MAY 2000

TRANSMISSION SYSTEM VEGETATION MANAGEMENT PROGRAM

Final Environmental Impact Statement
DOE/EIS-0285

Arrow-leaf Balsamroot

Cooperating Agencies

Bonneville Power Administration Transmission System Vegetation Management Program Final Environmental Impact Statement (DOE/EIS-0285)

Responsible Agency: Bonneville Power Administration (Bonneville), U.S. Department of Energy

Cooperating Agencies: U.S. Forest Service (FS), U.S. Department of Agriculture; Bureau of Land Management (BLM), U.S. Department of Interior

Title of Proposed Action: Transmission System Vegetation Management Program

States Involved: California, Idaho, Montana, Oregon, Utah, Washington, and Wyoming

Abstract: Bonneville is responsible for maintaining a network of 24,000 kilometers (km) or 15,000 miles (mi.) of electric transmission lines and 350 substations in a region of diverse vegetation. This vegetation can interfere with electric power flow, pose safety problems for us and the public, and interfere with our ability to maintain these facilities. We need to (1) keep vegetation away from our electric facilities; (2) increase our program efficiency and consistency; (3) review herbicide use (under increased public scrutiny); and (4) maximize the range of tools we can use while minimizing environmental impact (Integrated Vegetation Management). This FEIS establishes Planning Steps for managing vegetation for specific projects (to be tiered to this EIS). In addition to No Action (current practice), alternatives are presented for Rights-of-way, Electric Yards, and Non-electric Facilities (landscaping, work yards). Four vegetation control methods are analyzed: manual, mechanical, herbicide, and biological. Also evaluated are 23 herbicide active ingredients and 4 herbicide application techniques (spot, localized, broadcast, and aerial). For rights-of-way, we consider three sets of alternatives: alternative management approaches (time-driven or establishing low-growing plant communities); alternative method packages; and, if herbicides are in a methods package, alternative vegetation selections (noxious weeds, deciduous, or any vegetation). For electric yards, one herbicide-use alternative is considered. For non-electric facilities, two method package alternatives are considered. For rights-of-way, the environmentally preferred alternative(s) would use manual, mechanical, and biological control methods, as well as spot and localized herbicide applications for noxious and deciduous plant species; the BPA-preferred alternative(s) would add broadcast and aerial herbicide applications, and would use herbicides on any vegetation. Both would favor a management approach that fosters low-growing plant communities. **For additional information:**

Stacy Mason
Bonneville Administration
P.O. Box 3621-KECP
Portland OR 97208-3621
(503) 230-5455
slmason@bpa.gov

To receive additional copies of the FEIS or of the Summary, call BPA's document request line at 1-800-622-4520. You may access the EIS on our web site at http://www.efw.bpa.gov

For information on Department of Energy National Environmental Policy Act (NEPA) activities, please contact:

Carol Borgstrom, Director, Office of NEPA Policy and Assistance, EH-42, U.S. Department of Energy, 1000 Independence Avenue SW, Washington D.C. 20585, 1-800-472-2756; or visit the DOE NEPA Web at www.eh.doe.gov/nepa

TABLE OF CONTENTS

SUMMARY

CHAPTER I PURPOSE AND NEED 1

PURPOSE AND NEED FOR A PROGRAM 1
REASONS FOR THIS EIS 3
DECISIONS TO BE MADE 8
PUBLIC INVOLVEMENT: SCOPING 9
COOPERATING AGENCIES 10
MANAGING VEGETATION AT BONNEVILLE FACILITIES 10
RELATED PROJECTS AND PLANNING ACTIVITIES 19
HOW THIS FEIS IS ORGANIZED 21

CHAPTER II THE METHODS 23

METHODS OVERVIEW 23
MANUAL CONTROL METHODS 24
MECHANICAL CONTROL METHODS 28
BIOLOGICAL CONTROL METHODS 31
HERBICIDE CONTROL METHODS: ACTIVE INGREDIENTS 35
HERBICIDE CONTROL METHODS: APPLICATION 38
DEBRIS DISPOSAL 44
RESEEDING AND REPLANTING 46
APPROVING NEW TECHNIQUES FOR USE 47
METHODS ELIMINATED FROM CONSIDERATION 49
INFORMATION, EDUCATION, AND PREVENTION 50

CHAPTER III SITE-SPECIFIC PLANNING STEPS 51

PLANNING STEPS OVERVIEW 51
1. IDENTIFY FACILITY AND THE VEGETATION MANAGEMENT NEED. 52
2. IDENTIFY SURROUNDING LAND USE AND LANDOWNERS/ MANAGERS. 56
3. IDENTIFY NATURAL RESOURCES. 62
4. DETERMINE VEGETATION CONTROL METHODS. 71
5. DETERMINE DEBRIS DISPOSAL AND REVEGETATION METHODS, IF NECESSARY 82
6. DETERMINE MONITORING NEEDS. 84
7. PREPARE APPROPRIATE ENVIRONMENTAL DOCUMENTATION. 85

OTHER PERMITS AND REQUIREMENTS THAT DO NOT PERTAIN TO THIS PROJECT 86

CHAPTER IV PROGRAM ALTERNATIVES 87

ALTERNATIVES OVERVIEW 87
RIGHT-OF-WAY MANAGEMENT APPROACH ALTERNATIVES 91
RIGHT-OF-WAY METHODS PACKAGE ALTERNATIVES 97
VEGETATION SELECTION ALTERNATIVES 113
ELECTRIC YARD PROGRAM ALTERNATIVE 116
NON-ELECTRIC PROGRAM ALTERNATIVES 117

CHAPTER V AFFECTED ENVIRONMENT 121

SETTING 121
VEGETATION 122
SOILS 126
WATER 127
FISH AND OTHER AQUATIC SPECIES 130
WILDLIFE 132
LAND USE 137
LAND OWNERSHIP/MANAGEMENT 140
CULTURAL AND HISTORICAL RESOURCES 146
PUBLIC HEALTH AND SAFETY 147
VISUAL RESOURCES 148
AIR QUALITY 149
SOCIOECONOMICS 150

CHAPTER VI ENVIRONMENTAL CONSEQUENCES 153

VEGETATION 153
WATER 163
SOILS 172
FISH AND OTHER AQUATIC SPECIES 176
WILDLIFE 180
AGRICULTURE 189
TIMBER PRODUCTION 191
RECREATION 192
RESIDENTIAL, COMMERCIAL, AND INDUSTRIAL 193
FS- AND BLM-MANAGED LANDS 195
OTHER FEDERAL LANDS 198
TRIBAL LANDS 199
CITY, COUNTY, AND STATE LANDS 200
CULTURAL AND HISTORICAL RESOURCES 200
WORKER HEALTH AND SAFETY 202
PUBLIC HEALTH AND SAFETY 206
VISUAL RESOURCES 211
AIR QUALITY 214
SOCIAL AND ECONOMIC RESOURCES 216
CONSEQUENCES OF RIGHT-OF-WAY MANAGEMENT APPROACH ALTERNATIVES 218
CONSEQUENCES OF RIGHT-OF-WAY METHODS PACKAGE ALTERNATIVES 220
CONSEQUENCES OF RIGHT-OF-WAY VEGETATION SELECTION ALTERNATIVES 228
CONSEQUENCES OF ELECTRIC-YARD ALTERNATIVES 229
CONSEQUENCES OF NON-ELECTRIC PROGRAM ALTERNATIVES 229
CUMULATIVE IMPACTS 230
EFFECTS OF SHORT-TERM USES OF THE ENVIRONMENT ON LONG-TERM PRODUCTIVITY 234
IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES 234
ADVERSE EFFECTS THAT CANNOT BE AVOIDED 234

CHAPTER VII PUBLIC COMMENTS AND RESPONSES 237

PUBLIC INVOLVEMENT DRAFT EIS COMMENT PERIOD 237

COMMENTS ON THE DEIS AND RESPONSES 239
COPIES OF ALL LETTERS, COMMENTS, AND EMAILS RECEIVED 329

LIST OF PREPARERS 363
AGENCIES, ORGANIZATIONS, AND INDIVIDUALS TO WHOM THE EIS IS SENT 367
REFERENCES 387
GLOSSARY AND ACRONYMS 417

INDEX

LIST OF FIGURES

Page/After Page

FIGURE I-1 BONNEVILLE SERVICE TERRITORY 2
FIGURE I-2 TIERING SITE-SPECIFIC ANALYSIS TO THE PROGRAM EIS 6
FIGURE I-3 HOW THIS EIS IS ORGANIZED 22
FIGURE IV-1 HOW THE RIGHT-OF-WAY ALTERNATIVES CAN BE COMBINED 90
FIGURE IV-2 STAGES TO A LOW-GROWING PLANT COMMUNITY 94
FIGURE IV-3 MIX OF METHODS UNDER ALTERNATIVE R1 99
FIGURE IV-4 MIX OF METHODS UNDER ALTERNATIVE R2 102
FIGURE IV-5 MIX OF METHODS UNDER ALTERNATIVE R3 105
FIGURE IV-6 MIX OF METHODS UNDER ALTERNATIVE R4 108
FIGURE V-1 BONNEVILLE REGIONS ..... AP 122
FIGURE V-2 PACIFIC NORTHWEST GEOGRAPHY ..... AP 122
FIGURE V-3 VEGETATION TYPE ..... AP 122
FIGURE V-4 THREATENED AND ENDANGERED SPECIES ..... AP 126
FIGURE V-5 LAND OWNERSHIP ..... AP 140
FIGURE V-6 LAND OWNERSHIP BY PERCENTAGE ALONG ROW CORRIDORS 141
FIGURE V-7 BLM- AND FS-MANAGED LANDS ..... AP 142
FIGURE V-8 LAND OWNERSHIP BY PERCENTAGE AROUND SUBSTATION PROPERTY 144
FIGURE V-9 LAND OWNERSHIP BY PERCENTAGE AROUND RADIO/MICROWAVE STATIONS 146
FIGURE VI-1 RESPROUTING CONSEQUENCES OF CUTTING WITHOUT HERBICIDE FOLLOW-UP 157

LIST OF TABLES

TABLE II-1 CONTROL METHODS APPROPRIATE TO THE FACILITY 27
TABLE II-2 METHODS APPROPRIATE BY RIGHT-OF-WAY VEGETATION TYPES 30

TABLE II-3 IMPACTS SPECIFIC TO THE METHODS 33
TABLE II-4 BONNEVILLE PROPOSED LIST OF APPROVED HERBICIDES FOR USE..... 37
TABLE II-5 COST COMPARISON OF METHODS 44
TABLE II-6 COST COMPARISON OF DEBRIS DISPOSAL 46
TABLE III-1 BUFFER WIDTHS TO MINIMIZE IMPACTS ON NON-TARGET RESOURCES..... 64
TABLE III-2 HERBICIDE-FREE ZONES FOR RIGHTS-OF-WAYS, SUBSTATIONS, ELECTRIC YARDS, AND NON-ELECTRIC FACILITIES..... 65
TABLE III-3 ADDITIONAL HERBICIDE-FREE ZONES FOR SUBSTATIONS, ELECTRIC YARDS, AND NON-ELECTRIC FACILITIES..... 65
TABLE III-4 MECHANICAL BUFFER ZONES..... 66
TABLE III-5 GENERAL CLIMATE RESTRICTIONS FOR HERBICIDE APPLICATIONS 75
TABLE IV-1 COMPARISON OF THE ROW MANAGEMENT APPROACH ALTERNATIVES..... 96
TABLE IV-2 COMPARISON OF THE METHODS PACKAGE ALTERNATIVES 111
TABLE IV-3 VEGETATION SELECTION FOR HERBICIDE TREATMENT ALTERNATIVES.....115
TABLE IV-4 COMPARISON OF NON-ELECTRIC PROGRAM ALTERNATIVES 119
TABLE V-1 FOREST TYPES BY REGIONAL DISTRIBUTION AND TYPICAL DOMINANTS 124
TABLE V-2 CURRENTLY LISTED THREATENED AND ENDANGERED PLANTS.....125
TABLE V-3 SOIL TYPES IN BONNEVILLE'S SERVICE TERRITORY 126
TABLE V-4 CURRENTLY LISTED THREATENED AND ENDANGERED FISH.....131
TABLE V-5 CURRENTLY LISTED THREATENED AND ENDANGERED AQUATIC INVERTEBRATES.....131
TABLE V-6 CURRENTLY LISTED THREATENED AND ENDANGERED MAMMALS 135
TABLE V-7 CURRENTLY LISTED THREATENED AND ENDANGERED BIRDS AND INSECTS 135
TABLE V-8 FS NATIONAL FORESTS WITH BONNEVILLE TRANSMISSION FACILITIES 142
TABLE V-9 BLM DISTRICTS WITH BONNEVILLE TRANSMISSION FACILITIES.....143
TABLE VI-1 RUNOFF AND LEACH POTENTIAL 165
TABLE VI-2 BUFFER WIDTHS TO MINIMIZE IMPACTS ON NON-TARGET RESOURCES 170
TABLE VI-3 HERBICIDE-FREE ZONES FOR RIGHTS-OF-WAY, SUBSTATIONS, ELECTRIC YARDS, AND NON-ELECTRIC FACILITIES 171
TABLE VI-4 ADDITIONAL HERBICIDE-FREE ZONES FOR SUBSTATIONS, ELECTRIC YARDS, AND NON-ELECTRIC FACILITIES 171
TABLE VI-5 HERBICIDE TOXIC RATINGS FOR AQUATIC SPECIES 178
TABLE VI-6 HERBICIDE TOXIC RATINGS FOR MAMMALS AND BIRDS.....184
TABLE VI-7 HERBICIDE ECOLOGICAL TOXICITIES AND CHARACTERISTICS.....185
TABLE VI-8 ADJUVANT ECOLOGICAL TOXICITIES AND CHARACTERISTICS 186

TABLE VI-9 HUMAN HEALTH TOXICOLOGY ASSESSMENT.....209
TABLE VI-10 RELATIVE CUMULATIVE IMPACTS OF THE ALTERNATIVES 233

APPENDICES (SEE COMPANION VOLUME)

A PUBLIC INVOLVEMENT: PUBLICATIONS
B BIOLOGICAL WEED CONTROL AGENTS
C BPA HERBICIDE LICENSING PLAN
D SAMPLE EDUCATIONAL INFORMATION
E CLEARANCE CRITERIA
F FS MITIGATION MEASURES AND BACKGROUND
G BLM MITIGATION MEASURES AND BACKGROUND
H HERBICIDE FACT SHEETS

This page intentionally left blank.

Chapter I: Changes

In response to comments, we made these changes in Chapter I:

- Placed more emphasis on the need to control noxious weeds at our facilities, including our commitment to work with landowners and land managers in noxious weed control programs.
- Emphasized that the analysis for *site-specific* actions is not covered in this document, but would be "tiered" to it.
- Noted the role that other agencies' National Environmental Policy Act responsibilities play in site-specific analysis.
- Noted changes to the BPA-approved herbicide list (dropping those with higher persistence, migration, or toxicity).
- Added references to the list of related planning activities.

Some small changes were also made to make the document clearer and easier to read. For specific comments and responses, please see Chapter VII.

Chapter I
Purpose and Need

In this chapter:

- **Need**
- **Purposes**
- **Reasons for the EIS**
- **Decisions**
- **Public Involvement: Scoping**
- **Cooperating Agencies**

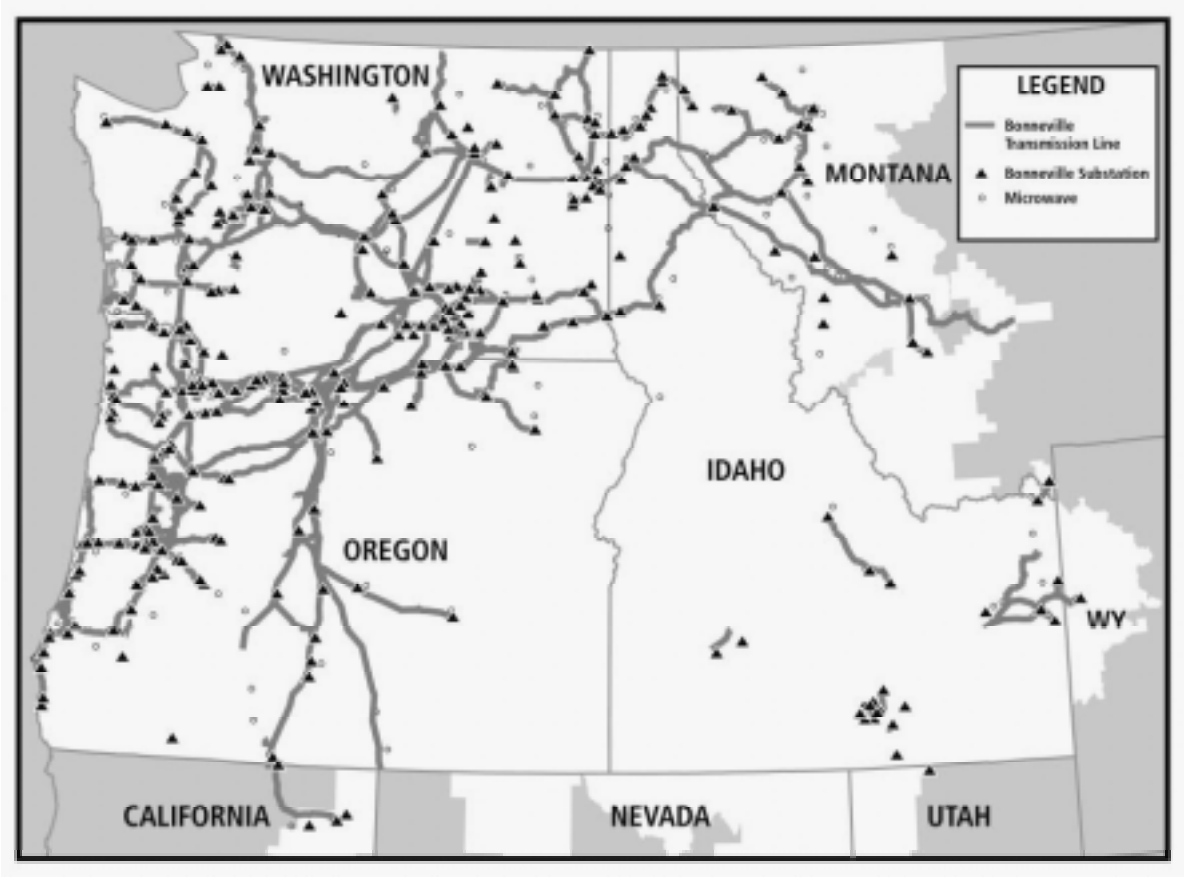
Purpose and Need for a Program

Need

Bonneville Power Administration (Bonneville) is responsible for maintaining a network of 24,000 kilometers (km) or 15,000 miles (mi.) of electric transmission lines and 350 substations. This electric transmission system operates in seven states of the Pacific Northwest. (See Figure I-1.)

The seven states offer a great diversity of vegetation. This vegetation can interfere with electric power flow, pose safety problems for us and neighboring members of the public, and interfere with our ability to maintain these facilities. **We need to keep vegetation a safe distance away from our electric power facilities and control noxious weeds at our facilities**. Bonneville's vegetation management program is the policy and direction for managing vegetation at specific sites.

Figure I-1: Bonneville Service Territory



Our electric power facilities include rights-of-way (transmission lines and access roads), electric yards, and non-electric facilities.[1] We must be able to get to these facilities to carry out routine and emergency maintenance activities, and we must make sure that nothing falls into or grows too close to our power lines (electricity could arc over and cause an outage of the line and/or a fire). We must also manage vegetation at our maintenance storage yards and administrative office complexes. (For more details, please see **Managing Vegetation at Bonneville Facilities**, later in this chapter.)

Bonneville is a major provider of electricity throughout the Pacific Northwest. Our transmission system makes up three-quarters of the Pacific Northwest's high-voltage transmission grid. Because the electric power transmission systems throughout the area are interconnected, our system can greatly affect transmission flow in the rest of the western United States.

---

[1] Please see the Glossary for useful definitions.

For example, on August 10, 1996, a major power outage occurred. The outage was caused by a number of factors, including abnormally high temperatures that cause transmission lines to stretch and sag near trees. When a transmission line sags too close to (not even touching) the tree, an electrical arc can occur, taking the line out of service. The August 10th outage affected parts of Canada and ten Western states, including New Mexico and Texas. Over 7-1/2 million customers (residents and businesses) lost power for a period of from several minutes up to nine hours.

We need to make sure that vegetation does not contribute to such an outage in the future.

In accordance with the Federal Columbia River Transmission System Act of 1974, " . . . the Administrator shall operate and maintain the Federal transmission system . . . (to) maintain the electrical stability and electrical reliability of the Federal (transmission) system . . . ." [Section 838b]

In order to ensure safe and reliable power, Bonneville must control the vegetation on land around the electrical facilities that make up the Federal transmission system.

Purposes

While managing vegetation around our facilities, we also have other **purposes** or objectives. Our vegetation management program needs to balance these purposes, while meeting the mission to ensure the transmission of safe and reliable power. These purposes are to

- minimize adverse environmental impacts,
- achieve cost and administrative efficiency, and
- comply with laws and regulations.

Bonneville will use these to help determine which alternatives will be chosen for our Transmission System Vegetation Management Program.

Reasons for This EIS

Preparation of this document is intended to fulfill the requirements of the National Environmental Policy Act (NEPA) for the decisions Bonneville is making through this EIS process. In 1983 we prepared an environmental impact statement (EIS) on our vegetation management program. As part of our compliance with NEPA, the EIS

analyzed the possible methods used to manage vegetation and their potential environmental impacts. The program and methods we selected have formed the basis for our vegetation management ever since.

Since that time, some important things have occurred:

- We need to increase our program efficiency and consistency.
- Herbicide use is under increased public scrutiny.
- There is more emphasis on using Integrated Vegetation Management approaches.[2]

This EIS proposes various program alternatives that respond to these factors.

Efficiency and Consistency

At present, Bonneville looks at all vegetation management choices and environmental impacts each time we undertake an individual (site-specific) project. This approach is inefficient: we must readdress many common issues over and over. This reiteration does not foster consistency across projects or jurisdictions, or over time.

To increase efficiency and consistency, this 2000 final EIS (FEIS) establishes Planning Steps and mitigation measures (**Chapter III**) to provide a *framework* to address potential site-specific environmental impacts and issues. The FEIS also explores, identifies, and discloses many of the commonly occurring environmental issues or impacts expected from vegetation management.

The site-specific environmental analysis would "tier" to this EIS by (1) using the Planning Steps to ensure consideration of all potential issues, (2) consulting with the EIS to determine whether impacts had been previously considered, and (3) applying the appropriate analysis established mitigation measures. Site-specific analysis would begin (and often end) in the form of a *Supplement Analysis*. Additional broad environmental would be required if anticipated impacts, project components, knowledge, or circumstances were to differ substantially from those evaluated in this EIS. (In areas where other Federal agencies have decisions regarding the proposed project, environmental

[2] More information on Integrated Vegetation Management (IVM) is provided on pages 5 - 7.

analysis would also be prepared in accordance with those agencies' policies and procedures for implementing NEPA.) See Figure I-2, next page.

Herbicide Use

Scrutiny of chemicals used to control insects or vegetation has increased through the years. In 1984, the U.S. Forest Service (FS; U.S. Department of Agriculture) and the Bureau of Land Management (BLM; U.S. Department of Interior) stopped using herbicides to control vegetation on their lands in Oregon and Washington, in response to an injunction against herbicide use. Bonneville accordingly stopped using herbicides to control vegetation on those lands, and drastically lessened herbicide use on rights-of-way across private lands. However, we have found that, without at least some herbicide use, it has been very difficult to keep up with the growth of deciduous trees, which resprout and grow quickly, multiplying maintenance work.

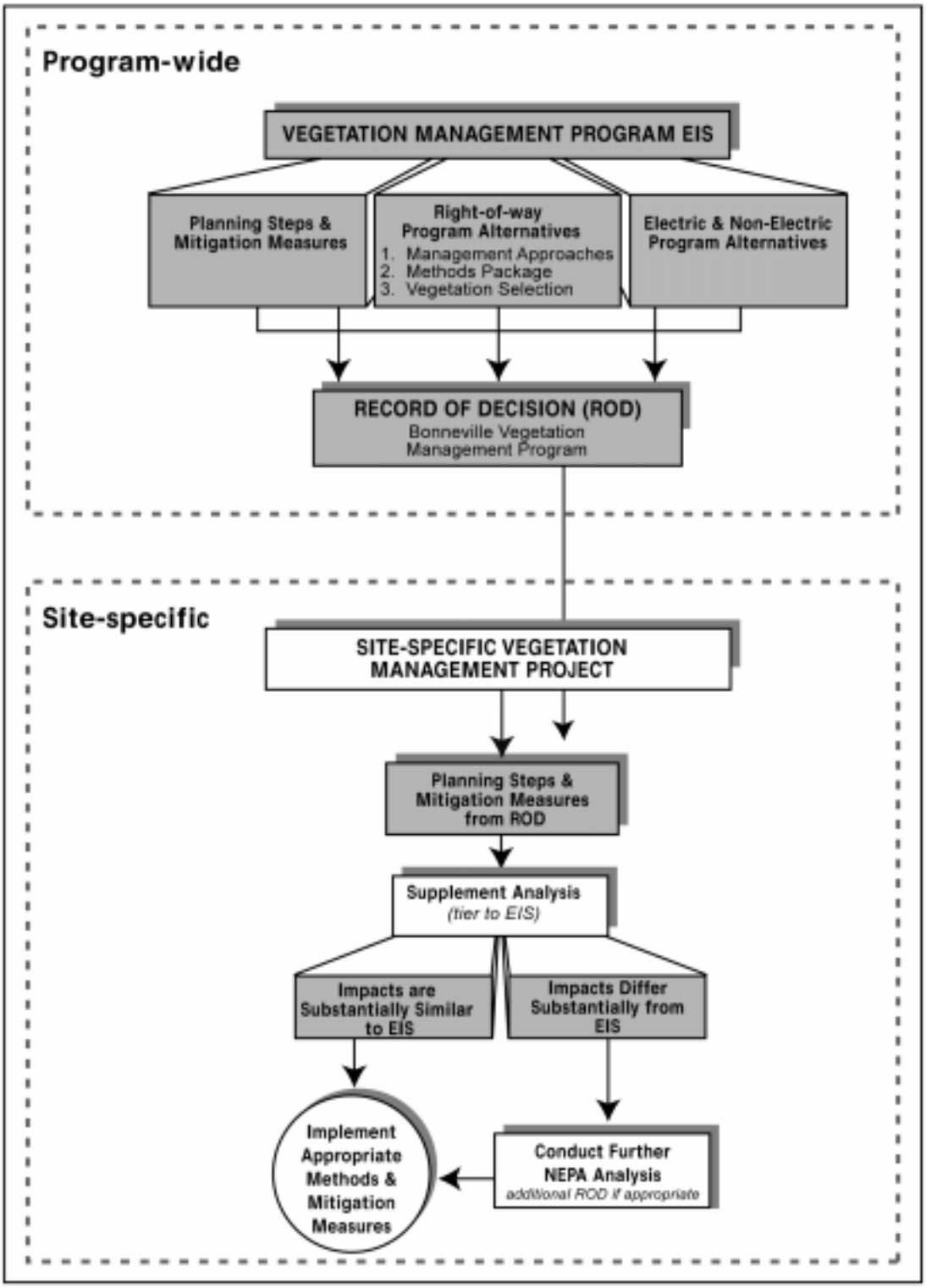
This FEIS describes the advantages and disadvantages of herbicide use. The alternatives were designed to help determine whether to use herbicides and, if so, to what extent.

Integrated Vegetation Management (IVM)

Integrated Vegetation Management (IVM) is a strategy to cost effectively control vegetation with the most benign overall long-term effect on public health and safety and the environment (ecosystem). IVM tries to optimize favorable effects, while minimizing potential negative effects.

The utility industry has had continuing success in applying an IVM strategy for managing rights-of-way vegetation (Bramble and Byrnes, 1983; McLoughlin, 1997). IVM controls unwanted vegetation by considering the use of all suitable control methods within the context of the whole ecosystem. Methods are chosen, based on the vegetation needing control and the environmental conditions present. The study and development of new vegetation management techniques, as well as the analysis and incorporation of newly developed and approved herbicides, is also a major focus of IVM.

Figure I-2: Tiering Site-specific Analysis to the Program EIS



All of our right-of-way alternatives will use the overall IVM concept: we will use an array of control methods, choosing those methods or combination(s) of methods based on the vegetation needing control, cost-effectiveness, and the environmental conditions present.

IVM was developed by the utility industry from the strategy of Integrated Pest Management (IPM). IPM is the strategy for using timing and a combination of methods to control insects, diseases, and weeds that affect crops or plants. Because the "pests" for rights-of-way are strictly vegetation, not insects or diseases, the name of the strategy was changed to Integrated Vegetation Management (IVM) for utilities.

" . . . [IPM] is a sustainable approach to managing pests by combining biological, cultural, physical, and chemical tools in a way that minimizes economic, health, and environmental risks. . . . Federal agencies shall use [IPM] techniques in carrying out pest management activities and shall promote [IPM] through procurement and regulatory policies, and other activities."

— The Food Quality Protection Act of 1996, Sec. 303 Integrated Pest Management

The ultimate goal for IVM right-of-way management is to convert the right-of-way to low-growing plant communities that keep tall-growing vegetation out. As discussed in the Alternatives chapter (**IV**), studies have shown that low-growing plants can often "out-compete" trees and tall-growing brush for sunlight and nutrients. This approach can allow utilities to manage tall-growing vegetation with the least possible amount of control. This in turn reduces the amount of herbicides used, and incorporates a variety of analytical tools used to help select the least toxic chemicals.

IVM at work: As a result of this environmental impact statement, BPA rigorously examined the toxicological data associated with the initially proposed herbicide active ingredients and proposed guidance for use based on herbicide characteristics. Because of potential problems such as chemical persistence, migration into ground- or surface water, high aquatic toxicities, etc., BPA has decided to revise the guidance and discontinue and/or prohibit the use of the following herbicides: atrazine, benefin, monuron, pendimethalin, prometone, simazine, and trifluralin.

Some of the Right-of-way Program alternatives are more supportive of the IVM strategy than others. The management approach alternative—

MA2: Promoting Low-growing Plant Communities—uses the IVM concept to the maximum, by managing vegetation so that low-growing plant communities can develop as much as possible.

Decisions to Be Made

Several decisions will be made through this FEIS document and process. Those decisions are framed by considering alternative ways of managing vegetation.

Bonneville has decided to undertake planning through a series of Planning Steps (see **Chapter III**) for site-specific projects, rather than continue under the project-by-project approach we follow now.

Given the umbrella of the Planning Step approach, the decisions to be made are as follows:

Rights-of-way

1. **Management Approach** - Which management approach should Bonneville adopt for maintaining rights-of-way (Alternatives MA1, MA2)?
2. **Methods Package** - What methods should Bonneville have available for use for managing right-of-way vegetation (Alternatives R1, R2, R3, R4)?
3. **Herbicide Vegetation Selection** - If Bonneville decides to use herbicide methods, on what kinds of vegetation should they be applied (Alternatives VS1, VS2, VS3)?

Electric Yards

4. **Current Practice** - Should we continue to manage electric yard vegetation as we do currently (Alternative E1)?

Non-electric Facilities

5. **Methods** - What methods should Bonneville use for managing non-electric facility vegetation (Alternatives NE1, NE2)?

Decisions will be based on the findings contained in this FEIS (based on how each choice meets our need and purposes) and the consideration of public comments and recommendations. The Bonneville Administrator will decide which alternatives to adopt.

The decision, the reasons behind it, and the conditions for it will be presented in a document called the *Record of Decision (ROD).*

Public Involvement: Scoping

Early in a project cycle, Bonneville contacts people who may be interested in or affected by the project, to learn what issues should be studied in the EIS. Because those issues help define the scope of the EIS, this process is called "scoping."

In "scoping" this EIS, we contacted people throughout the Northwest, including Federal and state land management agencies; state and local governments; and Indian Tribes and special interest groups like the Sierra Club. Comments were sought and received in several ways.

- Published Notice of Intent to prepare an EIS, June 1997;
- Mailed letter, fact sheet (*fyi*), and comment form to about 1,500 people, June 1997;
- Held scoping meeting in Portland, July 10, 1997;
- Conducted one-on-one meetings, June-August, 1997;
- Researched public comments from earlier, similar Bonneville projects.

In all, we received about 650 comments. The focus was on what vegetation management methods to consider, what resources need to be protected, which vegetation is particularly troublesome to electric facilities, and how to coordinate with other public agencies when Bonneville facilities cross their lands. As expected, the comments were diverse and even contradictory. Here is a summary of the issues raised. (**Appendix A** offers more detail.)

- When selecting among methods, consider manual, mechanical, fire, herbicide, biological, grazing, selective cutting, herbicides, and the promoting of low-growing plant communities. (See **Chapters II and lV**.)
- When analyzing impacts, consider these resources: cultural resources, fish and wildlife, rare plants, aquatic communities, terrestrial communities, water quality, native plants and their ecological communities, wildlife habitat, hydrology, soil, soil microbes, historic and archeological resources, cultural/

traditional use plants, human and wildlife health, recreation, cost, visual resources, timber, fisheries, downstream resources and use, watersheds, and fuel management areas. (See **Chapter Vl**.)

- Other advice: Fit the technique to the resource; our area (Pacific Northwest) is diverse, so the techniques must be diverse. Be sensitive to the seasonal needs of wildlife (such as nesting, giving birth, and feeding). Be sensitive to the seasonal activities of humans (such as outdoor recreation, and farming). Limit pesticide use to the extent practical through implementation of IVM. Convey the values behind the alternatives. We know you need to consider cost, but balance cost with other needs such as resource protection. (See **Chapters III, IV, and VI**.)

Cooperating Agencies

The FS and BLM are Federal agencies that manage publicly owned lands to meet the diverse needs of people for resources such as timber, recreation, range, and minerals, and for environmental values such as wilderness and wildlife.

About 2,300 km (1,400 mi.) of Bonneville's transmission-line corridors and a number of Bonneville substations are located on lands managed by either the FS or BLM. Because we all have strong interests in how vegetation and land along these corridors is managed, these agencies are cooperating agencies with Bonneville in developing this vegetation management program EIS.

Their cooperation should help Bonneville to analyze or coordinate vegetation management work on BLM or FS land in an effective, efficient, consistent, and timely way.

Managing Vegetation at Bonneville Facilities

To operate our facilities safely, the vegetation around them must be controlled. Some facilities require only minimal control; others require that no vegetation at all be allowed. This section gives details

on our need, outlines the requirements for safe operation, and identifies our current vegetation management program.

Where

We manage vegetation in three main areas.

- **Rights-of-way** - We manage vegetation on our rights-of-way (along transmission lines—including trees just off the right-of-way, microwave beam paths, and access roads). Here is where our vegetation management program is most visible.
- **Electric yards** - We manage vegetation in our electric yards (substations, switching stations, and around line sectionalizing switches).
- **Non-electric facilities** - We manage vegetation around "non-electric" facilities (microwave sites, parking lots, and building landscaping).

How

We use four different methods—alone or in combinations—to manage vegetation:

- **Manual cutting** (for instance, cutting brush or tree limbs with chainsaws),
- **Mechanical cutting** (such as using tractors or large mowers to remove brush),
- **Biological agents** (insects or pathogens for noxious weed control only), and
- **Herbicides** and growth regulators (using chemicals that will check or regulate vegetation growth).

The next sections describe vegetation management requirements for each facility to ensure safe and reliable operation, and what we are doing now to meet those requirements.

Rights-of-way

Transmission Lines

Transmission-line rights-of-way make up the largest area of land where we manage vegetation. As noted earlier, we deliver electric power over a network of more than 24,000 km or 15,000 mi. of transmission lines. Each line is located on a right-of-way that varies in width from a few feet (ft.) for a pole line easement[3] up to 305 meters

[3] Pole line easements are generally used just for electric lines strung on wood poles. The easement is just for the land the pole is on, not for the strip of land under the line. These easements also include a general right to prevent obstructions to the transmission of electricity.

(m) or 1000 ft. for a corridor where several transmission lines are built side-by-side. The Bonneville system contains about 93,078 hectares (ha) or 230,000 acres (ac.) of rights-of-way.

Requirements. When transmission lines are built, we clear the corridors of brush and trees in order to build the line safely. We then manage the corridors over time to limit tall-growing vegetation.

As required by law, we use the National Electrical Safety Code (NESC, 1997) as the basis for tree clearing: it defines the minimum safe distances between objects or workers and energized lines. There are two NESC requirements: vegetation must not interfere with workers maintaining, upgrading, or repairing the line; and vegetation must not create a safety hazard.

If vegetation is too close to a line, electricity can "arc over" and can create a fire or injure or kill anyone nearby. This can also happen when a line heats up on a hot day or when it is carrying a high power load and, as a result, stretches and sags closer to the vegetation below. The NESC requires us to remove any trees or other vegetation that is a hazard to the power system or that *could* become a hazard to the system.

We also need to work with the landowners or land managers on noxious weed control where those owners/managers have active weed control programs, or where it has been documented that Bonneville has caused or aggravated a noxious weed infestation.

Past Practices. Beginning in 1937, when Bonneville was created by Congress, and for the next 30 years, our vegetation maintenance program reflected the clearing we did to build new lines. This clearing was called "clean and green": all trees (and just about everything else) were cut in a straight swath to create the right-of-way. The edges of that swath are called the "backline." Any trees that later grew in this right-of-way swath were cut when maintenance personnel could no longer see over them.

Original clearing for Vancouver-Eugene transmission line

Beginning in the late 1960s/early 1970s, we were more selective in what we cut for construction. We created curved backlines by using the natural curves of the land (topography), the differing tree heights, and the swing of the line (conductor) back and forth in the wind. (This swing area helps determine how far trees can be from the line.) The curved backlines produced a "scalloped" right-of-way. Bonneville also "feathered" the rights-of-way by leaving some trees in the right-of-way. Individual, hand-marked "save trees" were left in the right-of-way. These trees were relatively short and did not pose a near-term threat to the transmission line. In general, trees in the rights-of-way may not grow over 3 m (10 ft.) tall, unless they are in a deep canyon so they could not possibly grow into the line.

Using these techniques meant that the rights-of-way no longer had the harsh straight-line look. However, the trees then grew too close to the conductors. We often found that we had to come back more often to reclear the right-of-way or start our first regular maintenance clearing earlier than planned.

Up until the mid-1980s, Bonneville (and the FS and BLM) used herbicides, including some aerial and high-volume spraying, as well as manual cutting to control vegetation on rights-of-way. We used only those herbicides approved by the Environmental Protection Agency (EPA). However, as noted earlier, in 1984 an injunction against herbicide use halted FS and BLM use of herbicides on their lands in Washington and Oregon, including herbicide use by Bonneville on those lands. Bonneville also voluntarily cut back on our use of herbicides on other rights-of-way, including our infrequent use of aerial spraying to control noxious weeds. Instead, we hand-cut most vegetation during maintenance cycles, and used very limited amounts of herbicides to keep stumps from re-sprouting or to control weeds. As a result, however, the effectiveness of our vegetation program declined to a point that the safety and reliability of the power grid were

threatened. Even with increased funding, we were unable to keep up with the growth of vegetation along many of our rights-of-way.

Current Practice. On our rights-of-way now, Bonneville currently balances the use of all four vegetation control methods: manual cutting, mechanical cutting, herbicide controls, and biological agents (for noxious weeds).[4] We are also working to inform and educate the public on our need to keep vegetation away from our facilities.

When we build a new line, we still design backlines that take into consideration the lay of the land, tree heights, tree growth, and conductor swing and sag. When necessary, we scallop and/or feather the right-of-way, depending on the trees on the site, the design and type of the transmission line, and the visual sensitivity of the area. We scallop and feather less than in the past because of the difficulty in maintaining those rights-of-way.

In special circumstances, we still leave shorter "save trees," but only when they are *not* under the conductors of the transmission line.

Once a line is in place, we routinely patrol the rights-of-way to monitor tree and shrub growth along the powerlines and access roads. We schedule maintenance *before* vegetation grows inside the minimum safe distance for an electrically unqualified worker to cut next to or under the energized line—as required by the Occupational Safety and Health Administration (OSHA). We control vegetation on the rights-of-way to achieve a maintenance-free period, which tends to be 2 - 8 years on the West side of the Cascades, and 10 - 15 years on the East side of the Cascades.

We also selectively remove "danger trees"—trees that could potentially grow, fall, or bend into the lines—from the area *next to* the right-of-way. We select them for removal based on the overall condition of the tree: the stability of the ground around the tree, the tree species, and any other defect that might cause the tree to be "unstable" and likely to fall into the transmission line. If a tree is healthy and stable, it is usually not designated for removal, even if it is tall enough to fall into the transmission line. Sometimes we trim the

[4] Biological agents are sometimes used to control noxious weeds. For example, working with the Oregon Department of Agriculture, Bonneville has used helicopters to drop spider mites over gorse-infested areas. These insects feed on gorse and may be able to keep these noxious weeds from forming impenetrable thickets under power lines.

limbs of trees next to the right-of-way so those branches will not grow into the conductors.

The rights-of-way are maintained using mostly manual cutting—by chainsaws—and occasionally mechanical cutting. We also spray herbicides on smaller trees or do follow-up herbicide treatments on stumps. Noxious weed control is usually done in conjunction with other agencies, using either herbicides or biological agents.

Access Roads

We have over 13,680 km (8500 mi.) of access road to maintain. Maintenance crews use access roads to get to the transmission-line towers, substations, and other facilities.

Requirements. Access roads have to be sufficiently free of vegetation so that our crews and their necessary machinery and vehicles can safely and efficiently travel over them to the electric facility for emergency and routine maintenance work.

Access roads—no woody-stem vegetation is allowed to grow.

Current Practice. Access roads that we maintain are generally unimproved dirt or gravel roads. We keep them clear of trees and brushy vegetation, using manual cutting tools, machines on wheels or tracks, and herbicide sprayed with backpack sprayers and truck-mounted booms. Some roads are public, some are private. Some are maintained by Bonneville, some by the underlying landowner. Some

are open to public use, while others are available for use only by Bonneville and the underlying landowners.

Microwave Beam Paths

Microwave stations are used to send information quickly from point to point to help us control and regulate the flow of power across the system. Microwave stations are generally located on a series of hilltops or mountain peaks.

Requirements. Sending these signals requires that nothing obstruct the beam's path or line-of-sight.

Current Practice. Maintenance crews cut trees with chainsaws when they are found to be growing into the beam path.

Electric Yards

Substations

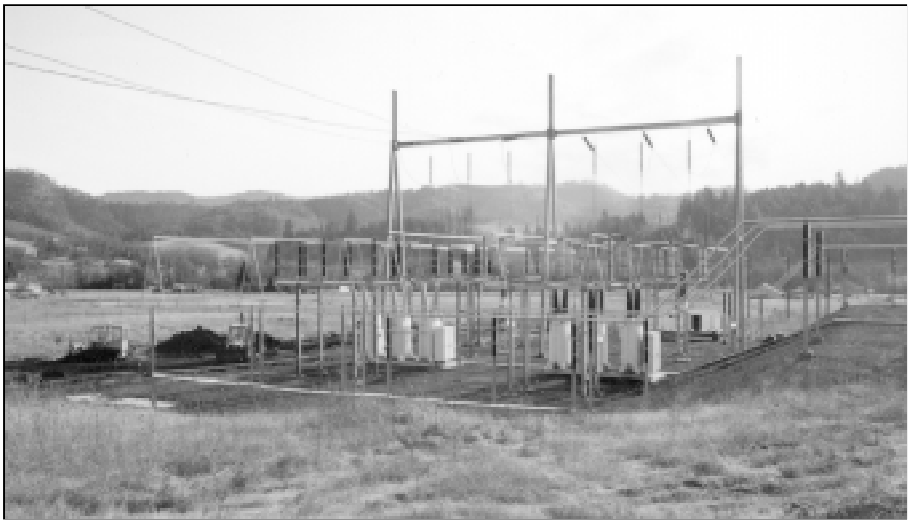
Bonneville owns and operates more than 350 substations or electric yards throughout our service area. Substations are facilities that connect transmission lines, direct electricity, and convert voltage as needed to meet customer requirements. Many of our customers supply power to businesses and residents through a distribution system. To meet our customer requirements, we need to convert or "step-down" the voltage that travels over our transmission lines to a level appropriate for their distribution system.

For safety reasons, a fence surrounds substations. Inside the fence, the land is graveled and graded flat. The fenced area can range from less than 0.2 ha (0.5 ac.) up to about 16 ha (40 ac.), depending on the size of the substation. Altogether, we have about 930 ha (2300 ac.) of substation yards.

Outside the substation fence, there is typically a 3-m (10-ft.) buffer of rock/gravel. Beyond that buffer, the substation property may range in size from less than an acre to over 283 ha (700 ac.). That property may be forest, field, or landscaped shrubs.

Requirements. Vegetation is not allowed to grow in electric yards or in the 3-m (10-ft.) buffer around the yard because it could interfere with the operation of the ground mat. A ground mat is a metal grid buried under the soil to "ground" the electrical equipment of the substation. A plant growing up through the ground mat could provide another grounding path for electricity. If a person were to touch the

plant during a fault in or near the substation, he or she could be electrocuted.



Substations and electric yards—no vegetation is allowed to grow inside the area, so that electrical "grounding" of equipment and the safety of workers are maintained.

Current Practice. Currently, we control vegetation inside a substation fence and in the 3-m (10-ft.) buffer zone beyond, using herbicides and, occasionally, steamers or burners. In addition, trees or other vegetation that could fall across the fence and into the substation are manually cut.

Line Sectionalizing Switches

Line sectionalizing switches are located on transmission towers that redirect electricity on the right-of-way. Generally there is a metal grated platform on the tower where a worker stands to operate the switching equipment.

Requirements. Just as in a substation (and for the same reasons), the area below the sectionalizing switch platform needs to be kept completely clear of vegetation. The function of the ground mat in the substation is identical to that of the platform on the tower. If a plant grows up through or near the platform, it can create a difference in the electric potential. If there is a fault in the area, and a worker touches or comes close to that plant while on the platform, the worker could be injured or killed.

Current Practice. Current practice is to remove all vegetation by herbicides, usually with a backpack sprayer or hand-applied granular method.

Non-electric Facilities

Radio/Microwave Stations

Bonneville operates about 381 microwave or radio stations with antennae or repeaters; about 146 of these stations are co-located at Bonneville substations. Together, they form the backbone of our communication system, carrying information from substation to substation for the protection and control of the Bonneville transmission system as well as for voice communication for Bonneville's radios and telephones.

These fenced stations are typically located at prominent points in the landscape, on hilltops or mountaintops.

Requirements. In order to access the towers and buildings easily, the area within the station fence is graveled and kept clear of most vegetation.

Current Practice. We use herbicide to keep the fenced area clear.

Landscaping Maintenance Buildings and Yards

Landscaping is in place outside many of our substation yards and buffers, as well as at many of our maintenance buildings and other "yard" facilities. Depending on their function, these maintenance facilities vary in size from 0.8 – 8 ha (2 – 20 ac.). Typically, most of the land has been developed with buildings, landscaping, and pavement with few or no natural features.

Landscape vegetation outside St. Johns substation in Oregon.

Requirements. Vegetation is managed in these areas for aesthetics, ease of handling equipment, maintenance of a firebreak, and prevention of the spread of noxious weeds.

Current Practice. We maintain landscaping by manual and mechanical cutting, as well as by spraying herbicide on turf, shrub beds, and gravel or dirt work yards and parking lots.

Related Projects and Planning Activities

The following Bonneville documents or projects are related to managing vegetation in the Bonneville transmission service area.

Bonneville Documents/ Projects

- **Transmission Facilities Vegetation Management Program Environmental Impact Statement (1983) -** This is our most recent program-wide vegetation management EIS. (USDOE/Bonneville, 1983)
- **Columbia Gorge Vegetation Management Project Environmental Assessment (July 1996)** (USDOE/Bonneville, 1996)
- **Bonneville-Hood River Vegetation Management Environmental Assessment** (USDOE/ Bonneville, 1998a).

The following FS and/or BLM documents or projects are related to managing vegetation in the Bonneville transmission service area.

Forest Service and Bureau of Land Management Documents/ Projects

- **Final Supplemental Environmental Impact Statement on Management of Habitat for Late-Successional and Old-Growth Forest Related Species within the Range of the Northern Spotted Owl (Northwest Forest Plan) (April 1994) -** This FS/BLM plan was developed to help find strategies to manage Federal forestlands west of the Cascade Range in Oregon and Washington. (USDA/FS and USDOI/BLM, 1994b)
- **Interior Columbia Basin Ecosystem Management Project Supplemental Draft Environmental Impact Statement (April 2000) -** This draft statement was developed by four Federal land management agencies to help select an ecosystem-based management strategy for the lands that the agencies administer east of the crest of the Cascade Range in Oregon and Washington. (USDA/FS and USDOI/BLM, 1997a)

- **Interior Columbia Basin Ecosystem Management Project Upper Columbia River Basin Draft Environmental Impact Statement (May 1997)** - This draft statement was developed by four Federal land management agencies to help select an ecosystem-based management strategy for the lands that the agencies administer in the upper Columbia River Basin. (USDA/FS and USDOI/BLM, 1997b)
- **Vegetation Treatment on BLM Lands in Thirteen Western States (May 1991)** - This BLM document analyzes the environmental impacts of vegetation treatment on BLM lands, using integrated pest management methods. (USDOI/BLM, Wyoming, 1991b)
- **A Guide to Conducting Vegetation Management Projects in the Pacific Northwest Region (1992)** - This FS document is the guide for implementing vegetation management on Forest Service land in Washington and Oregon. It summarizes information contained in the 1992 Amended ROD for Managing Competing & Unwanted Vegetation (FEIS) published in 1988 (USDA/FS Pacific Northwest Region, 1998b) and the Mediated Agreement from 1989. (USDA/FS, 1992a)
- **Western Oregon Program-Management of Competing Vegetation (August 1992)** - This document presents the provisions to govern the BLM's integrated management treatment program for undesirable plants and competitive levels of vegetation on public lands in western Oregon. (USDOI/BLM, 1992c)
- **Northwest Area Noxious Weed Control Program (December 1985)** - This BLM document covers a five-state program for the control of noxious weeds on BLM-administered lands. (USDOI/BLM, 1987a)
- **Forest Land and Resource Management Plans** - The plans provide for the allocation of National Forest System (NFS) lands and resources for a variety of management purposes. They include management direction, objectives, prescriptions, standards and guidelines, etc. that apply to each National Forest; they designate management areas within each Forest. Pursuant to the National Forest Management Act of 1976, all site-specific (or "project level") management activities must be consistent with the direction in each applicable land and resource management plan.

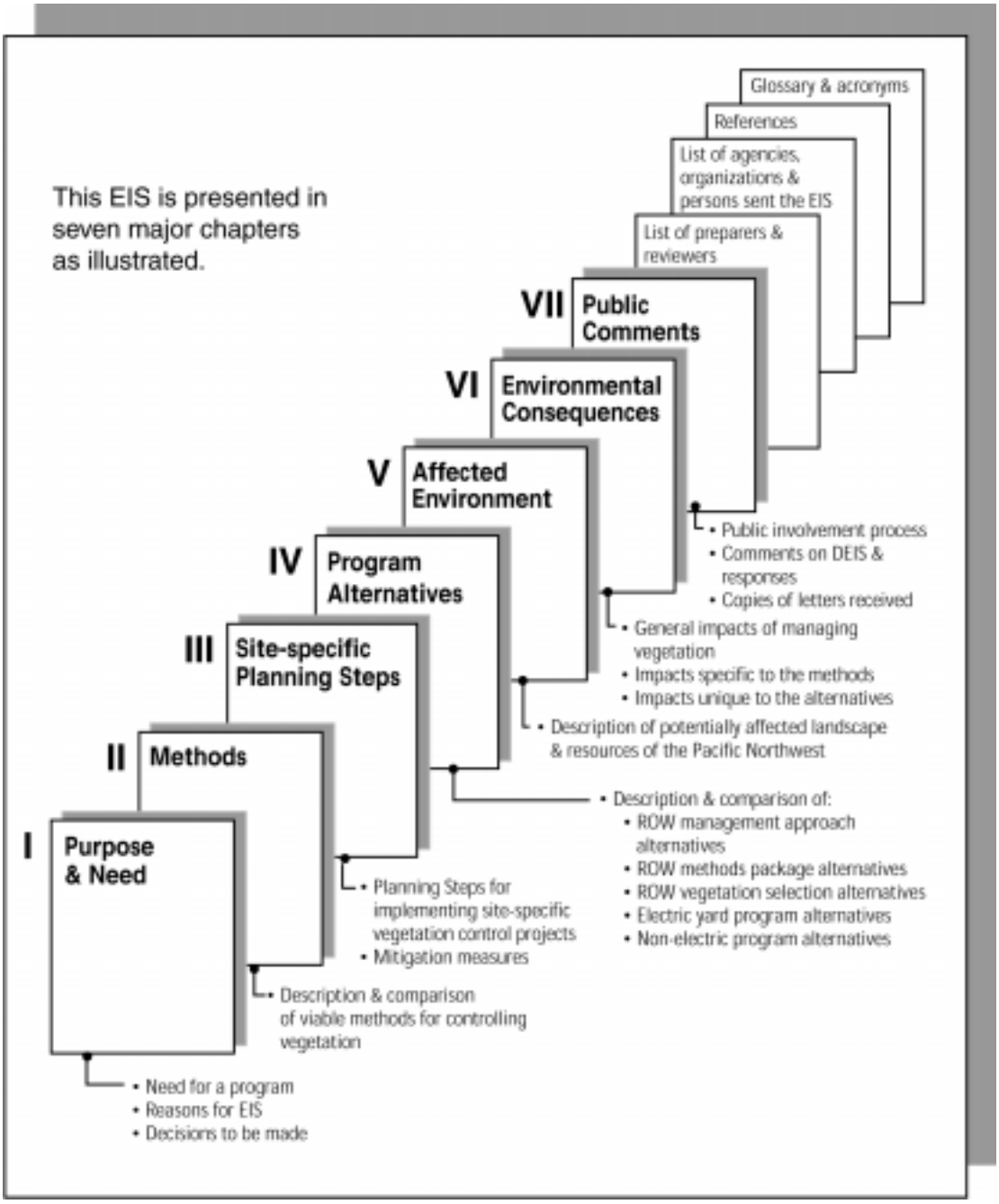
- **Other Forest Service Land or Resource Management Plans** - Management direction, prescriptions, and guidelines in other management plans, such as Wild and Scenic River Management Plans, may also apply in the consideration of vegetative treatment methods used in developing site specific vegetation management plans.

How This FEIS Is Organized

An EIS follows a guide[5] for what must be covered and (generally) in what order. Because this EIS covers so many different choices and alternatives (including different techniques), the figure on the next page shows what kind of information is provided, and where. Some people like to go straight to particular topics of interest; others like to read through chapter by chapter. In either case, Figure I-3 will help you find what you want to know.

[5] The National Environmental Policy Act (NEPA) specifies the need for environmental studies of major Federal actions that might affect the environment; the Regulations of the Council on Environmental Quality spell out the approach and content.

Figure I-3: How This FEIS Is Organized



ROW = Right-of-way

Chapter II: Changes

In response to comments, we made these changes in Chapter II:

- Noted changes to the list of proposed herbicides (two added; three dropped) that are to be found in our "tool-box"; and redesignated how many could be used in which places (rights-of-way and electric yards). Clarified that individual herbicide use would be determined on a site-specific and condition-specific basis (not all herbicides would be used in any one area). These changes are reflected in Table II-4 as well as in the text.
- Added more material relating to noxious weeds and their control; recognized that manual and mechanical methods can be a tool (with limited effectiveness) for noxious weed control in certain circumstances.
- Debris Disposal: Noted that cut trees can sometimes be left, on request, for landowners' use.
- Supplemented material regarding public involvement when Bonneville is considering adding a new techniques for vegetation management.

Some small changes were also made to make the document clearer and easier to read. For specific comments and responses, please see Chapter VII.

Chapter II
The Methods

In this chapter:

- **Vegetation Control Methods**
- **Debris Disposal, Replanting and Reseeding**
- **Approving New Techniques**
- **Methods Eliminated from Consideration**

Methods Overview

Bonneville is considering four[1] **general control methods** that can be used individually or in combination to control vegetation**:**

- manual cutting,
- mechanical cutting,
- biological control agents, and
- herbicides and growth regulators.

For herbicides, we are considering 23 **herbicide active ingredients** and 4 **herbicide application techniques:**

- spot,
- localized,
- broadcast, and
- aerial.

These methods and techniques, in various combinations, make up the alternative vegetation management programs discussed in **Chapter IV**. The information presented below is used to help compare those alternatives.

[1] Bonneville also conducts Public Information and Education to create an awareness of the need to keep vegetation away from electric facilities. Public Information and Education can also be considered a "control method." It is discussed at the end of this chapter.

To assist the reader, we provide three tables to show each of the types of methods in the context of where they might be used, and what their impacts would be. See page 27 for Table II-1 (Control Methods Appropriate to the Facility), page 30 for Table II-2 (Methods Appropriate by Right-of-Way Vegetation Types), and page 33 for Table II-3 (Impacts Specific to the Methods).

Manual Control Methods

Description

Vegetation can be managed by pulling or cutting with hand tools. Here is a list of manual techniques.

- **Pulling** – physically pulling vegetation from the soil.
- **Cutting** – using shears, clippers, chainsaws, brush saws, and axes to sever above ground vegetation (including topping and pruning).
- **Girdling** – cutting a ring around the trunk of the tree deep into the cambium layer, killing the tree but leaving it standing.
- **Steaming/Burning** – using a hand-held hot device that kills vegetation with steam or by burning (used in electric yards only).

Hand-pulling and hoeing are most appropriate for landscaping at non-electric facilities.

The most commonly used manual method in the right-of-way is **cutting** with chainsaws. This method is used particularly when cutting down larger trees within the right-of-way or danger trees next to the right-of-way.

Chainsaws are also used in the rare cases where we **top** or **prune** trees.

Topping is removing the top portion of a tree without felling the whole tree. On an evergreen, one-third or less of the top would be cut (if we cut any more off, the tree would be likely to die). Deciduous trees can often be cut back more severely without killing the tree. Topping can delay the tree's growing into transmission lines or microwave beam paths, but the tree will require frequent treatment to keep it from threatening the line. Severe topping can also be done purposely to kill the tree, leaving a snag for wildlife habitat.

Pruning is the removal of selected branches from tree trunks, without felling the whole tree.

Bonneville uses or allows topping and pruning, which are highly labor-intensive, only in special situations—for instance, where it is necessary to leave trees in place as visual screens or where other options are not available.

Girdling means manually cutting a ring around a selected tree trunk deep into the growth layer. Girdling kills conifer species; deciduous trees, however, will frequently resprout below the girdle unless the cut is treated with herbicide. If girdling kills the tree, it can be left standing as a snag to decompose and fall on its own. We rarely use this practice, but it may be appropriate where the snag would offer high-quality habitat for wildlife.

Bonneville has used **steamers** and **burners** as an experimental control method for vegetation within a few substations. The hand-held steamer uses steam to kill the vegetation it contacts. Burners are machines that resemble a large riding lawn mower that burns the vegetation. Very little smoke is produced because the vegetation must be dry to achieve the best results. (Burning is not used as a vegetation control method on Bonneville rights-of-way because of safety problems. Please see **Methods Eliminated from Consideration**.)

Advantages and Disadvantages

Manual techniques—mainly using a chainsaw—can be used in many circumstances, with relatively low environmental impacts. One or two trucks, carrying equipment and workers, drive along the access road to the appropriate site. Crews of 8 –10 people with chainsaws then hike along the right-of-way, cutting target vegetation.

Manual methods have limited use for noxious weed control (especially is used without follow-up herbicide treatments), but possibly could be used where only a few weeds have been established. Manual techniques can be highly selective, cutting only targeted vegetation. The short-term impact of chainsaw noise can disturb wildlife and neighbors.

Worker health and safety issues center on the safety impacts of hiking along the right-of-way, carrying and using chainsaws and other tools, and felling trees. Manual vegetation control is difficult to carry out in areas where the vegetation is dense, in remote locations, or in steep terrain. This method also creates lots of debris.

This method works only in the short term for deciduous trees, which often resprout. Resprouting trees grow back with more stems than the original cuts, creating more dense vegetation than existed *before* the manual cut. Successive cuttings significantly increase the amount and difficulty of labor needed to complete vegetation control.

Manual vegetation control can be used under many weather and site conditions. However, sometimes chainsaw use is not allowed during hot summer dry spells when fire potential is high and sparks are a concern. Due to the noise and potential disturbance, chainsaw use may also be restricted at certain times in areas with threatened and endangered species.

Please see Tables II–1 (following), and II-2 (page 30) for a list of methods and their appropriate use for various facilities and vegetation types. Please see Table II-3 (page 33) for the impacts specific to each method.

Cost

As with all methods, the cost of implementing manual vegetation control varies: the taller and more dense the vegetation, the costlier the control. Other factors contributing to cost variations include the remoteness of work locations and length of the work performance period.

Manual vegetation control costs from $70 to $700 per acre.

In the best of circumstances, the low-cost manual figure is *less* than the costs for mechanical methods or broadcast herbicide techniques. This difference is due to the lower costs associated with the use of manual equipment compared to that for the heavy equipment involved in the other methods.

The manual cost figure is two to five times as much as spot and localized herbicide costs. This cost difference is because (1) manual control may require debris cleanup, while herbicide-sprayed vegetation is usually left in place; (2) it is less labor-intensive to walk through an area spraying vegetation (spot and localized treatments) than it is to walk through an area cutting down vegetation; and (3) aerial applications can be done much more quickly than manual applications.

The high-end cost of manual control reflects the difficulty of using manual control in remote areas or in areas where the tree density is thick: in these areas the costs can be as high as $700/per acre. That cost is exceeded only by high-end costs for mechanical methods.

Please see Table II-5, on page 44, for the cost comparisons of the methods.

Table II-1: Control Methods Appropriate to the Facility

Vegetation Control Method	Rights-of-Way	Electric Yards	Non-electric Facilities
Manual	**YES** Manual methods are appropriate for selective veg. removal, & may be used in most circumstances.	**YES *in a few cases*** Steamers, burners, or hand pulling maybe needed for emergent veg. (but can be dangerous).	**YES** Manual methods are appropriate for selective veg. removal at non-electric facilities.
Mechanical	**YES *in some cases*** Mechanical methods are appropriate where thick stands of veg. must be controlled.	**NO** Mechanical methods are not appropriate for veg. control in graveled electric yards.	**YES** Lawnmowers are appropriate for landscaping. Mechanical methods are not suitable at microwave/radio sites.
Biological Agents	**YES** Biological agents are appropriate for controlling noxious weeds on ROWs or access roads, if immediate control not required.	**NO** Biological agents work too slowly to be useful at these facilities; they reduce but do not eliminate unwanted veg.	**NO** Biological agents work too slowly to be useful here; they reduce but do not eliminate unwanted veg.
Herbicide *Spot*	**YES** Spot treatments are appropriate where selective elimination of species is desirable.	**YES *in some cases*** Spot treatments appropriate where plants re-appear in previously treated electric yards.	**YES *in some cases*** Spot treatments appropriate for individual plant treatments around a non-electric facility.
Herbicide *Localized*	**YES** Localized treatment is appropriate on ROWs with low-to-medium target plant density.	**YES** Localized applications are appropriate bare-ground treatments in small-to-medium-sized electric yards.	**YES *in some cases*** Localized treatments may be appropriate for small areas of veg. around a non-electric facility.
Herbicide *Broadcast*	**YES *in some cases*** Broadcast suitable for treating large/dense areas of right-of-way veg., especially where access by truck is readily available.	**YES** Broadcast (spray/ granular) is appropriate for large-scale treatment of an electric yard.	**YES** Broadcast is appropriate for non-electric facilities (esp. parking lots, work-yards bare-ground treatments).
Herbicide *Aerial*	**YES *in a few cases*** Aerial spraying is appropriate in remote areas (difficult to reach by vehicle & hiking) & areas of high veg. density or noxious weeds.	**NO** Aerial application is not appropriate for electric yards; applications would coat electric equipment & might not reach the soil.	**NO** Aerial spray is not appropriate for non-electric facilities (unless, perhaps, a large property needed noxious weed control).
Other	**YES *in some cases*** Reseeding is appropriate in areas of steep slopes or erodable soils & little potential natural reveg.	**NO**	**YES *in some cases*** Black plastic appropriate in microwave/radio & landscaping. Reseeding & plantings appropriate for landscaped grounds.

Key: **YES** = Appropriate in most circumstances; often used. **YES *in some cases*** = Often appropriate, but not in every circumstance. **YES *in a few cases* =** Rarely used. **NO** = Not appropriate for this type of facility.

Mechanical Control Methods

Description

We can manage vegetation by cutting it with mowing-type equipment mounted on rubber-tired or tracked-type tractors. This equipment consists of the following:

- **Chopper/shredders.**
- **Mowers** with a rotary head piece (usually mounted on an articulated arm) that is driven by a track or rubber-tired vehicle.
- **Walking brush controllers** with booms, dippers, and others means to manipulate equipment and control vegetation with minimal soil disturbance.
- **Feller-bunchers,** machines that grab the trees, cut them at the base, pick them up, and move them to a pile or onto the back of a truck. The tree is always under the machine's control.
- **Roller-choppers,** rotating drums, towed by a variety of vehicles, that roll and chop vegetation and forest debris. A series of blades, steel chains, or other protuberances attached to the drum obliterates the target vegetation/debris.
- **Blading,** a steel blade or steel fork attachment on a tracked or rubber-tired vehicle that removes vegetation through a combination of pushing and/uplifting motions.

Of the mechanical methods identified above, mowers are the most often used for utility work. On access roads, we have used mowers to mow both grasses and small woody-stemmed shrubs. Mowers can also be used around tower legs or poles and in the rights-of-way where stems are small. Regular lawnmowers are used for grounds-keeping at non-electric facilities.

Advantage and Disadvantages

Mechanical methods are very effective for completely removing thick stands of vegetation. These methods clear thick stands of vegetation more quickly than manual cutting. Some mechanical equipment can also mulch or lop and scatter vegetation debris as the equipment moves through an area, so debris disposal is taken care of all in one step.

Mechanical methods have limited use for noxious weed control (if used without follow-up herbicide treatments), because the machinery can tend to spread seed and not kill roots.

Most mechanical techniques (e.g., using mowers or roller-choppers) are non-selective or much less selective than manual methods: they tend to clear or cut all vegetation within the path. Mechanical methods that affect all vegetation in the path of the machine are undesirable for selective vegetation removal.

Some mechanical methods (walking brush controllers and feller-bunchers) can selectively remove target vegetation with little disturbance to surrounding plants.

In general, mechanical methods that disturb soil (heavy equipment or scraping actions) are not appropriate to use near water bodies or wetlands, on steep slopes, or in areas of soft soils. Soil can be compacted and eroded. Subsurface cultural artifacts can be disturbed or destroyed.

Heavy machinery noise, exhaust, and dust associated with many mechanical methods can disturb wildlife and neighbors. Due to the noise and potential disturbance, heavy machinery use may be restricted at certain times in areas with threatened and endangered species. There is also some possibility of oil spills, using mechanical equipment.

As with manual methods, the mechanical methods can also often be limited in effectiveness to the short term: deciduous trees can often resprout after being cut, growing back with more stems and creating a denser cover that takes more work to remove. Sometimes mechanical methods shake or pull the roots, so the plant does not resprout.

Health and safety issues of using heavy equipment include vehicle accidents and flying debris.

Please see Tables II–1 (page 27) and II-2 (following) for a list of methods and their appropriate use for various facilities and vegetation types. Please see Table II-3 (page 33), for the impacts specific to each method.

Cost

Mechanical vegetation control costs from $100 to $600 per acre.

The relatively high costs of mechanical clearing reflect the need to use heavy machinery and the transport of that equipment.

Please see Table II-5 (page 44), for the cost comparisons of the methods.

Table II-2: Methods Appropriate by Right-of-Way Vegetation Types*

Vegetation Control Method	Agricultural Areas	Forest Areas	Grassland & Shrub	Noxious Weeds	Danger Trees *Along rights-of-way*
Manual	**YES** ***in a few cases*** Usually not many trees needing control.	**YES** Manual methods appropriate for tree removal.	**YES** ***in a few cases*** Usually not many trees needing control, brush on access roads.	**YES** ***in a few cases*** Manual methods would work only in very limited cases. Weed roots would not be controlled; seeds would spread.	**YES** Manual methods are appropriate for selective removal of danger trees.
Mechanical	**YES** Underlying agricultural landowner often uses mechanical methods.	**YES** ***in some cases*** Appropriate for dense stands of vegetation.	**YES** ***in some cases*** Appropriate for clearing brush on access roads, or around towers.	**YES** ***in a few cases*** Same as for Manual (above; also, ground might be disturbed.	**NO** Mechanical methods tend to be non-selective and used for smaller tree heights (use of feller-buncher machine may be appropriate).
Biological Agents	**NO** Noxious weeds are usually taken care of through agricultural practices.	**YES** ***in a few cases*** Appropriate if noxious weeds are also in areas adjacent to right-of-way.	**YES** Appropriate for noxious weed control.	**YES** Biological agents are appropriate only for controlling noxious weeds.	**NO** Not appropriate for target vegetation other than noxious weeds.
Herbicide	**YES** Underlying agricultural landowner often uses herbicide methods – localized treatments of weeds around tower legs.	**YES** Appropriate for target vegetation control (including noxious weeds), stump treatments of deciduous.	**YES** Appropriate for use on access roads, around tower sites, or for noxious weed control.	**YES** Appropriate for controlling noxious weeds.	**YES** ***in a few cases*** Growth regulator appropriate to stunt growth of potential danger trees, injection treatment to allow dead standing tree.

* The Planning Steps help determine other resources that may be present and the appropriate methods or mitigation measures for the given site-specific circumstances.

Key: **YES** = Appropriate in most circumstances; often used. **YES *in some cases*** = Often appropriate, but not in every circumstance. **YES *in a few cases* =** Rarely used. **NO** = Not appropriate for this type of facility/circumstance.

Biological Control Methods

Description

The biological methods discussed here are biological agents: **plant-eating insects or pathogens** (agents such as bacteria or fungus that can cause diseases in target plants) that weaken or destroy noxious weeds.[2] Because most noxious weeds originate in other countries, they can gain a competitive advantage over native plants because the natural enemies found in their homelands are often missing. With biological controls, selected natural enemies of a weed are introduced and managed to control weed spread.

Biological control agents affect noxious weeds both directly and indirectly:

Direct impact destroys vital plant tissues and functions.

Indirect impact increases stress on the weeds, which may reduce their ability to compete with desirable plants.

Agents released in our area have been tested to ensure they are host-specific: that is, they will feed *only* on the target plant and will not switch to crops, native flora, or endangered plant species when the target vegetation becomes scarce. Testing is an expensive and time-consuming task that must be done before the agents are introduced into the United States. The agents are not allowed into the United States if they are not host-specific (Pacific Northwest Weed Control Handbook, 1997). Please see **Appendix B** for a list of biological weed control agents.

Bonneville works with local or state weed control agencies to control noxious weeds along the rights-of-way.

Advantages and Disadvantages

Insect biological controls are used exclusively to control noxious weeds. At present, scientists have not identified insect biological controls for all noxious weeds; this depends on the testing and approval of insects for this use.

Using insects causes little potential environmental impact. Insects eat or stress weeds so they die without disturbing soil or other plants. The use of insects also does not create the intrusive human presence that

[2] Grazing (not included here) is also considered a biological method; see **Methods Eliminated from Consideration** at the end of this chapter.

mechanically or manually clearing noxious weeds does; insect use also does not have the potential contamination issues of herbicides.

Biological control is a slow process, and its effectiveness varies widely. It is often stated that this type of noxious weed control is highly unlikely to eradicate noxious weeds. For example, scotch broom seed weevils (*Apion fuscirostre*) will feed on the broom seeds. This feeding will limit the broom's spread, but the seed weevils will not kill the existing plants because the agents depend on the density of the "host" weeds for survival. As populations of the host weeds decrease (leaving less to feed on), populations of the biological control agent will correspondingly decrease. Therefore, a resurgence of weed populations may occur due to seed reserves in the soil, missed plants, and lagging populations of agents.

Health and safety impacts are limited to transporting insects to the site, hiking along the right-of-way, and potential helicopter accidents with aerial release of insects.

Since biological control agents are living entities and require specific conditions to survive, the ability to use insects may be affected by weather and other site conditions.

Please see Tables II-1 (page 27), and II-2 (page 30) for a list of methods and there appropriate use for various facilities and vegetation types. Please see Table II-3 (following) for the impacts specific to each method.

Costs

Biological vegetation control costs range from $80 to $150 for ground applications of insects to noxious weed areas, and $150 to $275 for aerial drop.

The relative high cost of this method reflects the availability of appropriate insects, as well as the coordination and expertise involved in dealing with the particular insects and with treating noxious-weed-infected areas in general. The higher costs of aerial application reflect the use of the helicopter, although this method is probably more feasible for large areas or areas that are difficult to access.

Please see Table II-5 (page 44), for the cost comparisons of the methods.

Table II-3: Impacts Specific to the Methods

Vegetation Control Method	Vegetation	Soils	Water	Fish	Wildlife	Agriculture	Timber	Recreation	Residential	USFS/ BLM Tribes	Cultural Resources	Worker Health & Safety	Public Health & Safety	Visual
Manual	Can be selective with little/no impact on adjacent non-target vegetation. Encourages resprout of deciduous species.	Little impact, duff layer disturbed in small area.	Little erosion potential for sedimentation, minor chance oil/fuel spill.	Minor potential for sedimentation or chainsaw oil/fuel spill to affect fish.	Short-term chainsaw noise disturbance, habitat changes if dense resprouting.	No impact.	No impact on adjacent timber lands.	Chainsaw noise may disturb recreation.	Chainsaw noise annoying.	Impacts could occur if USFS, BLM, or Tribal representatives are not consulted *(measures mitigate)**.	No impact on subsurface artifacts, cultural plants could be disturbed *(measures mitigate)**.	Impacts if accidents with felling trees, chainsaw, due to rough terrain.	Impacts if accidents to the public near tree felling.	Cut stumps can be unsightly.
Mechanical	Some mechanical is not selective, can destroy non-target vegetation, may encourage resprout of deciduous, may expose soils for noxious weed invasions.	Some mechanical can expose, rut, or compact soils.	Can cause erosion, increasing sediments *(buffers mitigate)**.	If sediments from soil-disturbing equipment, fish feeding is affected, oxygen depleted *(buffers mitigate)**.	Noise may disturb; non- selective habitat changes, may harm soil-dwelling species.	If terrain grade changed, potential drainage impact on adjacent agricultural areas.	No impact on adjacent timber lands.	Noisy, in a few cases, shredded slash may be difficult to traverse.	Noise and dust could disturb residents.		If soil disturbance, subsurface artifacts and cultural plants could be disturbed *(avoidance measures mitigate)**.	Potential heavy machinery accidents.	Potential flying debris if nearby public.	Can leave swaths of scarified land.
Biological Agents	May encourage growth of non-target and native species.	No impact.	No impact.	Insects may provide food source.	Insects may provide forage.	Variable positive impact on production.	Variable positive impact on production.	Insects may not be aesthetically pleasing.	Insects may not be aesthetically pleasing.		May encourage growth of cultural plants.	Potential accidents in rough terrain, or helicopter.	No impact.	No impact.
Herbicides	If non-selective applications or herbicides used, non-target plants affected. Use can encourage low-growing plants.	Slight potential that soil micro-organisms could be affected.	If spill, drift, or leaching occur, water could be affected *(buffers mitigate*).*	If certain herbicides reach water, fish could be harmed (*buffers mitigate*)*.	Slight potential that direct spray or spill would affect wildlife. Use can create low-growing habitat.	Impact if drift on adjacent crops/ organic farming, grazing animals *(buffers mitigate)**.	Slight possibility of drift or over-spray affecting timber trees.	Standing dead vegetation may reduce aesthetics.	Potential drift/spill smell, health impacts *(measures mitigate)**.		Slight potential to affect unknown cultural plants *(measures mitigate*).*	Impacts of repeat exposure if herbicide handled carelessly *(safety measures mitigate)**.	Contact through drift, leach, or spill could cause reactions *(measures mitigate*).*	Areas of browned vegetation can be unsightly. Can help create low-growing plant community.
Debris Disposal	Non-target plants can be damaged when debris dispersed.	Can decrease nitrogen until decomposed, add nutrients after decom-position.	Debris in streams can clog *(measures mitigate)**.	Leafy debris in stream depletes oxygen (*measures mitigate*)*. Downed wood can provide fish habitat.	Debris piles change habitat.	Impact on cows if conifer debris eaten *(measures mitigate)**.	No impact.	Difficult to traverse lop & scatter; smoke from slash piles.	Impacts of noise and dust.		Cultural plants could be affected if presence unknown *(measures mitigate)**.	Care must be taken with chipping & burning.	Impacts if flying debris.	Lop & scatter looks unkempt.

* Measures are incorporated into the program to mitigate (lessen) these potential impacts.

Herbicide Control Methods: Active Ingredients

Description

Herbicides kill or damage plants by inhibiting or disrupting basic plant processes. Different herbicides affect plants in different ways: they may keep plants from manufacturing the food they need to live and grow (inhibit photosynthesis), alter hormonal balances, distort normal plant growth, or inhibit seed germination. Herbicides are most often applied in mixtures with water or oil carriers, various adjuvants (wetting agents, sticking agents, stabilizers or enhancers, thickening agents, etc.), and/or dyes needed for application or environmental monitoring.

Growth regulators are also discussed in this section. Growth regulators *slow* the growth of vegetation rather than killing it.

Note: This EIS offers alternatives on whether or under what conditions to use herbicides. The active ingredients discussed in this section are the herbicides we are considering when referring to herbicide use.

Bonneville uses only those herbicides that have been approved by the Environmental Protection Agency (EPA) (as with all herbicides sold in the United States). All those who use such chemicals are required by law to follow the label directions on the manufacturer's herbicide container— "the label is the law." Bonneville's herbicide treatments comply with the EPA-reviewed and -approved manufacturers' instructions printed on the label.

Bonneville is considering 23 different active herbicide ingredients—including 4 growth regulators—to be available for use in those Program Alternatives that use herbicides.

- Seventeen of these herbicides could be used for rights-of-way (Program R).
- Seven herbicides could be used in electric yards (Program E).
- Eleven herbicides could be used for non-electric facilities (Program NE).

Some of the herbicides have multiple uses and can be used in more than one program. The active herbicide ingredients are used in various formulations developed by chemical companies. Table II-4 (page 37) lists the active ingredients, registered uses and facilities where they

might appropriately be used. Please note that this is a list of herbicides that would be in the overall program "tool box." The planning steps (Chapter III) would determine which herbicides, if any, would be appropriate for site-specific use (i.e., some National Forests have a limited list).

EPA uses a toxicity rating system for herbicides, from “Category I” (highly toxic) to “Category IV” (practically non-toxic). Most of the toxicity ratings of the herbicides proposed in this EIS fall into the categories "slightly toxic" or "practically non-toxic." Depending on the formulation of the technical product, some of the herbicides fall into higher categories because they hold greater risk for injury.

The Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) requires all herbicides to be classified for their potential hazards based on the circumstances to which they are used. The two classifications are GENERAL USE and RESTRICTED USE. *General Use* herbicides generally have lower toxicities with corresponding lower hazards to humans and the environment. *Restricted Use* herbicides generally have higher toxicity ratings and are often hazardous to humans and/or the environment. Some herbicide formulations containing the same active ingredient may be registered in both classifications, depending on the ingredient concentration, application method, and intended use. In addition, individual states may reclassify a General Use pesticide to a Restricted Use pesticide (Federal law allows qualifying states to regulate FIFRA in a more, but not less, strict sense). All the herbicides Bonneville is proposing for use are General Use herbicides.

With exception, General Use herbicides can be purchased and applied by the general public without training or licensing. Exceptions include, but are not limited to, applying General Use herbicides with motorized equipment and the application of aquatic use herbicides. These exceptions and all Restricted Use herbicides can be purchased and used only by trained and licensed applicators[3] or others under the direct supervision of a trained and licensed applicator. With either classification, the applicator is required by law to follow all label instructions and restrictions.

---

[3] See Appendix C, Bonneville Pesticide Applicator Certification Plan.

Table II-4: Bonneville Proposed List of Approved Herbicides for Use

Herbicide	Registered Label Uses	Facilities Where Registered Use Is Appropriate		
		Rights-of-way	Electric Yards (bare-ground)	Non-Electric (landscaping)
2, 4-D	Noxious weeds, broadleaf weeds, brush, & trees.	X		X
Azafenidin*	Broadleaf weeds and grasses.	X	X	X
Bromacil	Broad-spectrum; controls perennial grasses & broadleaf weeds.	X	X	
Chlorsulfuron	Broadleaf & grassy weeds.	X		
Clopyralid	Annual & perennial broadleaf weeds.	X		X
Dicamba	Perennial & annual broadleaf weeds, brush & trees.	X		X
Dichlobenil	Broadleaf weeds & grasses, annual & perennial in seedling stages; selective for pre- & post-emergence.			X
Diuron	Wide variety of annual & perennial broadleaf & grassy weeds on both crop & non-crop sites.	X	X	
Fosamine ammonium	Use in ROWs for control of broadleaf weeds, trees & brush.	X		
Glyphosate	Deep-rooted perennial & annual/biennial species of grasses, sedges, broadleaf weeds, brush & trees.	X	X	
Halosulfuron-methyl	Sedges & horsetail in turf & landscape.			X
Hexazinone	Annual & perennial broadleaf & grass, weeds, brush.	X		
Imazapyr	Brush, trees, annual & perennial weeds; frees up conifers for growth, maintains wildlife openings.	X		
Isoxaben	Pre-emergence control of broad spectrum of autumn- & spring-germinating broadleaf weeds.	X	X	X
Mefluidide	Growth regulator inhibits growth & suppresses seed head production of turfgrasses & woody species.			X
Metsulfuron-methyl	Use in ROWs for control of broadleaf weeds, trees & brush.	X		
Oryzalin	Selective soil-incorporated herbicide for pre-emergent control of annual broadleaf weeds & grasses.			X
Paclobutrazol	Growth regulator controls the growth of trees.	X		
Picloram	Certain annual broadleaf weeds & many annual & perennial broadleaf weeds, vines, & woody plants.	X		
Sulfometuron-methyl	Broad-spectrum pre- or post-emergence for grasses & broadleaf plants.		X	
Tebuthiuron	Relatively non-selective soil-activated herbicide. Pre- & post-emergence control of perennial & annual broadleaf weeds & brush, & grasses.	X	X	
Triclopyr	Growth regulator, woody plants & broadleaf weeds.	X		X
Trinexapac-ethyl	Grass growth regulator.			X

* Azafenidin is pending registration by EPA. Bonneville would not use this herbicide until it was registered.

Bonneville employees are trained and licensed through an EPA-approved Pesticide Applicator's Certification Plan; see **Appendix C**. The Applicator's Certification licenses are valid for Idaho, Montana, Oregon and Washington. Due to the small acreage involved, Bonneville employees applying herbicides in California and Wyoming obtain their certification from the individual states.

Herbicide Control Methods: Application

Description

Herbicides can be applied in different ways, depending on the plants that are targeted, the density of the vegetation, and site circumstances. We have divided herbicide applications into the following four categories:

- Spot
- Localized
- Broadcast
- Aerial.

These categories are based on the area that is being treated and the amount of herbicide being used. Each category uses various methods to apply the herbicide.

Spot Herbicide Application

A spot application treats individual plant(s) with the least amount of chemicals possible. The methods include, but are not limited, to the following:

- **Stump treatments.** Herbicide is applied by hand (squirt bottle) or backpack to freshly cut stumps of broadleaf trees and shrubs to prevent resprouting.

- **Injection and notch treatments.** Herbicide is injected into the tree around the base using tubular injectors (lances); or herbicide is squirted or sprayed into frills, notches, or cups chopped around the base of individual trees or shrubs. These very selective treatments are only used for specific trees or shrubs and within sensitive areas such as near water.

Injection treatment in live tree

Localized Herbicide Application

"Localized" herbicide application is the treatment of individual or small groupings of plants. This application method is normally used only in areas of low-to-medium target-plant density.

The application methods for this application group include, but are not limited to, the following:

- **Basal treatment.** The herbicides are applied by hand (squirt bottle) or by backpack. Herbicides are applied at the base of the plant (the bark or stem) from the ground up to knee height. The herbicide is usually mixed with an oil carrier to enhance penetration through the bark, and applied to the point short of run-off. These treatments can be done during the dormant season or active growing season.
- **Low-volume foliar treatment.** Herbicides are applied with the use of a backpack sprayer, all terrain vehicle (ATV), or tractor with a spraygun. Herbicide is applied to the foliage of individual or clumps of plants during the growing season, just enough to wet them lightly. A relatively high percentage of herbicide is used mixed with water. Thickening agents are added where necessary to control drift. Dyes may also be added to see easily what areas have been treated.
- **Localized granular application.** Granular or pellet forms of herbicide are hand-applied to the soil surface beneath the driplines of an individual plant, or as close to a tree trunk or stem base as possible. Herbicide is applied when there is enough moisture to dissolve and carry the herbicide to the root zone—but not so much water that it washes the granules off-site.

Spot and localized applications can be applied using a backpack sprayer.

- **Bare-ground treatments.** These applications (made via backpack sprayer, ATV or tractor with a spraygun) treat the *ground or soil* to keep any vegetation from growing, rather than treating the vegetation itself. The herbicide used can be in liquid or granular formulations. This technique is used in places such as substations and around wood poles.

Broadcast Herbicide Application

Broadcast herbicide applications treat an area, rather than individual plants. Broadcast applications are used to treat rights-of-way that are thickly vegetated (heavy stem density), access roads, noxious weeds, and electric yards. The application methods for this group include, but are not limited to, the following:

- **High-volume foliar treatments.** Herbicides are applied by truck, ATV, or tractor with a spraygun, broadcast nozzle, or boom. A hydraulic sprayer mounted on a rubber-tired tractor or truck or tracked-type tractor is used to spray foliage and stems of target vegetation with a mixture of water and a low percentage of herbicide. The herbicide mixture is pumped through hoses to a hand-held nozzle. A worker activates the nozzle and directs the spray to the target vegetation. Boom application methods involve a fixed nozzle or set of nozzles that spray a set width as the tractor passes over an area.
- **Cut-stubble treatment.** Herbicide is sprayed from a truck with a mounted boom over large swaths of freshly mechanically cut areas. This treatment is the broadcast style of cut-

stump treatments. It is intended to keep plants from resprouting.

- **Broadcast granular treatment.** Granular forms of herbicide are spread by hand, belly grinder, truck or tractor. The herbicide is spread over a relatively large area, such as in an electric yard, or around tower legs.
- **Broadcast bare-ground treatments.** Herbicides are spread by ATV or tractor with a spraygun, or by trucks with mounted booms. This application treats the ground or soil to keep vegetation from growing, but over a wider area. The broadcast bare-ground application is used in electric yards, sectionalizing switch platforms, and non-electric facilities.

Aerial Herbicide Application

Aerial herbicide applications are used to treat large areas that usually have heavy, dense vegetation needing control (including noxious weeds); steep slopes that make other methods unsafe; or poor road access. The application methods for this group include the following:

- **Fixed-wing aircraft.** A boom system attached to the undercarriage near trailing edge of airplane wings is used to dispense herbicides. Planes fly above the transmission-line conductors.
- **Helicopter.** Booms attached to a helicopter deliver herbicide to the target area. The helicopter may fly above or below transmission-line conductors.

Aerial applications are conducted during the growing season. Bonneville would only use non-petroleum-based carriers. Herbicide drift is controlled by immediate shut-off devices, close monitoring of weather conditions, and the use of adjuvants to enlarge the herbicide droplet size (bigger droplets fall straight down). For example, if wind speeds are greater than what is recommended by the label instructions and restrictions, no spraying would be allowed. (See **Site-specific Planning Steps, Chapter III**, for aerial spraying.)

New developments in helicopter aerial spraying use on-board Global Positioning Systems with predetermined computerized buffer zones. The system automatically adjusts the flow of herbicide mixture to the speed of the helicopter, and automatically shuts off at designated buffer distances. Portable weather stations are brought to the site for constant immediate read-outs of changing weather (wind speeds, humidity, temperature). The new thru-valve and microfoil booms provide accurate herbicide applications with minimal herbicide drift.

Advantages and Disadvantages

Herbicide treatments are effective in controlling vegetation in various circumstances. Herbicides can be **selective** (affecting only the target vegetation) or **non-selective** (affecting all the vegetation in its path), depending on the type of herbicide and the application technique.

Spot and localized herbicide treatments work well in treating deciduous stumps to keep them from resprouting or in small areas needing vegetation control along a right-of-way or around a non-electric facility. Because of the selective nature of spot applications, vegetation in environmentally sensitive areas can be treated with less impact than other application methods.

Broadcast herbicide treatment is more appropriate for densely vegetated areas that are accessible by truck (such as along the access road). Broadcast methods are also appropriate in electric yards where total vegetation management is desirable.

Aerial spraying is appropriate in remote areas that are difficult to access by hiking (although there needs to be an accessible landing site for both the helicopter and the herbicide mix truck). Aerial herbicide treatment is also well-suited for areas of dense tall vegetation, where it is difficult to walk through, and the foliage is high and not accessible by broadcast or backpack spray.

Only certain herbicides are appropriate for aerial application and registered for uses such as treating utility rights-of-ways. These herbicides are generally less toxic and less mobile than other herbicides. Examples of the active ingredients selected by BPA for aerial applications include clopyralid, dicamba, fosamine ammonium, glyphosate, and imazapyr. Other herbicides such as 2,4-D may be used, depending on the requirements of state/local noxious weed control authorities.

Because herbicides tend to kill the roots of the vegetation, there is less chance for resprouting to occur; therefore, the treatment is effective for a longer term. Short-term effectiveness is not always apparent (as with mechanical or manual methods). Often an area must be reviewed months later to see whether the target vegetation was treated and affected (sometimes dyes are used to help determine whether a plant was treated). In other cases, the effects are visible in days.

After most herbicide treatments, the dead vegetation is left standing: there is no debris disposal. Standing dead vegetation can provide both an eyesore and some wildlife cover.

Environmental concerns of herbicide treatments include the potential for herbicide drift or leaching that potentially could affect non-targeted vegetation, water sources, or fish or wildlife. Along the right-of-way there is usually little potential for herbicides to affect these resources because the amount of herbicide active ingredient actually used is small and because there is a long time span between treatments (3 to 10 years). In electric yards, herbicides are used more often (once a year), so there is more potential for spills, leaching, or surface runoff. No-spray buffer zones are necessary to ensure that herbicides will not reach water bodies. Care must be taken not to apply granular herbicide in areas where surface runoff is likely to occur. Herbicides should not be used adjacent to organic[4] farming.

Health and safety issues include the toxicity and potential long-term affects of the inert and active ingredients, carriers, and adjuvants. Workers—who are most likely to be exposed to large quantities and exposed repeatedly—need to take precautions when handling herbicides (as specified on labels: that is, they should wear gloves, change clothes after use and before eating, and so on). Public health and safety issues include the potential effects of exposure, particularly one-time exposure. Although there is some public use of the right-of-way, only rarely might someone be accidentally sprayed or water sources be contaminated.

Please see Tables II–1 (page 27), and II-2 (page 30) for a list of methods and their appropriate use for various facilities and vegetation types. Table II-3 (page 33) shows specific impacts.

[4] Certified organic farms do not use synthetic pesticides, herbicides, fertilizers or fumigants. A farm must comply with rigid standards that includes buffers between organic farms and nearby conventional farms.

Costs

The costs of **spot and localized** herbicide treatments are the lowest of all the methods ($35 - $140/per acre). It is manual labor—with little equipment involved—and it is much less labor-intense to spray vegetation than it is to cut it down. Also, there is no debris disposal involved.

The relatively high cost of **broadcast** herbicide treatments ($150 - $250/per acre) reflects the use of truck equipment, and the difficulty of reaching sites by access road. The costs are *less* than mechanical costs because it is quicker to drive through and spray an acre of vegetation than it is to drive through, stopping to cut and chop the vegetation.

The costs of **aerial** herbicide treatment ($20 - $160/per acre) are low because, although the equipment costs are expensive, aerial spraying can be done much more quickly than any other method.

Table II-5, below, compares the costs of the methods.

Table II-5: Cost Comparison of Methods

Vegetation Control Method	*Costs per acre
Manual	**$70 - $700**
Mechanical	**$100 - $600**
Biological	**Ground: $80 - $150** **Aerial: $150 - $275**
Herbicide	
Spot	**$35 - $140**
Localized	**$35 - $140**
Broadcast	**$150 - $250**
Aerial	**$20 - $160**

*In general, cost variations within the same method reflect the vegetation density of the right-of-way: low costs for low-density areas; higher costs for more densely vegetated areas. Other contributing factors include remote work locations and short work performance periods.

Debris Disposal

Description

Managing vegetation includes clean-up—the treatment of slash and debris disposal. There are four basic methods of disposing of the vegetative debris generated when vegetation is cut: chipping, lopping and scattering, burning, and mulching.

Chipping

With chipping, a mechanical brush disposal unit cuts brush into chips 10 centimeter (cm) (4 inches [in.)] or less in diameter. The chips are spread over the right-of-way, piled on the right-of-way, or trucked off site. Trunks too large to be handled by the chipper are limbed and the limbs chipped. Trunks are placed in rows along the edge of the right-of-way or scattered, as the situation requires. The chips and trunks left on the right-of-way decompose naturally.

Lopping and Scattering

With lopping and scattering, some of the branches of a fallen tree are cut off (lopped) by ax or chainsaw, so the tree trunk lies flat on the ground. The trunks are usually cut in 1-to-2-m (4-to-8-ft.) lengths. The cut branches and trunks are then scattered on the ground, laid flat, and left to decompose.

Mulching

Mulching is a debris treatment that falls between chipping and lop-and-scatter. The debris is cut into 30-to-60-cm (1-to-2-ft.) lengths, scattered on the right-of-way and left to decompose. This method is used when terrain and conditions do not allow the use of mechanical chipping equipment.

Pile Burning

With pile burning, vegetative debris is piled off the right-of-way and burned in small piles. On occasion, Bonneville may clear brush off land right next to a substation, pile it in small piles, and burn it. Burning is a hazard *in* the right-of-way and near our electric facilities because the smoke can induce flashovers from electrified facilities. This method is rarely used because of this safety issue. Burning also contributes to air pollution. The fire can escape to other areas if not properly managed.

Other

If larger trees are cut, landowners will often want them left for their personal use (e.g., so that the trees can be sold for timber or cut-up for firewood).

Table II-6: Cost Comparison of Debris Disposal

Debris Disposal Methods	*Costs per acre
Chipping	$175 - $250
Lop and Scatter	$75 - $125
Mulching	$175 - $275
Pile Burning	$90 - $125

*In general, cost variations within the same method reflect the vegetation density of the right-of-way: low costs for low-density areas; higher costs for more densely vegetated areas. Other factors that contribute to higher costs per-acre include remote work locations and short work performance periods.

Reseeding and Replanting

Description

Reseeding and replanting are done for several reasons:

1. to control soil erosion,
2. to prevent the establishment of noxious weeds,
3. to help establish low-growing vegetation,
4. to promote wildlife habitat,
5. to mitigate visual impacts.

Reseeding

For reseeding, seeds of grasses, legumes, and forbs are purchased and dispersed by drilling or by broadcasting the seeds. A tractor-drawn machine drills holes in the ground and deposits seeds in the holes. Broadcasting can be done by hand (throwing seed onto the ground), by belly-grinder (a front-held container that disperses seeds by turning a hand crank), from a truck or from tractor-mounted seeders, and from a seeder suspended from a helicopter. Seeding is appropriate on access roads, around tower legs, potentially on other portions of a right-of-way, and at non-electric facilities in landscaping.

Replanting

For reseeding, seedling trees, nursery stock trees, shrubs, or other perennial vegetation (that will not grow to heights that could threaten the operation of electric facilities) are bought and planted. Seedling trees are appropriate for large areas of planting next to a right-of-way. Nursery stock trees or shrubs are more appropriately used as

replacement trees for landowners who may need to have a landscaped danger tree removed, or for landscaping around substations or maintenance facilities.

Reseeding and replanting must be done with adapted seed and plants, at proper planting times, using good quality seed (with no noxious weed seeds present), proper seedbed preparation (soil amendments and fertilizers if necessary), and the use of effective seeding rates and drill spacing. Native seeds/plants can be used if they meet the need of the project, are readily available, and the costs are reasonable. (See **Chapter III, Site-specific Planning Steps,** for more details.)

Approving New Techniques for Use

As part of an integrated vegetation management strategy, Bonneville would adopt new techniques for vegetation control that are more effective, safer or more environmentally benign, as appropriate. The discussion below covers the process for approving and adding new techniques or new active herbicide ingredients to our selected vegetation management program.

Adding New Techniques

In order to approve a new technique for use in our program, we would review the effectiveness of the technique, the cost to use it, and the potential environmental impacts it might cause. The environmental review would include, as appropriate, consultations with appropriate agencies and tribes, as well as public notification and solicitation of comments. (Public and agency notification/solicitation of comments would be done through various means that could include the use of the *Bonneville Journal*, a publication used to announce projects, as appropriate, and the use of other targeted mail lists.)

This information would be gathered in a Supplement Analysis. The Supplement Analysis would be tiered to this program-wide EIS by comparing the impacts of the technique with those disclosed in the EIS. If the impacts were equivalent to, and safer or more environmentally benign than the ones discussed in this EIS, then the new technique would be added as a tool for use in our program. (see also the discussion under **Reasons for This EIS** in **Chapter I**.)

If the impacts of using the new technique were substantially different from those discussed in this EIS, we would either not approve its use or conduct further environmental review in order to make an informed

decision as to whether we should approve and add the tool to our program.

For example, a new “laser-chainsaw” for manually controlling vegetation could be developed. We would review its effectiveness, costs, environmental impacts, and solicit public input as appropriate. If the review shows that the environmental impacts were equivalent or less to those discussed in this statement, Bonneville could add this tool to our program without further analysis.

Adding New Herbicides

Approving new herbicides or growth regulators would require the same approval process of review and tiering. (This process applies only if the vegetation management program selected includes the use of herbicides.)

For example, if a new active herbicide ingredient in which Bonneville was interested were to be approved by EPA, we would review the effectiveness, costs, and environmental impacts of the herbicide for use around our facilities. The potential environmental impacts would be analyzed, including appropriate consultations (i.e. for impacts to threatened or endangered species). Public and agency notification and comments on the new herbicide would be solicited through various means (this could include the use of the *Bonneville Journal*, a publication used to announce projects, as appropriate, and the use of other targeted mail lists).

The analysis of the new herbicide would be compared to the herbicide analysis done in this statement. If the environmental impacts were equivalent—or if the impacts showed that the herbicide was safer or more environmentally friendly than those impacts discussed in this statement—Bonneville could add this herbicide to our program.

Likewise, if new information is developed about an herbicide we are using (for instance, if it was found to be much more toxic than when it was originally studied), then we would review that information in light of the analysis in this EIS to determine whether the impacts have been considered. If the new information about the herbicide were substantially different than originally reviewed, we would use the new information about the herbicide to decide whether it was appropriate for us to continue using the product.

Methods Eliminated from Consideration

Two vegetation control methods were eliminated from further consideration from Bonneville's vegetation management program: grazing and prescribed fire.

Grazing

Grazing uses domestic livestock (sheep or goats) to eat the vegetation that needs controlling. Past studies on this method determined that it was only "somewhat" effective, and that logistics (supplemental feed, water, containment, and predators) limited the usefulness of this method.

In 1977, Bonneville conducted a simulation study on the use of domestic sheep grazing to control and convert vegetation on the right-of-way. However, sheep did not readily eat conifers and red alder, the tree species of most concern for right-of-way maintenance. The study did predict that sheep grazing in forests dominated by grand-fir would cause some gradual changes in vegetation composition, leading to an increase in the abundance of grasses. The grasses would then compete with and reduce the establishment of conifer seedlings.

Goats have also been used to control brush regrowth on chaparral fuel breaks in southern California. The goats are nonselective and consume a wide variety of plant species. Effective fuel-break clearing requires enough goats to eat all leaves from all brush species (bringing in more goats two or three times per year). The goats were not expected to control tall, mature brush because it is hard to get to and, when accessible, was avoided by the animals. No one has studied whether goats could be used to control brush on rights-of-way in the Pacific Northwest.

There are problems with managing grazing animals: these include road access during wet weather, fencing, herding, water and supplemental feeding, protection from predators, disease, poison plants, erosion, water quality, and conflicts with big game management.

However, the idea of grazing is being reexamined by a New Hampshire utility that recently borrowed sheep from Montana for a right-of-way clearing pilot project.

At this point, Bonneville will continue to rely on the concluded studies. If new approaches are found more effective and feasible, Bonneville can then decide whether to prepare the appropriate NEPA analysis for inclusion of the grazing method in the vegetation management program.

Prescribed Fire

"Prescribed fire" uses closely managed burning at periodic intervals to maintain low-growing vegetation. Woody vegetation is consumed, while the regrowth of grasses and forbs is promoted.

Bonneville currently prohibits burning on the right-of-way for vegetation management, mainly for safety and reliability reasons. Prescribed burning under transmission lines is dangerous because smoke and hot gases from a large fire can create a conductive path for electricity. When a fire is burning under a transmission line, an electric current could arc from the conductor to the ground, endangering people and objects near the arc.

There are other problems with prescribed fire: it is difficult to manage burning in narrow rights-of-way, and the potential for fire to escape is great.

Information, Education, and Prevention

A vegetation management program also includes steps to educate and inform people that live along the line or near an electric facility about the need to keep vegetation a safe distance away from those facilities. Information and education are a part of all the Program Alternatives that will be discussed. The extent of information and education can vary from actively pursuing forums (such as at neighborhood community meetings or schools) to discuss Bonneville needs, to letting local people know why we are cutting vegetation if they happen to be in the area during the maintenance activities. We presently send pamphlets to people living along our transmission lines; these pamphlets describe the dangers of vegetation near electric facilities. Please see **Appendix D** for a sample of the type of information we provide.

Prevention—managing vegetation in and around our facilities so that it doesn't become a problem—is another important aspect of managing vegetation. In this EIS, the idea of prevention is discussed as part of other components of the program. Prevention is a key in IVM strategy, in the management approach of Promoting Low-growing Plant Communities, and when reseeding or replanting disturbed areas to prevent the spread of noxious weeds.

Chapter III: Changes

In response to comments, we made these changes in Chapter III:

- Identified this chapter as the place to find discussions on permits and requirements.
- Clarified that the planning steps apply to rights-of-way, electric yards and non-electric facilities, as appropriate.
- Clarified public involvement and notification measures.
- Strengthened language regarding contact with the Forest Service and use of measures specific to FS lands and comment on FS proposals that might affect designation and management of utility corridors.
- Added mitigation measures for working with State and local land managers.
- Revised proposed herbicide list (added two; eliminated three). Revised herbicide buffer tables to include consideration of herbicide and adjuvant toxicities. Added information on noxious weed treatment to clarify with regard to nearby water bodies.
- Noted ongoing T&E consultation with NMFS and USFWS on T&E fish species. Also added need to consult if herbicides should be used in marbled murrelet and spotted owl protected areas. Added mitigation measures for "Other Species."
- Revised language regarding need to contact Tribes with traditional use areas/plants and the need to contact SHPO.
- Strengthened language regarding taking erosion control measures on steep slopes. Added consideration of geology and soil types when selecting herbicides and adjuvants.
- Revised language for considering the use of native seeds/plants. Added a discussion of the Migratory Treaty Bird Act.

Some small changes were also made to make the document clearer and easier to read. For specific comments and responses, please see Chapter VII.

Chapter III
Site-specific Planning Steps

In this chapter:

- **Site-specific Planning Steps**
- **Mitigation Measures**
- **Permits and Requirements**

Planning Steps Overview

This chapter describes the seven Planning Steps that we are proposing to use for site-specific vegetation management projects including rights-of-way (transmission lines, danger trees, access roads, and microwave beam paths), electric yards, and non-electric facilities. The Planning Steps will be a tool for ensuring that environmental aspects are considered as part of an integrated vegetation management strategy and under NEPA.

The **Planning Steps** are as follows:

1. **Identify facility and the vegetation management need.**
2. **Identify surrounding land use and landowners/managers.**
3. **Identify natural resources.**
4. **Determine vegetation control methods.**
5. **Determine debris disposal and revegetation methods, if necessary.**
6. **Determine monitoring needs.**
7. **Prepare appropriate environmental documentation.**

Note: These steps apply to *planned* maintenance, not to *emergency* maintenance.

Each Planning Step has a set of **mitigation measures** used to avoid or reduce potential impacts on the environment, and to allow for safe operation and maintenance of the transmission system. Not all measures would be appropriate for all program alternatives. For example, a right-of-way alternative that does not use herbicides would (appropriately) not need any herbicide mitigation measures. Also, not all measures would be appropriate for all facilities. For example, aerial spraying would not apply to electric yards or non-electric facilities.

The Planning Steps and mitigation measures will provide a consistent and efficient process for ensuring that NEPA compliance is achieved and environmental and landowner concerns are considered when making decisions about vegetation control. Based on these steps, a checklist will be developed to facilitate the process.

The Project Manager—the person responsible for the vegetation management at a particular facility—would ensure that these steps are carried out.

Currently, Bonneville prepares for site-specific vegetation management on an individual basis, without program-wide direction. We plan to adopt the program-wide Planning Steps to help foster consistency across projects and jurisdictions, and over time.

This chapter also has the Federal laws that may pertain to vegetation management. Other laws that were considered, but do not pertain to this action, are listed at the end of the chapter.

In this chapter, Federal laws are stated in shaded boxes within the text.

1. Identify facility and the vegetation management need.

In this step, Project Managers would do the following:

- Identify the facility needing vegetation control (e.g., right-of-way, access road, electric yard) and the safety and electrical clearance requirements that need to be met.
- Identify the types of vegetation needing control (e.g., tall-growing vegetation, noxious weeds) and the density of the growth.

Rights-of-way

For rights-of-way, Project Managers would apply the following mitigation measures, as appropriate(in addition to measures in Steps2 through 7).

As defined here, rights-of-way include danger tree clearing, access roads and microwave beam paths.

- *With the use of applicable mitigation measures,* methods that may be appropriate for controlling vegetation on rights-of-way include manual, mechanical, herbicide (spot, localized, broadcast, and aerial), and biological controls (for noxious weeds).
- *Around transmission structure*s, control all tree and brush species within about 9 m (30 ft.) of structures. Cut stumps are not to be taller than 5 – 10 cm (2 – 4 in.). These species include blackberries, poison oak, scotch broom, and other vegetation that, by size or density, might hinder routine inspection and maintenance work or make it more hazardous.
- Pull all debris and slash out of the 9-m (30-ft.) area around transmission structures.
- *On the right-of-way,* control all tall-growing species that are now or would be a hazard to the line. Cut stumps are not to be taller than 10 – 15 cm (4 – 6 in.).
- *On access roads,* control all vegetation except grasses, to enable safe driving.
  - The access road is 4 to 8 m wide (14 to 25 ft. wide) and requires a 5-m- (15-ft.-) high clearance. Limbs should not hang down into the access road.
  - Cut stumps are not to be taller than 5 – 10 cm (2 – 4 in.) in the roadbed.
  - Stumps will be cut horizontal to the ground to prevent personal injuries and tire puncture.
  - Limbs are to be trimmed back as flush to the trunk as possible when trees are rooted outside of the access road.
  - All debris is to be pulled back from the access road as prescribed.
- *For danger trees*, remove all off-right-of-way trees that are potentially unstable and would fall within a minimum distance or into the safety zone of the power line, as well as trees that could blow into that zone or enter into the zone when the conductor swings. Tree growth within the treatment cycle should be taken

into consideration when selecting trees. (See **Appendix E** for danger tree clearance criteria.)

- *For microwave beam paths,* cut trees when they have grown into the beam path, disrupting the signal.

Promoting Low-growing Plant Communities

Consider the following steps or mitigation measures to promote a semi-stable low-growing plant community:

1. Remove existing tall-growing vegetation. If using manual methods to eliminate deciduous (resprouting-type) species, carry out follow-up herbicide treatments to ensure that the roots are killed.
2. Replant or reseed with ground cover if none exists or if there is a low potential for natural revegetation by low-growing species (and a high potential for natural revegetation by tall-growing species).
3. Maintain, by selectively eliminating tall-growing vegetation before it reaches a height or density to begin competing with low-growing species.
4. As much as practical, be careful not to disturb low-growing plants. When possible, use only selective vegetation control methods (such as spot/localized herbicide applications) that have little potential to harm non-target vegetation.

Electric Yards

For electric yards, Project Managers would apply the following mitigation measures, as appropriate, in addition to those in Steps 2 - 7.

Electric yards are defined as substations, switching stations, and electric yards (including a 3-m or 10-ft. bare-ground buffer zone outside the fenced area).

- *With the use of applicable mitigation measures,* methods that may be appropriate for controlling vegetation in and around electric yards are herbicide (spot, localized, and broadcast) applications, with very selective use of weed burners, steamers, and hand-pulling.
- Use only herbicides that (1) will not corrode ground mats, underground facilities, or other metals on site; (2) are non-combustible; and (3) are non-conductive.
- Select and rotate the use of herbicide products to prevent weeds from developing resistance to herbicides.

- For electric yards within 100 m (328 ft.) of wells, streams, rivers, or wetlands, determine whether the water body should be monitored for potential herbicide contamination.

Non-electric Facilities

For non-electric facilities, Project Managers would apply the following mitigation measures, as appropriate, in addition to those in Steps 2 - 7.

Non-electric facilities are defined as microwaves, maintenance yards, and the grounds surrounding electric yards or maintenance facilities.

> ***Guidance for Environmentally and Economically Beneficial Practices on Federal Landscaped Grounds*** *(1995; 60 FR 40837) directs Federal agencies to incorporate, to the extent practicable, guidance for environmentally and economically beneficial practices into their landscaping programs and practices.*

- *With the use of applicable mitigation measures,* methods that may be appropriate for controlling vegetation at non-electric facilities include manual, mechanical, and herbicide (spot, localized, and broadcast).
- *Where cost-effective and to the extent practicable,* use regionally native plants for landscaping.
- *Where cost-effective and to the extent practicable,* seek to prevent pollution by, among other things, reducing fertilizer and pesticide use, using integrated pest management techniques, recycling green waste, and minimizing runoff.
- *Where cost-effective and to the extent practicable,* implement water-efficient practices, such as the use of mulches, efficient irrigation systems, audits to determine exact landscaping water-use needs, recycled or reclaimed water, and the selecting and siting of plants in a manner that conserves water and controls soil erosion.

Noxious Weeds

For noxious weeds, Project Managers will take the following mitigation measures, as appropriate.

> *The* ***Federal Noxious Weed Act*** *(amended 1990) directs Federal agencies to develop and implement Integrated Pest Management Noxious Weed Programs.*

- *With the use of applicable mitigation measures,* methods that may be appropriate for controlling noxious weeds include the use of biological controls and herbicides (spot, localized, broadcast, and aerial applications).
- Take full responsibility for controlling noxious weeds on fee-owned property.
- Enter into active noxious weed control programs with land owners/managers or county weed control districts where Bonneville activities may have caused or aggravated an infestation.
- *Where appropriate,* provide herbicides or biological control agents to landowners.
- *When possible,* wash vehicles that have been in weed-infested areas (removing as much weed seed as possible) before entering areas of no known infestations.
- *Consider, if appropriate,* reseeding after noxious weed treatments.
- *When reseeding is needed,* use approved weed-free seed.

2. Identify surrounding land use and landowners/ managers.

In this step, Project Mangers would do the following:

- Evaluate, generally, existing land uses (e.g., agriculture, residential) along a right-of-way or surrounding a facility needing vegetation control to determine any constraints on vegetation control.
- *To the extent practicable,* identify casual informal use of the right-of-way by non-owner publics to determine any constraints on vegetation control.
- Determine, generally, landowners or land managers (e.g., private residential, timber company, Federal, state) in or around the facility needing vegetation control.
- Determine whether there are any existing landowner agreements with provisions that need to be followed regarding the vegetation maintenance of a specific portion of line.

- *During planning for vegetation control activities,* use an appropriate method (i.e., doorhanger, letter, phone call, e-mail, and/or meeting) to 1) notify landowners where Bonneville has a right-of-way easement to inform them of upcoming activities, 2) request any information that needs to be considered.
- Determine whether there are *other* potentially affected people or agencies that need to be notified or coordinated with; determine appropriate method(s) of notification and coordination.
- (Please see **Tribal Lands** and **Cultural Resources** for information on necessary contacts with Tribes.)

Agriculture

For agricultural areas, Project Managers would apply the following mitigation measures, as appropriate.

> *The **Farmland Protection Policy Act** (7 USC 4201 et seq.) directs Federal agencies to identify and quantify adverse impacts of Federal programs on farmlands. Vegetation management activities will not contribute to irreversible conversion of agricultural land to non-agricultural uses.*

- *With the use of applicable mitigation measures,* methods that may be appropriate for controlling vegetation in agricultural areas include manual, mechanical, biological (for noxious weeds), and herbicide (spot, localized applications, and [potentially] broadcast and aerial applications).
- Prevent the spread of noxious weeds by cleaning seeds from equipment before entering cropland.
- *If on grazing lands and there is potential for pine needle poisoning,* do not lop and scatter pine tree vegetative debris—machine-chip or haul debris off-site.
- *If using herbicides on grazing lands,* comply with grazing restrictions as required per herbicide label.
- *If using herbicides near crops for consumption,* comply with pesticide-free buffer zones, if any, as per label instructions.
- *For rights-of-way adjacent to agricultural fields,* observe appropriate buffer zones necessary to ensure that no drift will affect crops.
- *For rights-of-way near organic farms,* determine appropriate no-herbicide or spot-herbicide-only buffer zones, or provide for the

owner to maintain the right-of-way, by way of a vegetation management agreement.

- *If reseeding*, determine whether any of the adjacent properties are being, or will in the immediate future be, used for growing grass seed, especially high-purity strains.
- *If reseeding near grass-seed fields*, consult with the area seed certification and registration authority to determine whether buffer zones are necessary, appropriate grass mixtures allowed, and appropriate modes of seeding used.

Residential/ Commercial

For residential or commercial areas, Project Managers would apply the following mitigation measures, as appropriate.

> ***The Federal Noise Control Act of 1972*** *(42 U.S.C. 4903) requires that Federal entities such as Bonneville comply with state and local noise requirements.*

- *With the use of applicable mitigation measures*, methods that may be appropriate for controlling vegetation in residential/ commercial areas include manual, mechanical, biological (for noxious weeds), and herbicide (spot, localized applications and [potentially] broadcast applications).
- *Where appropriate*, assign responsibility for tall-growing species on the rights-of-way to underlying property owner (e.g., to owners of orchards or Christmas tree farms).
- *If appropriate*, offer to replace trees (with a low-growing species), or use tree growth regulators instead of removing a tree.
- *If using herbicides*, ensure that treated areas are posted and reentry intervals are specified and enforced in accordance with label instructions.

FS-managed Lands

For FS-managed lands, Project Managers would apply the following mitigation measures, as appropriate.

> *The* ***Federal Land Policy and Management Act*** *(1976) provides guidance for the uniform, periodic, and systematic inventories of Federal public lands and their resources.*

- Use, update, or develop site-specific vegetation management plans for rights-of-way that cross FS-managed lands.

- Review existing site-specific vegetation management plans for consistency with this EIS (including measures specific to Forest Service-managed lands—see **Appendix F** for examples). This EIS does not supercede or revoke any existing agreements or site-specific vegetation management plans. However, if appropriate, work with local Forest Officer in revising existing plans to achieve consistency.
- Develop site-specific vegetation management plans (where they do not already exist) using the Planning Steps and mitigation measures in this EIS (including measures specific to Forest Service managed lands—see **Appendix F** for examples). Conduct appropriate NEPA analysis and documentation (see Planning Step #7).
- Contact the local Forest Supervisor's or District Ranger's office, in advance of any proposed vegetation management activity (non-emergency) on national Forest System lands (or follow direction in site-specific vegetation management plans for notification procedures). Notification should be made as far in advance of the planned date of on-the-ground implementation as is reasonably possible, in order for appropriate environmental compliance to be conducted.
- *If expecting the FS to conduct environmental data collection or analysis,* allow more than one year for completion, and be prepared to reimburse the FS for the costs in conducting such activities.
- *With the use of applicable mitigation measures,* methods that may be appropriate for controlling vegetation on FS-managed lands include manual, mechanical, biological (for noxious weeds), and herbicide (spot, localized applications, and [potentially] broadcast and aerial applications).
- Comment on and engage in Forest Service proposals to revise or amend Forest Land and Resource Management Plans, to assure that the designation and management of utility corridors are adequately addressed wherever appropriate.
- See **Appendix F** for additional mitigation measures specific to FS-managed lands.

BLM-managed Lands

For BLM-managed lands, Project Managers would apply the following mitigation measures, as appropriate.

- Use, update, or develop site-specific vegetation management plans for rights-of-way that cross BLM-managed lands.
- Contact the local BLM office, before implementing vegetation management activities on BLM lands (or follow direction in site-specific vegetation management plans for notification procedures). Notification should be made as far in advance of the planned date of on-the-ground implementation as is reasonably possible.
- *For NEPA compliance on BLM-managed lands,* use the Planning Steps and mitigation measures in this EIS, including the BLM-specific mitigation measures (see **Appendix G**) and appropriate NEPA analysis and documentation (see Planning Step #7*)*.
- Consult with appropriate BLM office regarding presence of natural resources and features and appropriate buffers or other mitigation measures.
- *With the use of applicable mitigation measures,* methods that may be appropriate for controlling vegetation on BLM-managed lands include manual, mechanical, biological (for noxious weeds), and herbicide (spot, localized applications, and [potentially] broadcast and aerial applications).
- See **Appendix G** for additional mitigation measures specific to BLM-managed lands.

Other Federal Lands

For facilities that are on other Federal lands, Project Managers would apply the following mitigation measures, as appropriate.

- *With the use of applicable mitigation measures,* methods that may be appropriate for controlling vegetation on other Federal lands include manual, mechanical, biological (for noxious weeds), and herbicide (spot, localized, broadcast, and aerial applications).
- Notify, consult, and cooperate with other Federal agencies when scheduling vegetation control activities on rights-of-way over their lands.

State and Local Lands

For facilities that are on state or county/city lands, Project Managers would apply the following mitigation measures, as appropriate.

- *With the use of applicable mitigation measures,* methods that may be appropriate for controlling vegetation on state or local lands

include manual, mechanical, biological (for noxious weeds), and herbicide (spot, localized, broadcast, and aerial applications).

- *When facilities cross state or local agency lands*, notify, and cooperate with those entities (such as State Parks or county lands) prior to vegetation control activities, as appropriate.

Tribal Reservations

For facilities that are on Tribal reservations, Project Managers would apply the following mitigation measures, as appropriate.

Bonneville's Tribal Policy *(April 1996) follows the* ***Department of Energy's American Indian Policy*** *(DOE Order No. 1230.2) for Bonneville's Trust responsibility as a Federal agency; it provides a framework for a government-to-government relationship with the thirteen Federally recognized Columbia Basin Tribes. Notify, consult, and cooperate with Tribal representatives when scheduling right-of-way vegetation control activities that may affect Tribal Trust, Treaty, or cultural resources.*

- If possible and practical, develop a cooperatively written right-of-way vegetation management plan with the Tribe. The plan should address specific land-use or environmental resources along the corridor that need consideration, including appropriate mitigation measures identified in this EIS.
- If possible, consider working with the Tribes on replanting of traditional-use plants. Low-growing traditional-use plants may include blue camas, bitter root, wild celery, biscuit root, Canby's desert parsley, Indian carrot/false caraway, field mint, blue huckleberries.
- *With the use of applicable mitigation measures,* methods that *may* be appropriate for controlling vegetation on Tribal reservations include manual, mechanical, biological (for noxious weeds), and herbicide (spot, localized applications and [potentially] broadcast and aerial applications).

See **Cultural Resources** discussion, later in this chapter, for additional coordination/consultation with Tribes regarding cultural resources.

3. Identify natural resources.

In this step, Project Managers would do the following:

- Identify natural resources, or the potential for the presence of natural resources, that could be affected by vegetation management activities. These resources might include wetlands, springs, and threatened or endangered species, etc. Any consultations or contacts made through Step 2, above, could be used to help identify the natural resources along a given right-of-way or site.
- Determine whether mitigation measures should be applied or specific control methods should be used, based on the presence or potential presence of those resources.

Water Resources

For water resources (streams, rivers, lakes, wetlands, wells), Project Managers would apply the following mitigation measures, as appropriate.

*Discharge Permits under the **Clean Water Act** regulate discharges into waters of the United States, including wetlands.*

***Section 401** of the Clean Water Act regulates discharges into navigable waters.*

***Section 402** of the Clean Water Act regulates storm water discharges associated with industrial activities under the National Pollutant Discharge Elimination System (NPDES). The regulation includes a general permit authorizing Federal facilities to discharge storm water from construction activities (that can include tree clearing) disturbing land of 2 or more ha (5 or more ac.) into waters of the U.S. The conditions for the permit include preparation of a Storm Water Pollution Prevention (SWPP) plan.*

***Section 404** of the Clean Water Act requires permits from the U.S. Army Corps of Engineers to discharge dredged or fill material into waters of the U.S.*

*The Department of Energy (Bonneville's parent agency) has regulations for environmental review to be in compliance with **Floodplains/ Wetlands** requirements (10 CFR 1022.12, and Executive Orders 11988 and 11990).*

*The **Safe Drinking Water Act** (42 U.S.C. sec 300f et seq.) is designed to protect the quality of public drinking water and its sources. State and local public drinking water regulations including sole-source aquifers.*

- *With the use of applicable mitigation measures,* methods that may be appropriate for controlling vegetation near water resources

include manual, biological (for noxious weeds), some mechanical methods, and potentially some herbicides (see Tables III-1, -2, and -3 for Buffer Zones and Herbicide-free Zones).

- Use selective control methods and take care not to affect non-target vegetation.
- Leave vegetation intact, where possible.
- Recognize that any discharge of material (displaced soils, and in certain circumstances, vegetation debris) within a water of the U.S. may be subject to Corps regulations under the Clean Water Act.
- Notify inspector and the State of any amount of herbicide spill in or near water.
- Consider climate, geology, and soil types in selecting the herbicide/adjuvant with lowest relative risk of migrating to water resources.
- *When using herbicides/adjuvants*, apply appropriate buffer zones to preclude the possibility of herbicide movement from the application site to adjoining water bodies. See Tables III-1, III-2, and III-3.
- The buffers in tables III-1, III-2, and III-3 are to be used unless other agencies, local authorities, or T&E consultations require more strict buffers. In cases of more strict local buffers, those would apply.
- For noxious weed treatment, try to apply buffer zones, recognizing that treatment may be necessary within zones for control in compliance with local weed boards and Federal noxious weed laws.

Table III-1: Buffer Widths to Minimize Impacts on Non-target Resources

Herbicide & Adjuvant Ecological Toxicities and Characteristics	Buffer Width from Habitat Source per Application Method (i.e., stream, wetland, or sensitive habitat)				
	Spot	Localized	Broadcast[1]	Aerial[2]	Mixing, Loading, Cleaning
Practically Non-Toxic to Slightly Toxic	Up to Edge[3,4]	Up to Edge[3,4]	10.7m[3,4] (35 ft.)	30.5m[4] (100 ft.)	30.5m[5] (100 ft.)
Moderately Toxic, or if Label Advisory for Ground/ Surface Water	7.6m[3,4] (25 ft.)	10.7m[3,4] (35 ft.)	30.5m[3,4] (100 ft.)	76.2m[4] (250 ft.)	76.2m[5] (250 ft.)
Highly Toxic to Very Highly Toxic	10.7 m[3,4] (35 ft.)	30.5m[3,4] (100 ft.)	Noxious weed control only. Buffer as per local ordinance	Noxious weed control only. Buffer as per local ordinance	76.2m[5] (250 ft.)

[1] Using ultra low volume (ULV) nozzles with orifice size and spray pressure set to produce droplets at a minimum of 150 microns, boom or nozzle heights at the lowest possible height, and cross-wind speed of less than 10 mph.[3]

[2] Using ULV nozzles with orifice size and spray pressure set to produce droplets at a minimum of 150 microns, minimizing air shear relative to nozzle angle and aircraft speed, boom length at 70% or less of wingspan/rotor, swath adjustment not to exceed 60 feet based on maximum cross-wind speed of less than 10 mph, minimum safety clearance application height, and herbicide tank mixture dynamic surface tension is less than 50 dynes/cm.[3]

[3] Goodrich-Mahoney, J.W., Determination of the Effectiveness of Herbicide Buffer Zones in Protecting Water Quality, Electric Power Research Institute, Report No. TR-113160, September 1999

[4] Calculated from: A Summary of Ground Application Studies, Spray Drift Task Force, 1997
[5] BPA Best Management Practice

Table III-2: Herbicide-free Zones for Rights-of-way, Substations, Electric Yards, and Non-electric Facilities

Zone	Buffer Width
Agricultural Irrigation Source of Any Kind (Wet or Dry)	15m (50 ft.) from each bank (linear) or well (radius) for any herbicide.
Domestic/Public Drinking Water Well	50m (164 ft.) radius for any herbicide having a ground/surface water advisory* 15m (50 ft.) radius for any other herbicide
Domestic/Public Drinking Water Intakes/Spring Developments	For slopes <10% 50-m (164- ft.) radius for any herbicide having a ground/surface water advisory*
	15-m (50-ft.) radius for any other herbicide For Slopes >10% <30% 150-m (492-ft.) radius for any herbicide having a ground/surface water advisory* 50-m (164-ft.) radius for any other herbicide For slopes >30%
	300-m (984-ft.) radius for any herbicide having a ground/surface water advisory* 100-m (328-ft.) radius for any other herbicide
Sole Source Aquifers	As per local aquifer management plan.

*as stated on the label

Table III-3: Additional Herbicide-free Zones for Substations, Electric Yards, and Non-electric Facilities

Zone	Buffer Width
Secondary Containment Liners, Vaults, and Lagoons	2-m (6-ft.) radius for any herbicide having a ground/surface water advisory* Up to edge of containment feature for any other herbicide
Storm Drains that Discharge Offsite	2-m (6-ft.) radius for any herbicide having a ground/surface water advisory*, or, if moderately/highly/very highly toxic to any aquatic vertebrate or invertebrate
	Up to edge of drainage feature for any other herbicide

Table III- 4: Mechanical Buffer Zones

Ground-disturbing Mechanical Methods	Buffer Width From Habitat Source, i.e., Stream or Wetland
Slopes under 20%	10.7 m (35 ft.)*
Slopes over 20%	No disturbance

* USDA, Natural Resources Conservation Service (NRCS), Conservation Practice Standard, Riparian Forest Buffer, Code 391A, 1997

Threatened or Endangered Species and Critical Habitat

For threatened or endangered (T&E) plant or animal species, Project Managers would apply the following mitigation measures, as appropriate.

*The **Endangered Species Act (ESA)** (16 USC 1536) provides for conserving endangered and threatened species of fish, wildlife and plants. Federal agencies must determine whether proposed actions would adversely affect any endangered or threatened species.*

- With the use of applicable mitigation measures, methods that may be appropriate for controlling vegetation in places that potentially have sensitive or threatened and endangered (T&E) species include manual, biological (for noxious weeds), mechanical (except in areas of T&E plants), and herbicide (spot and localized applications.
- Determine whether any T&E species or designated T&E critical habitats are potentially present in the project area (through the use of T&E maps, specialist's determination, or T&E list from the U.S. Fish and Wildlife Service (USFWS) and/or National Marine Fisheries Service (NMFS)).
- *If T&E species or designated critical habitats are potentially present in the project area,* determine whether they are likely to be affected. If project is likely to affect but not *adversely* affect T&E species, obtain concurrence from the USFWS and/or NMFS.
- *If it is determined that the project is likely to adversely affect T&E species or their designated critical habitats,* initiate formal consultation with the USFWS and/or NMFS and prepare a Biological Assessment according to 40CFR Part 402 or follow measures developed through existing programmatic considerations.

- Apply mitigation measures (such as timing restrictions, or specific method use) resulting from determinations or consultations.
- (Bonneville is currently in consultation with NMFS and the USF&W Service for T&E anadromous and resident fish species. Protocols developed through this consultation shall be applied to vegetation management activities.)

Marbled Murrelet

The specifications below are based on Bonneville consultation with USFWS (1995) on our maintenance program, which includes vegetation management. These specifications apply in areas determined to be suitable marbled murrelet habitat (Peterson, 1995). These measures are appropriate for manual and mechanical tree removal and noise disturbance from all vegetation control activities. Herbicide use will require further consultation.

- *If a tree needing removal is greater than 80 cm (32 in.) in diameter at breast height and has suitable nest tree characteristics,* initiate formal consultation with the USFWS.
- *During core breeding season, from April 1- August 5,* do not carry out maintenance activities (e.g., chainsaw work) that produce noise above ambient noise levels, within 0.4 km (0.25 mi.) of known marbled murrelet habitat or occupancy (based on marbled murrelet maps).
- *During the late breeding season, from August 6 - September 15,* do not carry out maintenance activities using motorized equipment within 0.4 km (0.25 mi.) of marbled murrelet habitat or occupancy within two hours after sunrise or within two hours before sunset.

Spotted Owl

The suitable spotted owl habitat specifications below are based on Bonneville consultation with USFWS (1992) on Bonneville's maintenance program, which includes vegetation management. (USFWS, 1992). Theses measures are appropriate for manual and mechanical tree removal and noise disturbance from all vegetation control activities. Herbicide use will require further consultation.

- *Where opportunity exists,* suspend vegetation management activities within 0.4 km (0.25 mi.) of spotted owl critical habitat between March 1 and June 30, unless the owls are shown not to be nesting.

- Examine any large trees (greater than 20.3 cm [8 in.] in diameter at breast height east of the Cascades, or 28 cm [11 in.] in diameter at breast height west of the Cascades) that need to be removed in spotted-owl habitat for evidence of owls. If a tree has evidence of owl nesting activity, conduct formal consultation with the USFWS.
- *In case of an emergency danger tree removal—a tree suddenly becoming an imminent threat to the line, posing a danger to life and property*—immediately examine the felled tree for evidence of owl nesting. If such evidence is found, start emergency consultation with the USFWS, or, if the situation occurs during off-duty hours, conduct after-the-fact emergency consultation the next business day.

Other Species

*The **Fish and Wildlife Conservation Act of 1980** (16 USC 2901 et seq.) encourages Federal agencies to conserve and promote conservation of non-game fish and wildlife species and their habitats. In addition, the Fish and Wildlife Coordination Act (16 USC 661 et seq.) requires Federal agencies undertaking projects affecting water resources to consult with the USFWS and the state agency responsible for fish and wildlife resources.*

For other fish, wildlife, or protected plant species, Project Managers would apply the following mitigation measures, as appropriate.

- Through coordination with the state department of fish and wildlife or appropriate Federal agency, determine whether any other locally listed (state, FS, BLM) endangered, threatened, or sensitive species or habitats are potentially present in the project area.
- *If listed species or habitats are potentially present in the project area,* determine whether they are likely to be affected and what appropriate mitigation measures should be applied to lessen potential impacts (such as timing restrictions, or specific method use).
- Where possible and appropriate, leave brush piles for small animal habitats.
- Where possible and appropriate, top and leave tall dead trees (snags) in place for wildlife habitat.

Visual Resources

In visually sensitive areas, Project Managers would apply the following mitigation measures, as appropriate.

- *With the use of applicable mitigation measures,* methods that may be appropriate for controlling vegetation in visually sensitive areas

include manual, mechanical, biological (for noxious weeds), and herbicide (spot and localized applications).

- Limit use of broadcast foliar application of herbicide to reduce the creation of large areas of browned vegetation.
- *At road crossings, highways/visual overlooks,* leave sufficient vegetation, where possible, to screen view of right-of-way.
- *If the area is a very sensitive visual resource,* consider (1) planting low-growing tree seedlings adjacent to the right-of-way (or providing low-growing seedlings to landowner for planting); (2) softening the straight line of corridor edge by cutting some additional trees outside the right-of-way; or (3) if possible, leaving some low-growing trees within the right-of-way.

Cultural Resources

For cultural resources, Project Managers would apply the following mitigation measures, as appropriate.

National Historic Preservation Act (1966, 16 U.S.C. 470) *requires Federal agencies to take into account the potential effects of their undertakings on properties on or eligible for the National Register of Historic Places.*

Archeological Resources Protection Act *prohibits excavation, removal, damage, or other alteration or defacement of archeological resources on Federal or Indian lands without a properly issued permit.*

American Indian Religious Freedom Act *requires Federal land managers to include consultation with traditional Native American religious leaders in their management plans and guarantees First Amendment rights for traditional religions.*

The Historic Sites Act of 1935*, the basis for the National Historic Landmarks Program, provides for the preservation of historic American sites, buildings, objects and antiquities of national significance.*

Native American Graves Protection and Repatriation Act of 1990 (PL101-601) *recognizes the property rights of Native Americans in certain cultural items, including Native American human remains, funerary objects, sacred objects, and items of cultural patrimony. In cases involving the inadvertent discovery of Native American human remains or defined cultural items during activities occurring on Federal or Tribal lands, the activity must be halted temporarily, the items protected, and the appropriate Federal agency and Tribal authority notified of the discovery.*

- *With the use of applicable mitigation measures,* methods that may be appropriate for controlling vegetation in areas with potential cultural resources include manual, biological (for noxious weeds),

non-soil-disturbing mechanical, and (potentially) herbicide (spot, localized, broadcast and aerial applications).

- Contact Tribes with traditional-use areas of Trust or Treaty resources in the project area (even when not crossing reservation lands) to determine the potential presence of traditional-use plants or other cultural resources and to determine the desired level of Tribal involvement in planning efforts. (Restrictions such as seasonal constraints for vegetation control, avoidance of certain areas, or using methods that do not affect non-target plants may be required.)

- *If potentially affecting cultural resources (especially if proposing mechanical ground-disturbing methods*) consult with the appropriate State Historic Preservation Officer or Tribal Historic Preservation Officer (THPO) if on reservation lands with designated THPO.

Steep Slopes/ Unstable Slopes

For steep or unstable slopes, Project Managers would apply the following mitigation measures, as appropriate.

- *With the use of applicable mitigation measures,* methods that may be appropriate for controlling vegetation in areas of steep slopes or unstable soils include manual, biological (for noxious weeds), non-soil-disturbing mechanical, and herbicide (spot, localized, broadcast and aerial applications).
- Do not using ground-disturbing mechanical equipment to clear on slopes over 20%.
- Avoid using granular or total vegetation management (non-selective) herbicides on slopes over 10%.
- Do not use herbicides with a high potential for surface runoff.
- Perform mechanical clearing when the ground is dry enough to sustain heavy equipment.
- Reseed or replant seedlings on slopes with potential erosion problems and/or take other erosion control measures as necessary.

Spanned Canyons

For spanned canyons, Project Managers would apply the following mitigation measures, as appropriate

- Avoid removing vegetation where it will not grow up into the safety zones for the transmission line.

4. Determine vegetation control methods.

In this step, Project Managers would do the following:

- Determine the appropriate control method or combination of methods to be used for a specific facility or right-of-way, based on the three steps above: 1) facility and vegetation control needs, 2) type of land-uses and contacts with land owners/managers, and 3) natural resources present.
- *For all methods using machinery or vehicles (i.e. chainsaws, trucks, graders),* keep the equipment in good operating condition to eliminate oil or fuel spills or excess exhaust.
- Do not wash equipment or vehicles at a stream.

Manual

For the use of manual methods, Project Managers would apply the following mitigation measures, as appropriate.

Manual control methods include the following: pulling weeds; cutting with shears, clippers, chainsaws, brush saws, or axes; steaming with a hand-held hot steam device (electric yards); burning plants with propane burners (electric yards); and girdling by cutting a ring around the trunk of the tree.

- *When crews are working during the fire season*[1], each crew shall have the proper fire-suppression tools and materials, as required by the responsible fire control agency.
- Equip power-cutting tools with approved spark arresters.
- Cut conifers below the lowest live limb to eliminate the continued growth of lateral branches.
- *If planning follow-up herbicide stump treatment,* cut stumps flat for application of the chemical.
- *If planning follow-up herbicide stump treatment in rights-of-way,* cut deciduous brush about 15.2 cm to 20.3 cm (6 to 8 in.) above the ground line.
- *If planning follow-up herbicide stump treatment in access roads,* cut deciduous stumps 5 to 10 cm (2 to 4 in.) above the ground line.
- *If planning follow-up herbicide stump treatment,* apply herbicides as soon as possible after cutting. (If herbicide is not applied soon

[1] Fire season is defined by the fire protection district that has jurisdiction in that area.

after the vegetation has been cut, it may be best to wait until resprouting has occurred and then spray by foliar technique.)

- *For safety,* cut all brush stumps flat where possible. (Angular cuts leave a sharp point that could cause injuries if fallen upon.)
- *For cutting trees close to "live" power lines,* use only qualified personnel.

Mechanical

For the use of mechanical methods, Project Managers would apply the following mitigation measures, as appropriate.

Mechanical methods include the use of chopper/shredders, walking brush controllers, mowers, feller-buncher machines, roller-choppers, and blading.

- Do not use ground-disturbing mechanical equipment to clear on slopes over 20%.
- Perform soil-disturbing or heavy mechanical clearing when the ground is sufficiently dry to sustain heavy equipment.
- Use measures to control the spread of noxious weeds.
- Do not use ground-disturbing mechanical methods in areas with T&E plant species unless determined appropriate through consultations.
- Do not use ground-disturbing mechanical methods in areas with cultural resources unless determined appropriate through consultations.

Biological Controls

For the use of biological controls, Project Managers would apply the following mitigation measures, as appropriate.

- Use only those biological control agents (insects) that have been tested to ensure they are host-specific.

Herbicides

For the use of herbicide methods, Project Managers would apply the following mitigation measures, as appropriate.

*The **Federal Insecticide, Fungicide and Rodenticide Act (FIFRA)** regulates all herbicides and herbicides labels; classifies herbicides as "general" or "restricted" use; describes written records certified applicators must keep; and may give fines of up to $25,000 and jail sentences of up to one year for misapplication of herbicides and violation of FIFRA standards.*

***Resource Conservation and Recovery Act (RCRA)** regulates the disposal of toxic wastes (including the disposal of unused herbicides).*

Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) *regulates how to clean up spills of hazardous materials and when to notify agencies of spills.*

Superfund Amendments and Reauthorizations Act (SARA)*, also known as the Emergency Planning and Community Right-to-Know Act (EPCRA), sets up emergency response committees, requires industrial facilities to provide written plans in the event of a "chemical emergency," and requires annual inventory of all chemicals.*

Toxic Substance Control Act (TSCA) *provides authority for EPA to secure information on all new and existing chemical substances.*

Federal Occupational, Safety and Health Administration (OSHA) *protects worker health and safety, including requiring that workers be provided with a Material Safety Data Sheet (MSDS) for hazardous materials including herbicides.*

Food, Agriculture, Conservation, and Trade (FACT) *Act of 1990, and amended in 1995, addresses restricted-use pesticide record-keeping.*

- Follow product label directions, as required by FIFRA, including "mandatory" statements (such as registered uses, maximum use rates, application restrictions, worker safety standards, restricted entry intervals, environmental hazards, weather restrictions, and equipment cleaning).
- Follow all product label "advisory" statements (such as techniques for mixing, applying and cleaning within the mandatory requirements, recommendations for protection clothing, guidelines for differing soil types, etc).
- Always have a copy of the herbicide label and Material Safety Data Sheets (MSDS) at work sites during all mixing and applications.
- Ensure that all herbicide applications are conducted in the presence of a licensed applicator valid for the state where the work is located.
- Keep records of each application, including the active ingredient, formulation, application rate, date, time, location, etc. Records must be available to state and Federal inspectors.
- Ensure the use of EPA-approved herbicides that have been reviewed by Bonneville for effectiveness and environmental considerations.

- See **Water Resources** for herbicide mitigation measures near wetlands, streams, rivers, ponds, and wells.
- *Before application*, thoroughly review the right-of-way to identify and mark, if necessary, the buffer requirements.
- Observe restricted entry intervals specified by the herbicide label and post public warning signs where required.

Bonneville is proposing to use the following 23 herbicide active ingredients:

2,4-D	Fosamine ammonium	Oryzalin
Azafenidin*	Glyphosate	Paclobutrazol
Bromacil	Halosulfuron-methyl	Picloram
Chlorsulfuron	Hexazinone	Sulfometuron-methyl
Clopyralid	Imazapyr	Tebuthiuron
Dicamba	Isoxaben	Triclopyr
Dichlobenil	Mefluidide	Trinexapac-ethyl
Diuron	Metsulfuron-methyl	

* Pending registration by EPA

Each herbicide has information on the label that must be followed. The information given below is not intended to replace reading the labels.

Drift and Leach Reduction

- Use drift reduction agents, as appropriate, to reduce the drift hazard when applying herbicides as broadcast, aerial, or localized foliar treatments.
- *When trying to reach the upper foliage of tall brush*, take care to prevent drift or spraying of non-target species.
- When selecting herbicides/adjuvants, consider climate, geology, and soil types when using formulations with ground- or surface water advisories or restrictions.
- Avoid application (with herbicides that could damage subsequent crops) to ground that is to be planted later.

- Pay close attention to present weather and changing weather:
  - ✶ **wind** (may blow dry or wet spray applications away from treatment site),
  - ✶ **humidity** (if humidity is too low, herbicide effectiveness may be reduced due to volatilization and closed pores on surface of vegetation),
  - ✶ **temperature inversions** (may cause movement of evaporated "clouds" of herbicide formula to non-target vegetation or evaporation of carrier, reducing drop size and increasing drift potential), and/or
  - ✶ **heavy rainfall** (may wash herbicide off plants or soil and move away from treated area).

Table III-5, below, identifies Bonneville's minimum weather restrictions (to be used in the absence of more stringent label instructions and restrictions.)

Table III-5: General Climate Restrictions for Herbicide Applications (restrictions may vary according to label instructions and state or local requirements)

Control Method	Max. Temp*	Min. Humidity	Precipi-tation	Wind	Season
Stump	____	_____	Minimal	_____	frost-free (wood must not be frozen for penetration)
Foliar	75°F	30%	None	0-5 mph	spring/summer (or as specified on herbicide label)
Basal	75°F	30%	Minimal	0-10 mph	frost-free (wood must not be frozen for penetration)
Pellet	____	_____	Moderate required	_____	frost-free
Aerial	70°F	50%	None	0-5mph	growing season

* Evaporation (volatilization) of some herbicides occurs with higher temperatures, causing drift and potential damage to non-target plants. Volatilization is more likely a problem with ester formulations than amine formulations.

Spot Stump Application

A spot application is treatment of individual plant(s) with the least amount of chemicals possible. Stump treatments are done by hand (squirt bottle or canister) or by backpack.

- *For spot treatment*, cut stumps flat, 15.2 – 20.3 cm (6 – 8 in.) above ground (except for access roads and around structures sites which should be 5 – 10 cm (2 – 4 in.) above ground) to facilitate treatment and reduce trip and fall hazards. Treatment should occur within 8 hours to prevent resprouting.
- Directly spray the root collar area, sides of the stump, and/or the outer portion of the cut surface, including the cambium, until thoroughly wet, but not to the point of runoff. This would avoid, or minimize, deposition to surrounding surfaces.

Localized Basal Application

Localized herbicide application is the treatment of individual or small groupings of plants. Basal is the treatment of the base—bark or stem—of a plant.

- Apply basal treatments at any time during the year except when snow or water prevent application to the groundline. However, in general, treatments are more effective during the spring (when plants are leafing out) and less effective in the fall (when they are dropping their leaves).
- Use basal bark treatments to control woody plants with stems less than 15.2 cm (6 in.) in diameter.

Localized Foliar Application

Foliar treatment is the treatment of the leaves of the plant.

- Do not apply when rain is imminent (better plant penetration is obtained when herbicide dries and is absorbed; rain may wash herbicide off).
- Apply foliar treatments during active growing and after leaves have developed.

Localized and Broadcast Pellet Application

This is the application of granular or pellet herbicides, treating either small groupings of plants by hand or large areas with dispersing machines.

- Observe buffer zones and maintain recommended buffer widths.
- Do not broadcast pellets where there is danger of contaminating water supplies.

- Apply pelletized or granular herbicides as recommended by label instructions regarding adequate rainfall/irrigation following application to ensure pellets dissolve and the herbicide can be carried into the root system.
- Do not apply pellet herbicides within three times (3X) the crown width (or dripline) of an off-right-of-way tree.
  - ✶ *When soils are rocky or shallow, the slope is away from the right-of-way, or the size and age of the off-right-of-way vegetation may indicate that part of the root system may be within the right-of-way,* consider observing greater pellet edge distances.

Broadcast Application (Liquid Herbicide)

This is the application of herbicides by use of tractors or trucks that treat a large area.

- Observe buffer zones and maintain recommended buffer widths (see Tables III-1, -2, and -3 on pages 64, and 65).
- Do not use broadcast application where there is danger of contaminating water supplies (see Tables III-1, -2, and -3).
- Do not use the broadcast method where there are adjoining susceptible crops and ornamental bushes.

Aerial

This is the application of herbicides with a helicopter or airplane.

- Use only those herbicides/adjuvants registered for aerial application and apply according to all label instructions and restrictions.
- Consider surrounding land use before assigning aerial spraying as method. Aerial spraying may be limited by incompatible adjacent land use, such as domestic water sources, some agricultural areas, and densely populated areas. Observe buffer zones and maintain recommended buffer widths (see Tables III-1, -2, and -3 on pages 64 and 65).
- Do not use aerial application where areas of browned vegetation are not acceptable.
- Use drift reduction agents, if applicable, to minimize drift. The use of a microfoil boom may preclude need of drift reduction agents.

- Do not make aerial application when the wind velocity exceeds 5 mph. (See weather requirements.)
- Fly no higher than necessary to achieve appropriate application, reduce drift potential, and maintain flight safety.

Mixing

- Prepare spray mixture in accordance with the label(s) instructions (do not exceed the amount of herbicide per acre specified on the label).
- Perform mixing on rights-of-way, within electric yards, or other suitable locations and with respect to buffer zones and recommended buffer widths.
- Mix aerial applications only at a heliport (permanent or temporary).
- Always use siphon prevention devices/methods when filling herbicide tanks from domestic water supplies.

Spills and Misapplications

Most herbicide accidents and spills occur during mixing, loading and washing of equipment. The key to prevention is to ensure all equipment and vehicles are well-maintained and that personnel are well-trained and equipped.

- Refer to MSDSs for emergency response information.
- Report spills and misapplications to EPA in accordance with the Government Agency Plan (GAP). In addition, report spills and misapplications and clean-up according to various state and Federal laws and regulations. At a minimum:
  - Contain spill or leak, or halt misapplication;
  - Isolate area;
  - Request help and make appropriate notifications to Bonneville and state officials;
  - As soon as possible, notify the owner of the land, whether the spill occurs on or off right-of-way.
  - Clean up the spill;
  - Cleanup equipment and vehicles;
  - Dispose of cleanup materials, and
  - Follow up with appropriate cleanup documentation.

Handling

- *During transportation*, secure herbicide containers to prevent movement within the vehicle or loss from the vehicle during the operation of the vehicle.
- Do not store herbicides in passenger compartment of vehicles.
- *When spray equipment is not being used*, all valves and tank covers shall be closed during any movement of the vehicle.
- Firmly secure to the frame of the vehicle any portable tanks used for herbicide application.

Safety

- *On jobs where herbicide splash may occur,* always use suitable goggles or face shield as required.
- Always use personal protective gear listed on the herbicide label.
- Do not permit workers with a known allergy to herbicides to participate in herbicide applications.
- Provide applicators with an on-site hand washing facility.
- Wash hands before eating, drinking, or smoking after applying herbicides and take a hot shower at the conclusion of work.
- Do not smoke or consume food or drinks during the application of herbicides.
- Promptly change any clothing substantially contaminated by a herbicide if the material contacts the skin and the herbicide cannot be adequately removed. Each worker is to have one complete change of work clothes on the site.
- Use self-contained[2] herbicide handling equipment when appropriate and available to reduce worker exposure during herbicide mixing and handling.

Storage of Herbicides, Containers, and Equipment

- Follow label requirements for storage.
- Permanent storage facilities will meet the following requirements:

[2] Self-contained herbicide handling equipment is equipment designed to limit worker exposure to herbicides. Examples: premixed herbicide containers that can be attached to a backpack sprayer (to limit the pouring and addition of water or other carriers to common container); canisters that are injected into the base of a tree and that open to release herbicide, once injected.

- ✶ dry;
- ✶ protected from freezing or excessive heat;
- ✶ well-ventilated;
- ✶ locked and, where possible, secured by gates and/or a climb-proof fence;
- ✶ impervious flooring;
- ✶ all doors on storage areas properly posted to identify the use of the building for herbicide storage;
- ✶ spill containment measures or devices;
- ✶ a fully developed and maintained Spill Prevention and Countermeasure Plan;
- ✶ maintained ABC-type fire extinguisher, and
- ✶ meeting any additional standards set by State or local law.

- Store containers with labels plainly visible. Group together all containers of the same product.
- Inform local fire department, in writing, of the amounts, kinds, and locations of stored herbicides.
- Stack herbicide containers on stable pallets and out of the way, to prevent container damage by other traffic.
- Store containers upright. Seal all containers appropriately. If containers are not in good condition, repackage and label with a copy of the label and the relabeling date.
- Do not store herbicides in empty food or drink containers.
- *Where practicable*[3], maintain a complete inventory indicating number and identity of containers in storage unit.
- Label "contaminated with herbicides" any items used for handling herbicides at the storage site that might be used for other purposes. Do not remove item from site without thorough decontamination.
- Do not transfer herbicides to unmarked containers except for immediate use. Do not return unmarked containers back to a storage area.

---

[3] In some states, this is a requirement.

- Store herbicide containers in such a way that the oldest batch is used first and that partially used containers are used first.
- Clean spilled areas immediately. Inspect storage areas frequently for leakage.
- Store only minimum amounts of chemicals at field and temporary locations; order out no more chemicals than necessary.
- Dispose of unwanted or unusable products promptly and correctly.
- *In temporary locations, such as the field*, store all chemicals in buildings or vehicles that can be locked up.
- *During transportation*, do not leave vehicles transporting chemicals unattended unless the chemical is being carried in a closed van.

Disposals

- Use water-soluble packaging (WSP) when available, to eliminate the need for container disposal.
- Do not burn paper and carton-type containers unless so stated on the label.
- Dispose of containers or cartons in one of three ways:
  - ✶ **Triple rinse** containers of liquid herbicides before disposal. The rinse solution will be poured into the mix-tank and *used for treatment*. Each rinse solution shall be equal to at least 10 percent of the container volume. Dispose of the empty containers as noncontaminated waste, at any legal landfill dump.
  - ✶ Use a **rinsing nozzle** (instead of triple rinsing). A rinsing nozzle has a sharp point that can puncture a plastic or metal empty herbicide container and flush the container's contents into the mix tank.
  - ✶ Return **returnable** "mini-bulk" type containers to the distributor for refill.
- Dispose of unwanted or unusable herbicide products as contaminated waste at an approved waste facility.
- Dispose of contaminated materials (including contaminated soil) resulting from cleanup procedures according to agency directives.

- Place any contaminated materials to be transported in watertight containers.

5. Determine debris disposal and revegetation methods, if necessary.

In this step, Project Managers would do the following:

- Determine the appropriate debris disposal methods to be used, based on the four steps above: 1) facility and vegetation control needs, 2) type of land-uses and contacts with land owners/ managers, 3) natural resources present, and 4) control methods used.
- Determine whether reseeding or replanting is necessary for erosion control, preventing noxious weed infestation, establishing and promoting low-growing plants, or promoting wildlife habitat.

Vegetative Debris Disposal

For vegetative debris disposal, Project Managers would apply the following mitigation measures, as appropriate.

> *The **Federal Clean Air Act**, as revised in 1990 (PL 101-542, 42 USC 7401), requires the EPA and states to carry out programs intended to assure attainment of the National Ambient Air Quality Standards.*
>
> *Section 404 of the **Clean Water Act** requires permits from the U.S. Army Corps of Engineers to discharge dredged or fill material into waters of the U.S. (Vegetation debris left in a stream or wetland could be considered fill material.)*

- Do not permit debris from tree falling, cutting, or disposal to fall into or be placed in any watercourse, spring, pond, lake, or reservoir, *unless* there is approval from the appropriate authorities for stream habitat projects.
- *Where the scattering method of disposal is used,* perform in accordance with specific requirements or agreement with the responsible fire control agency.
- *If on grazing lands and there is potential for pine needle poisoning,* do not lop and scatter pine tree vegetative debris—machine-chip or haul debris off-site.

- *If using heavy equipment for piling debris*, perform when the ground is able to support equipment, and excessive rutting will not occur.
- Reduce vegetation debris accumulation that can produce a fire hazard along the right-of-way.
- *If debris is removed from site*, take debris to an approved dumpsite.
- *If burning vegetation debris piles*, burn off the right-of-way. Do not burn debris close enough to the right-of-way or facility where smoke could provide a conductive path from the transmission lines or electric equipment to the ground.
- *Before pile burning is attempted off the right-of-way*, secure from the applicable fire control agency any required permits for burning.
- *If burning vegetative debris piles*, keep piles relatively small to keep intense and prolonged heat from damaging the soil horizons.
- *If burning*, do not pile burn in or next to watercourses.
- *If burning*, do not use oil, diesel, or rubber to start pile burn fires.

Reseeding/ replanting

If reseeding or replanting is determined to be necessary, Project Managers would apply the following mitigation measures, as appropriate.

- Use seeds, seedlings, or plants that are consistent with management objectives and adapted to climatic conditions, soils, landscape position, and the site itself.
- Use native seed/plants if the species meet the objectives of the revegetation project, if the costs are reasonable, and if the seeds/plants are readily available in the quantity and quality needed to perform the project.
- *If native seed mixes are not reasonably priced or available in needed quantities*, consider a seed mix with some percentage of native seeds.
- Use high-purity seed; take actions to prevent purchase of seed contaminated with noxious weeds.
- Prepare seedbed properly.
- Use proper planting time and dates to ensure enough moisture for germination and growth before frosts.

- Use effective planting methods; drill seeding is most effective, broadcast methods are appropriate when drill method is impractical.
- Consider increasing seeding rates for critical erosion areas by 150% of recommended drill seeding rates.
- *For wildlife forage*, consider adding legumes.
- *For creating shrub cover*, consider adding shrub species.
- Plant tree and shrub stock according to local standard.
- Follow recommendations for applying appropriate soil amendments and fertilizers.
- If practical, control weed growth during seed or seedling establishment.
- *If possible*, protect the site from grazing for 1-2 years until establishment.
- See mitigation measures for seeding near agricultural areas.

6. Determine monitoring needs.

In this step, Project Managers would do the following:

- Determine what steps are needed to evaluate whether treatments or mitigation measures are working properly and to ensure that other resources are not being adversely affected.
- Visit rights-of-way shortly after treatment (at least within a year of treatment) to determine effectiveness:
  - ✶ Was target vegetation controlled?
- Visit rights-of-way within a year of treatment to determine whether any other impacts occurred:
  - ✶ Were non-targeted plants affected?
  - ✶ Were there any environmental impacts (e.g., erosion, water contamination, debris in wetlands)?
  - ✶ Were desired results for environmental resources achieved (water, fish, soil, scenic, cultural).

- Monitor to determine whether follow-up treatments or mitigation measures are necessary (e.g., erosion control measures such as mulching, hydroseeding, coconut blankets).
- Use monitoring to help determine methods/issues for next treatment cycle.

7. Prepare appropriate environmental documentation.

In this step, Project Managers would do the following for NEPA environmental compliance, as appropriate:

This Draft EIS was prepared according to the ***National Environmental Policy Act*** *(NEPA, 42 USC 4321 et seq.). NEPA is a national law that protects the environment. NEPA applies to all Federal projects or projects that require Federal involvement.*

- Document the outcome of the Planning Steps through the use of a checklist; attach any T&E species consultations or other supplemental information as appropriate.
- Develop a Supplement Analysis (a NEPA analysis tiered to this program-wide EIS) that compares the project-specific potential impacts with those disclosed in the EIS.
- Conduct further NEPA environmental review if anticipated impacts or site-specific work are *substantially different* from those evaluated in EIS, or if significant new circumstances or information relevant to environmental concerns are found. If further NEPA review is needed, it would be in the form of an EA or an EIS, depending on the extent of the substantially different impacts.

Other Permits and Requirements that Do Not Pertain to This Program

The following Federal requirements were reviewed through this EIS analysis and were found not to pertain to this program.

Energy Conservation at Federal Facilities *- Vegetation management activities do not include the operation, maintenance, or retrofit of an existing Federal building; the construction or lease of a new Federal building, or the procurement of insulation products.*

Rivers and Harbors Act section 10 - *No work or placement of structures would be expected for during implementation of vegetation management activities.*

Radon Gas and Indoor Air Quality Act *- This act does not apply because vegetation management activities would not involve the release of radon gas into the air, groundwater, or soil in levels that exceed the ambient radon level.*

Executive Order on Environmental Justice (EO 12898) - *This Executive Order was enacted to ensure that Federal agencies do not unfairly inflict environmental harm on economically disadvantaged and minority groups within the U.S. or any or its territories. The vegetation management program would not result in disproportionately high and adverse human health or environmental effects on minority populations and low-income populations.*

Coastal Zone Management Act *- This act requires that Federal actions be consistent, to the maximum extent practicable, with approved state Coastal Zone Management programs. Bonneville's vegetation management program is not expected to have coastal zone impacts.*

Migratory Bird Treaty Act - *Under this Act, it is unlawful to take, import, export, possess, buy, sell, purchase, or barter any migratory bird, except as allowed under hunting regulations established by the U.S. Fish and Wildlife Service. Take is defined as pursuing, hunting, shooting, poisoning, wounding, killing, capturing, trapping, or collecting. Bonneville's vegetation management program is not expected to have any of these impacts on migratory birds.*

Chapter IV: Changes

In response to comments, we made these changes in Chapter IV:

- Better defined the management approach that promotes low-growing plant communities.
- Added more detail to the definition of NE1, a non-electric program alternative.

Some small changes were also made to make the document clearer and easier to read. For specific comments and responses, please see Chapter VII.

Chapter IV
Program Alternatives

In this chapter:

- **Right-of-way Program Alternatives**
- **Electric Yard Program Alternative**
- **Non-electric Program Alternatives**

Alternatives Overview

This chapter describes and compares the different **program alternatives—**the different options for action to address the need to manage vegetation. Each set of alternatives identifies one alternative as "**current practice" (No Action**): this means that we keep doing what we are now, without any change.

*The National Environmental Policy Act says that, when agencies are making a decision on an action that could affect the environment, the agency must also consider **not** taking action—the "no action" alternative.*

In preparing this environmental study, we have analyzed, evaluated, and compared the alternatives. The resulting information will be used to decide which course of action to follow.

The alternatives are divided into three different programs, beginning on page 91. The "current practice," "environmentally preferred," and "Bonneville preferred" alternatives are also noted.

Right-of-way Program

The right-of-way program includes vegetation management on transmission-line rights-of-way and access roads, and along microwave beam paths. This program has three sets of alternatives that can be combined in different ways to create an overall right-of-way program. The different combinations will address the following three questions:

1. Which **management approach** should Bonneville adopt for maintaining rights-of-way?

Management Approach	
MA1 *(current practice)*	**Time-Driven** - uses repetitive maintenance cycles for vegetation control
MA2 (*Bonneville and environmentally preferred)*	**Promotion of Low-growing Plant Communities** – promotes low-growing plants where possible along the right-of-way, lessening intensity of maintenance in long term

2. What **methods package** (or "tool box") should Bonneville adopt for managing right-of-way vegetation?

Methods Package	
R1	**Manual, Mechanical, Biological**
R2 *(environmentally preferred)*	Manual, Mechanical, Biological **+ Herbicide – *spot and localized application***
R3 *(current practice)*	Manual, Mechanical, Biological, Herbicide – *spot, localized* **+ *broadcast application***
R4 *(Bonneville preferred)*	Manual, Mechanical, Biological, Herbicide – *spot, localized, broadcast* **+ *aerial application***

3. If Bonneville decides to use **herbicide methods** in the right-of-way program, on what **kinds of vegetation** should they be applied?

Vegetation Selection	
VS1	**Noxious Weeds** only
VS2 *(environmentally preferred)*	**Noxious Weeds & Deciduous**
VS3 *(Bonneville preferred) (current practice)*	**Any Vegetation**

Electric Yard Program

The Electric Yard Program includes substations, electric yards, and sectionalizing switches. The program has one alternative, and one alternative eliminated from further consideration.

Electric Yard Program	
E1 *(current practice)*	**Herbicide Treatment**

Non-electric Program

The Non-electric Program includes facilities that have landscaping and gravel work yards or parking lots. The two alternatives will address the following question:

What methods should Bonneville use for managing non-electric facility vegetation?

Non-electric Program	
NE1 *(Bonneville preferred) (current practice)*	**Mixed Methods with Herbicides**
NE2 *(environmentally preferred)*	**Non-herbicide Methods**

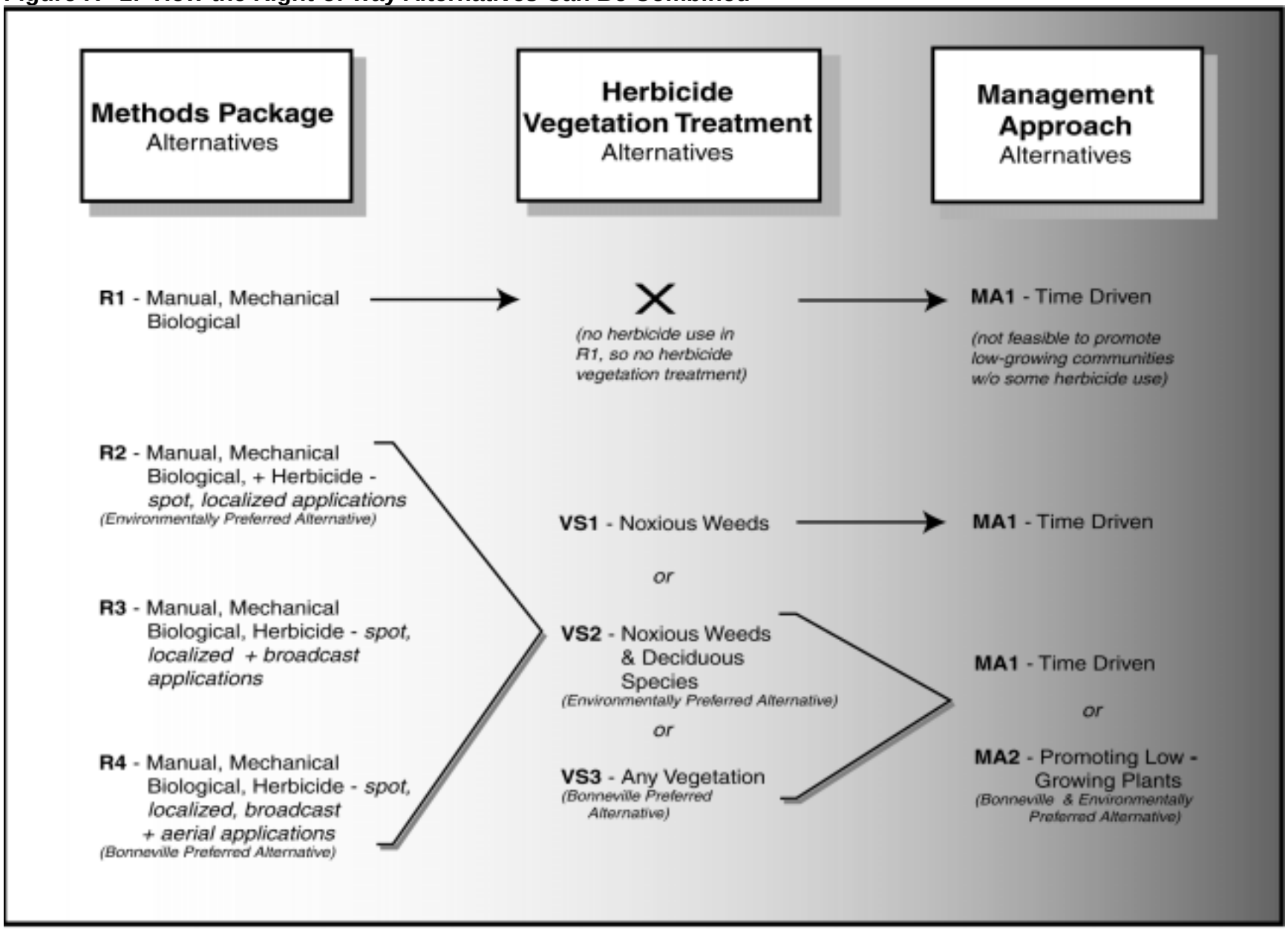
Differences between the Alternatives

Because herbicide use was a major topic of the comments received on Bonneville's vegetation management program, we have designed many of the alternatives to reflect the issue of **whether or not to use herbicides and, if so, to what degree.**

The **right-of-way program** addresses the herbicide issue in three ways:

1. The management approach, including whether there is an end goal that would reduce herbicide use in the long term;
2. Whether herbicides are included in our "tool box," and (if so) what kind of application methods would be allowed (a range from spot treatments to aerial spraying); and
3. If we do use herbicides, whether we limit the type of plants that can be treated with herbicides.

Figure IV–1: How the Right-of-way Alternatives Can Be Combined



The **non-electric program** addresses the herbicide issue by offering an alternative with, and an alternative without, herbicide use.

The next sections contain detailed information on each set of alternatives.

Right-of-way Management Approach Alternatives

The right-of-way program manages vegetation on transmission-line rights-of-way and access roads. (Rights-of-way cannot have tall trees or brush close to transmission-line conductors, nor can brush block access roads or towers; noxious weeds need to be controlled as appropriate.) The program also includes microwave beam paths (trees must not block paths). The right-of-way program has two alternatives for how to approach vegetation management:

Management Approach	
MA1 *(current practice)*	**Time-Driven** - uses repetitive maintenance cycles for vegetation control
MA2 (*Bonneville and environmentally preferred)*	**Promotion of Low-growing Plant Communities** – promotes low-growing plants where possible along the right-of-way, lessening intensity of maintenance in long term

Alternative MA1: Time-driven *(current practice)*

Description

Bonneville would follow a management approach in which cycles of maintenance are repeated in a continuing (and basically unvarying) loop to achieve the desired result.

We would determine appropriate scheduling (cycle times) for managing vegetation for a right-of-way. For instance, now we cut vegetation every 2 - 8 years on the West side of the Cascades (where ample water supply means that vegetation growth is faster) and every 10 - 15 years on the East side of the Cascades (where vegetation growth is slower).

At each designated cycle management point, we would clear or treat the right-of-way to try to ensure that no vegetation would threaten the transmission line or block access until the next cycle of treatment. As

with MA2, we would also undertake any emergency work (trees that threaten the line and need to be removed immediately, rather than waiting for planned maintenance).

This approach might use herbicides, or not. It is based on clearing or treating vegetation as it needs to be done, rather than trying to clear preventively to lessen future vegetation management. This approach could be implemented with any of the right-of-way program alternatives (e.g., any of the Methods Package alternatives and the Vegetation Selection alternatives).

This approach most closely resembles our current practice. We mostly manage our rights-of-way based on a time-driven approach, although we are attempting to promote low-growing plant communities in a few areas. More information on our current practice related to the Time-driven approach is found in Chapter I, under **Managing Vegetation at Bonneville Facilities.**

Impacts

Under this management approach**,** impacts would continue very much as at present. Sapling-filled corridors would develop, requiring the same or increasingly intensive maintenance with each maintenance cycle. With each cycle, there would be repeated disturbance of the right-of-way, including habitat disturbance, noise disturbance, and soil and non-target plant disturbance.[1]

Health and safety impacts associated with this alternative would be regular maintenance impacts; however, the chances of such impacts occurring would be greater with this alternative than with Alternative MA2 because the maintenance cycles would involve more intense work. If herbicides were not used, then there would not be any potential health impacts associated with exposure to herbicides (as there could be with Alternative MA2).

Because this approach could use any of the maintenance methods, the method-specific impacts would depend on the methods used. This alternative does not *require* the use of herbicides, and therefore could eliminate potential impacts associated with herbicide use.

Cost

This alternative would cost less than MA2 initially, but more in the long term. The costs of maintaining the right-of-way with a Time-

[1] Details on impacts are described in **Chapter VI.**

driven management approach would remain constant or go up with each maintenance cycle because the right-of way would either keep reverting back to forest stage, or would increase with tree density as deciduous species resprouted.

Alternative MA2: Promotion of Low-growing Plant Communities

(Bonneville Preferred & Environmentally Preferred Alternative)

Description

With this alternative, Bonneville would promote the establishment of low-growing plant communities on the right-of-way, in a progressive (evolving) approach that requires somewhat more intense work in the short term, but diminished work in the long term.

The goal of this alternative is to change the vegetation structure to predominately low-growing vegetation, so that the right-of-way would require less intensive maintenance over time. In the long term, the *schedule* for vegetation management along the right-of-way might be the same as that for the Time-driven alternative; however, established low-growing plant communities would lessen the *amount* of vegetation that would need to be managed. In the short term, the vegetation maintenance schedule would need to be adjusted to allow for more frequent visits: perhaps every year or two to treat new tree seedlings before they get tall enough to compete with the low-growing species.

As with MA1, we would also immediately undertake any emergency work to remove trees that are an imminent threat to the line.

Because maintenance would likely be scheduled often at first, we would be unable to do all rights-of-way at the same time and would have to “phase” the program in.

This management approach of promoting low-growing plant communities is based on protecting low-growing plants from disturbance during maintenance and from competing tall-growing vegetation so that low-growers can establish and propagate. We could not carry out a wholesale planting of species, which would be infeasible and expensive for some 24,140 km (15,000 mi.) of corridor.

This alternative could be implemented *only* with the right-of-way methods package alternatives that include the use of herbicides (R2, R3, or R4), and the vegetation selection alternatives that include treatment of deciduous species (VS2 and VS3). This alternative requires the use of at least spot-herbicide treatment to treat deciduous species. See Figure IV-1 for these combinations.

How Low-growing Plant Communities Function

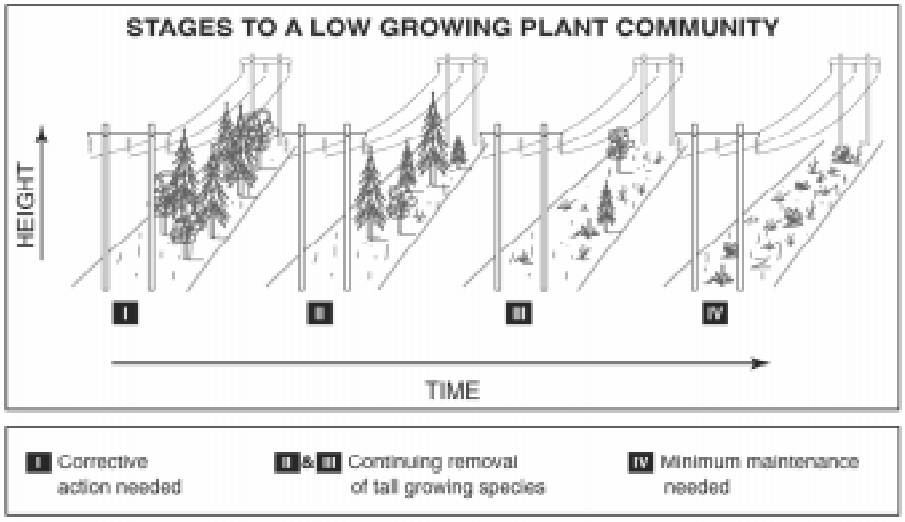
Research has shown that the establishment of a dense low-growing plant community may reduce the presence of trees (Bramble and Burns, 1983). Low-growing plants (grasses, shrubs, forbs, and herbs) can often “out-compete” trees and tall-growing brush for sunlight and nutrients. Where the low-growing plants shade the ground and absorb available moisture, it is harder for the trees to germinate underneath the shrubs or to grow up through the low-growing plant cover. This is essentially vegetation “self-management,” and lessens the need for human intervention.

The low-growing plant community consists of shrubs, ferns and grass species (e.g., salmonberry, ceanothus, blackberry, bracken fern, and pinegrass).

In addition to competing for nutrients and sunlight, some plants produce chemicals to keep competing plants away. Such "allelopathic" interactions between plants may help establish and maintain low-growing communities in the rights-of-way.

There will always be some trees that are able to ”get through” the low-growing vegetation and brush layer. We would have to eliminate those tall plants before they, in turn, begin shading and competing for moisture and space with the low-growing species.

Figure IV-2: Stages to a Low-growing Plant Community



There are a number of ways to achieve the goal of a semi-stable low-growing plant community that competes with and slows the growth of

tall-growing trees. Here are steps to illustrate one way to achieve a low-growing plant community:

1. Remove existing tall-growing vegetation.

   If the tree density is thick (as in Stage #I in Figure IV-2), it is considered **corrective** action. Methods used for corrective actions can include non-selective methods such as mechanical clearing and broadcast, or aerial herbicide applications. However, if the tree density is not great (as in Stages II & III), it is not considered corrective. At this stage, more selective methods of vegetation removal may be more appropriate so as not to disturb any existing low-growing or desirable plants.

2. Use herbicides to treat deciduous trees to ensure that the trees do not resprout. (Studies to date indicate that early herbicide treatments are instrumental in keeping taller-growing vegetation from developing, just long enough to allow low-growing plants to be competitive (Bramble and Burns, 1983)).

3. Consider replanting or reseeding with ground cover if none exists or if there is a low potential for natural revegetation by low-growing species (and a high potential for natural revegetation by tall-growing species).

4. Maintain by selectively eliminating tall-growing vegetation before it is tall enough to shade or compete with other desirable species. Maintenance should be done with great care, so as not to disturb low-growing plants. The first few years may require continuing removal (Stages II & III in Figure IV-I) of tree saplings before the low-growing plant community can successfully maintain itself.

Bonneville, in conjunction with Oregon State University, is undertaking a long-term research project to test and demonstrate vegetation management strategies on electric utility rights-of-way. The primary goal of the research project is to design, test, and document vegetation management strategies and methods that will promote the establishment and growth of successionally stable low-growing plant communities within rights-of-way. We hope to gain valuable information regarding Pacific Northwest rights-of-way plant community dynamics with respect to various applied vegetation control strategies.

Impacts

The right-of-way clearing for Alternative MA2 would be less drastic than that for Alternative MA1. Over time, low-growing plant communities would lead to fewer tall-growing plants and less need to clear. Impacts associated with removing vegetation (sedimentation, disturbance) would decrease over time.

Health and safety impacts of this alternative also decrease over time as low-growing plants become established and maintenance activities lessen.

Because this alternative requires the use of at least some herbicides to help control the resprouting of deciduous species, impacts include potential herbicide impacts.

Cost

This alternative would probably cost more than Alternative MA1, Time-driven, in the short term, because for the first few years vegetation would most likely need to be treated more often until low-growing plant communities were established. In the long term, however, it would be less expensive to maintain the right-of-way under this alternative because less clearing would be needed.

Table IV-1, below, compares the costs, impacts, and effectiveness of the two management approaches.

Table IV-1: Comparison of the Right-of-way (ROW) Management Approach Alternatives

Decision Factors	MA 1 Time-Driven *(current practice)*	MA2 Promotion of Low-growing Plant Communities *(Bonneville Preferred & Environmentally Preferred Alternative)*
	Managed on a designated cycle time	*Managed to achieve low-growing vegetation on ROW in the long term*

Decision Factors	MA 1 Time-Driven *(current practice)*	MA2 Promotion of Low-growing Plant Communities *(Bonneville Preferred & Environmentally Preferred Alternative)*
	Managed on a designated cycle time	*Managed to achieve low-growing vegetation on ROW in the long term*
Minimizes adverse environ-mental impacts	Increased frequency of habitat, noise, soil, and non-target plant disturbance and intrusions upon landowners. More frequent maintenance cycles in long-term increase health and safety risks. Reduced contamination risks if herbicide use is avoided.	Reduced soil, non-target vegetation, and habitat disturbance because less clearing needed as low-growing plant communities successfully establish on ROW. Reduced safety risks as maintenance cycles become less frequent. Slightly increased contamination risk from herbicide use.
Achieves cost and administra-tive efficiency	Long-term maintenance costs increase as deciduous species resprout and require more frequent treatment.	Long-term costs reduced as low-growing plant communities are successfully established and maintenance cycles become less frequent.
Complies with laws and regulations	Complies with all laws and regulations.	Complies with all laws and regulations.
Ensures a safe and reliable power system	Electric stability and reliability could be compromised if maintenance cycles are not adequately implemented.	Electric stability and reliability improves as low-growing plant communities successfully inhibit growth of species that could interfere with power flow.

Right-of-way Methods Package Alternatives

The right-of-way program has four Methods Package alternatives:

Methods Packages	
R1	**Manual, Mechanical, Biological**
R2 *(environmentally preferred)*	Manual, Mechanical, Biological + **Herbicide – *spot and localized application***

R3 *(current practice)*	Manual, Mechanical, Biological, Herbicide – *spot, localized* **+ *broadcast application***
R4 *(Bonneville preferred)*	Manual, Mechanical, Biological, Herbicide – *spot, localized, broadcast* **+ *aerial application***

These alternatives are the various packages or combinations of methods that could be available for use in our management program—the "tools" in our "tool box."

Please note: For each alternative described below, a pie chart shows a general percentage of each method that would be used to control right-of-way vegetation throughout our service territory, given the methods available with the alternative. These general percentages were developed by people who conduct vegetation management for Bonneville, who know the system, and who have the training to apply the various methods, given the terrain, vegetation types and natural resources present.

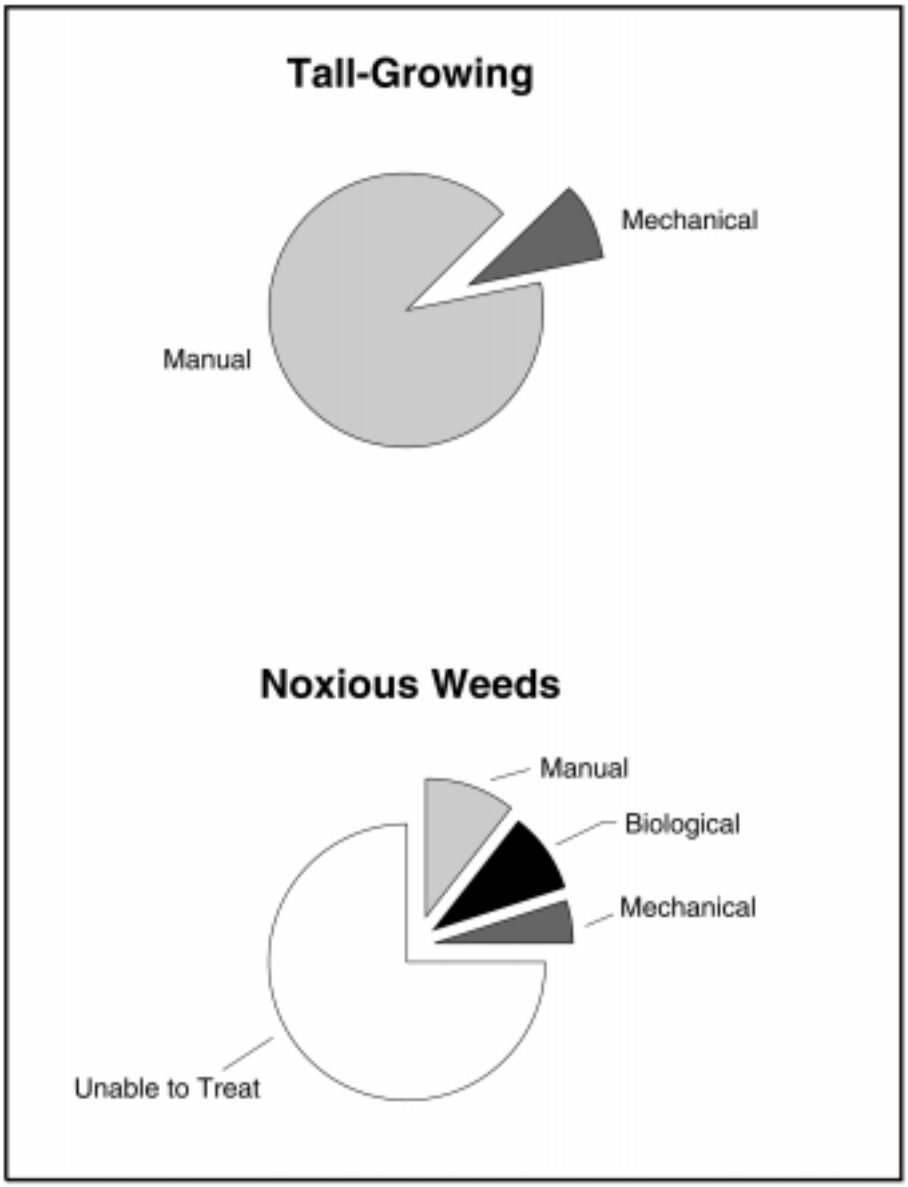
Also: The amount of biological control used does not change from alternative to alternative. Bonneville plans to pursue the use of insects, where possible in conjunction with other agencies, to help control the spread of noxious weeds, regardless of the management program chosen.

Alternative R1: Manual, Mechanical, Biological

Description

Alternative R1 would use a mix of manual, mechanical, and biological methods to control vegetation on the rights-of-way, access roads, and around towers. No herbicides or growth regulators would be used.

Figure IV-3: Mix of Methods under Alternative R1



This chart shows generally how much each of the methods would be used to maintain our rights-of-way using methods available under Alternative R1.

Some people think that herbicides should not be used in a variety of land management practices—forestry, agricultural, or home use. This sentiment (as well as the opposing sentiment that herbicides should be so used) was reflected in our EIS scoping, as well as in some comments to other Federal land-managing agencies in their practices. Alternative R1 was developed to see how it would work *not* to use herbicides to manage the vegetation along our rights-of-way.

With this mix of methods, most of the right-of-way would be managed manually, through chainsaw cutting of tall-growing vegetation. Mechanical control would be used in areas where vegetation was extremely dense, possibly on access roads where low brush can be a hindrance, and around tower structures. A large percentage of areas with noxious weeds could not be treated with this alternative. In those areas where noxious weeds could be treated, biological, manual, and a small amount of mechanical means would be used.

This alternative would be compatible with the Time-driven approach (MA1); it would not be compatible with the Low-growing Plant Communities approach (MA2).

Impacts

This alternative relies heavily on manually keeping the right-of way cleared. The environmental impacts, therefore, are mostly associated with manual impacts. Generally, environmental impacts from this alternative would be relatively benign in the short term: there would be some noise from chainsaws that would disturb wildlife and residents, and there is potential for chainsaw oil to get into water bodies. Overall, however, the direct environmental impacts from using chainsaws (other than the cutting of the vegetation) would be minimal.

The indirect or long-term impacts of this alternative would occur as vegetation resprouted. Deciduous vegetation resprouts with an increased number of stems when cut, creating more thickly vegetated rights-of-way that need to be managed even more intensively. The right-of-way then needs more extensive clearing (more vegetation per acre needs to be cut) with each successive maintenance cycle.

When densely vegetated areas are cleared, environmental impacts are more drastic compared to the selective removal of trees or brush. More habitat is affected, more soil is disturbed, non-target plants that have grown in shade-tolerant situations are suddenly exposed, human

presence on the right-of-way is increased, and visual impacts are more sudden and more dramatic.

Noxious weed control is a concern with this alternative. Biological control agents (insects) are available for some, but not all, noxious weeds. Biological controls can also be limited due to weather and site-conditions. Mechanical or manual methods are also not very effective, because noxious weeds are very resilient and capable of resprouting through roots, as well as from seed.

Worker health and safety impacts with this alternative would be related to chainsaw accidents, felling of trees, and relatively minor physical impacts of hiking—often on very rough terrain. It is also potentially dangerous to cut trees on steep terrain, compared to spraying a tree with herbicide and leaving it standing. Impacts related to mechanical methods would be due to heavy equipment accidents; impacts of biological methods include injury from hiking rights-of-way; and potential helicopter or plane accidents if aerially applying biological controls.

Cost

This alternative would cost more to implement than alternatives that include the use of herbicide methods, for the following reasons:

1. No herbicide treatments of deciduous vegetation means that maintenance cycles would repeat more often in areas of deciduous species.
2. In deciduous areas, maintenance would be more intensive (resprouts are denser than initial saplings).
3. The more labor-intensive manual methods generally cost more than herbicide methods. (See Table II-5 in **Chapter II**.)
4. Labor-intensive manual methods are more time-consuming, requiring higher administrative costs than herbicide methods.

Alternative R2:
Manual, Mechanical, Biological **+ Herbicide – *spot and localized application***
(Environmentally Preferred Alternative)

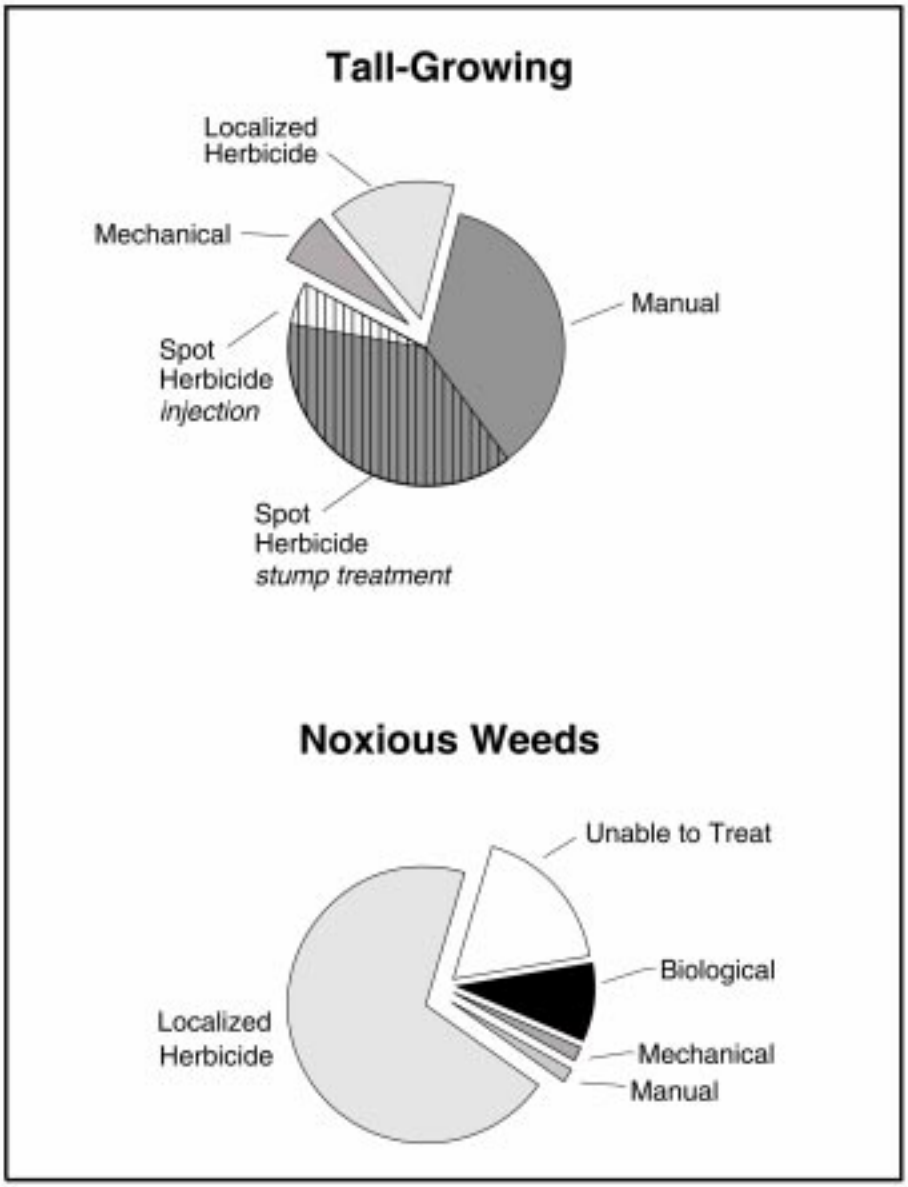
Description

Alternative R2 would use a mix of all the methods—manual, mechanical, biological, and herbicide. However, only spot herbicide and localized herbicide applications would be used (no broadcast or aerial herbicide applications would be used). Herbicide applications include the use of growth regulators.

Figure IV-4: Mix of Methods under Alternative R2

This pie chart shows generally the percentage of the methods we would use to maintain our rights-of-way under Alt. R2.

Herbicide use for tall-growing vegetation is dependent on the selection of Alternatives VS2 (noxious weeds and deciduous), or VS3 (any vegetation).



As with all the alternatives, most of the right-of-way would still be managed manually: we would use chainsaws to cut tall-growing vegetation.

However, nearly half those areas manually cut would receive follow-up spot herbicide treatments (on deciduous vegetation). *Herbicide use for tall-growing vegetation is dependent on the selection of Alternatives VS2 (noxious weeds and deciduous), or VS3 (any vegetation).*

The next most used method would be localized herbicide treatments. A relatively small amount of spot treatment (not used in conjunction with cutting) and mechanical methods would also be used. By adding herbicide methods, manual methods would be used somewhat less than with R1.

Noxious weeds would be treated mainly via localized herbicide applications (backpack or ATV-mounted sprayers). Some biological methods would be also used. Manual and mechanical would rarely be used. There would still be some areas or weeds that could not be treated.

This alternative would be compatible with both the Time-driven approach (MA1) and the Low-growing Plant Communities approach (MA2).

Impacts

This alternative would have short-term environmental impacts from manual methods (chainsaw noise, exhaust, potential fuel/oil leaks), although those impacts would be less than those of R1. Spot and localized herbicide use could involve potential spills that could contaminate water bodies and affect other non-target vegetation. However, because this alternative uses more selective herbicide application techniques that can target only the plants needing treatment and have less potential for drift, there is less potential to affect non-target plants or water bodies than under R3 or R4.

In the long term, this alternative could be able to control resprouting of deciduous plants, reducing the amount of regrowth along rights-of-way.

Worker health and safety issues associated with this alternative would include those for manual (chainsaw accidents, felling of trees), mechanical (heavy equipment accidents), and biological (hiking right-of-way) methods. This alternative would have fewer manual safety issues for workers than R1, because workers would be able to use herbicides to treat vegetation on steep slopes or sites that are awkward or potentially dangerous for felling trees.

Worker safety issues would also include those associated with handling herbicides—toxicity and potential chronic effects of repeated exposures to herbicides. Herbicides must be handled appropriately and with caution. (See discussions of herbicides in **Chapters II and III**.)

Public health and safety impacts with this alternative would include those associated with manual (little/no impact), mechanical (flying debris) and slight potential public exposure to herbicides (potential toxic reactions if there were a spill or misapplication).

This alternative could control noxious weeds more easily than R1, because noxious weeds are difficult to manage solely with mechanical and manual methods. However, noxious weed control would not be as easy as under R3 and R4, which allow the use of broadcast and/or aerial applications of herbicides.

Cost

This alternative would cost less to implement than Alternative R1 in the *short term*: herbicide methods of controlling vegetation are less expensive than manual methods. However, the cost difference is not dramatic because herbicide methods of treatment replace only some of the manual treatments that would occur in R1.

This alternative would cost quite a bit less to implement than R1 in the *long term:* the use of spot and localized herbicide treatments on deciduous trees should reduce the overall need for maintenance, which in turn should reduce overall program costs.

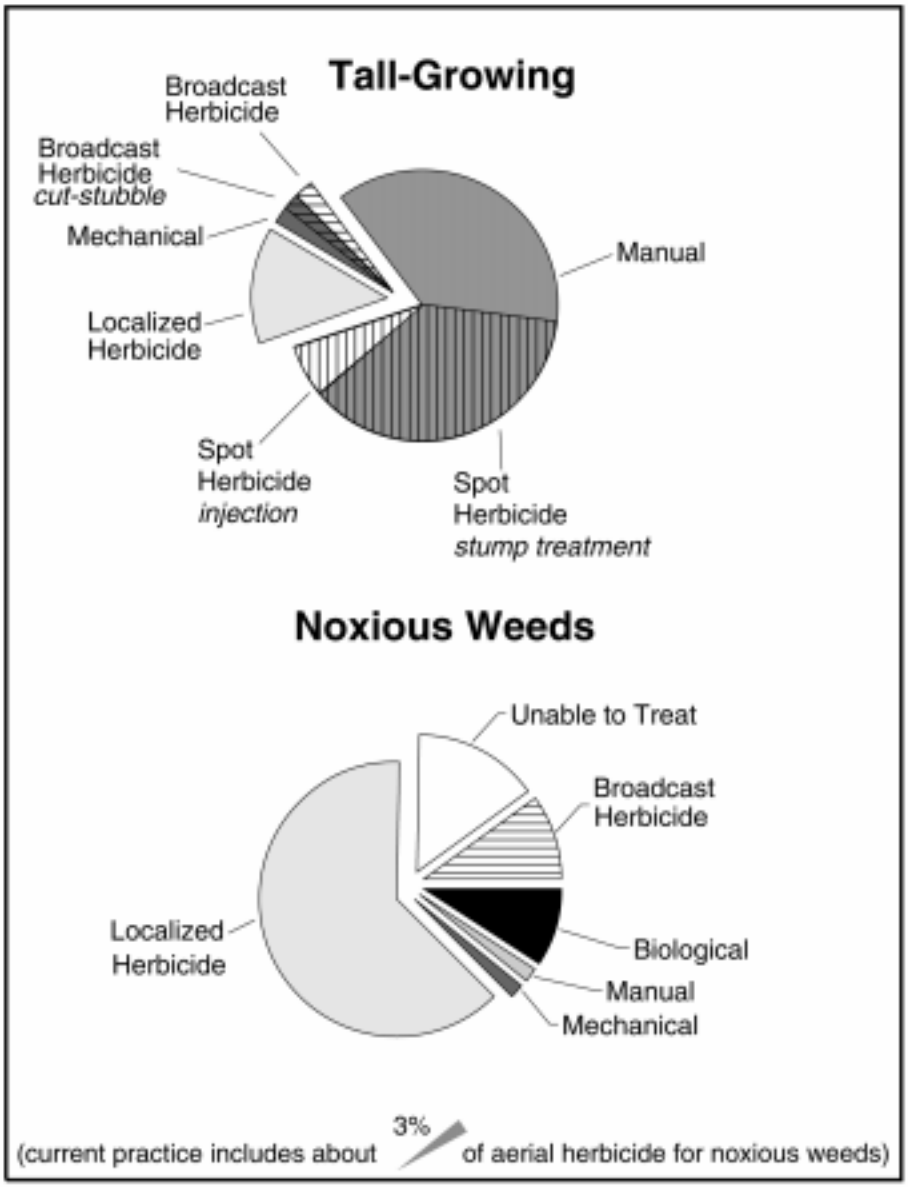
This alternative would cost slightly more than R3, and quite a bit more than R4.

Alternative R3:
Manual, Mechanical, Biological, Herbicide – *spot, localized* **+ *broadcast application***
(current practice)

Description

Alternative R3 would use a mix of all the methods—manual, mechanical, biological, and herbicide. Spot, localized, and broadcast herbicide applications would be used. No herbicides would be aerially sprayed. See Figure IV-5, below.

Figure IV-5: Mix of Methods under Alternative R3



This pie chart shows generally the percentage of the methods we would use to maintain our rights-of-way under Alt. R3.

Herbicide use for tall-growing vegetation is dependent on the selection of Alternatives VS2 (noxious weeds and deciduous), or VS3 (any vegetation).

This alternative varies only slightly from R2: most of the right-of-way would still be managed manually. Nearly half of those areas manually cut could receive follow-up spot herbicide treatments (deciduous vegetation).

Herbicide use for tall-growing vegetation is dependent on the selection of Alternatives VS2 (noxious weeds and deciduous), or VS3 (any vegetation).

The next most-used method could be localized herbicide treatments. A relatively small amount of broadcast herbicide, spot herbicide treatment (not used in conjunction with cutting), and mechanical methods would also be used.

Half of the mechanical treatments could also receive a subsequent broadcast herbicide treatment ("cut-stubble" treatment of deciduous species). Using broadcast herbicide means that the amount of right-of-way that would be treated manually is slightly reduced, compared to R2. The ability to use one more "tool" offers a little more flexibility in determining the best way to manage a right-of-way, given all the site conditions.

Noxious weeds would still mostly be treated with localized herbicide applications, with some broadcast application being used instead of localized or spot treatments. There would still be untreatable areas.

This alternative would be compatible with both the Time-driven management approach (MA1) and the Low-growing Plant Communities management approach (MA2).

This method most closely represents Current Practice for right-of-way vegetation management. However, our current practice includes participation with other agencies for a small amount of aerial herbicide applications on noxious weeds.

Impacts

Environmental impacts would be very similar to those for R2, with slightly less impact from manual methods and somewhat more potential for herbicide contamination impacts. The latter would be greater because somewhat more herbicide would be used and because the added broadcast *application* technique is non-selective (note, however, that the herbicide itself can be selective). Non-selective broadcast spraying can potentially affect non-targeted plants and has greater potential for drift.

As with R2, this alternative could in the long term be able to control resprouting of deciduous plants and reduce the amount of regrowth along rights-of-way. If promoting low-growing plant communities, broadcast herbicide applications would be most appropriate for rights-of-way requiring corrective action (see Figure lV-I). Broadcast herbicide applications are non-selective; they would not be appropriate for maintaining rights-of-way with low-growing plant communities.

As with R2, the worker health and safety issues associated with this alternative would include those for manual, mechanical, and biological. This alternative would have somewhat fewer manual safety issues for workers than R2, because manual controls would be used less, but slightly more potential herbicide safety issues because more herbicide would be used. However, because the application is done via a truck, there is actually less potential for worker exposure with the chemical.

Public health and safety impacts with this alternative would include those associated with manual, mechanical, and potential public exposure to herbicides. The slight potential public exposure to herbicide would be somewhat greater with this alternative than with R2, because there is more potential for drift and accidentally spraying persons on the right-of-way with broadcast methods (compared to spot or localized herbicide applications).

Noxious weeds could be controlled more easily with this alternative than with R1, which is limited to mechanical and manual methods, and somewhat more easily than with R2. Alternative R3 allows the flexibility to choose broadcast applications to treat a noxious weed infestation if the site and weed species would best be treated in this manner.

Cost

The costs of this alternative would be slightly less than R2. There would be some slight efficiencies in the use of broadcast applications (quicker right-of-way treatment of large areas), with higher costs for the use of the necessary equipment. As with R2, the long-term costs of this alternative would be less than those for R1 because deciduous plants could be treated so that they don't resprout.

Alternative R4:

Manual, Mechanical, Biological, Herbicide – *spot, localize*d, *broadcast* ***+ aerial application***

(Bonneville Preferred Alternative)

Description

Alternative R4 would use all the methods available, including limited use of aerial herbicide application.

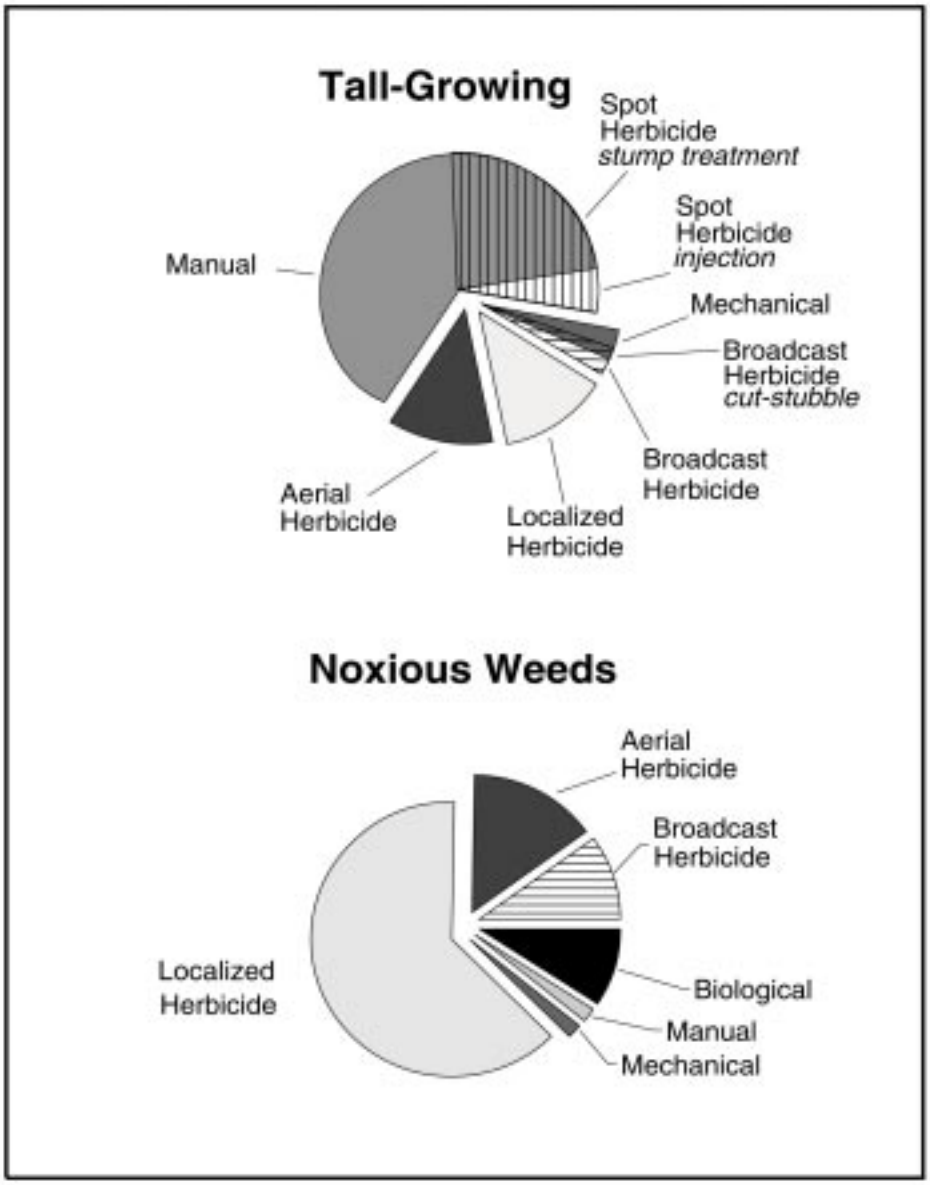
This alternative is similar to R2 and R3: most of the right-of-way would still be managed manually. Nearly half of manually cut areas could receive follow-up spot herbicide treatments (deciduous).

Herbicide use for tall-growing vegetation depends on selection of Alternatives VS2 (noxious weeds/deciduous), or VS3 (any vegetation).

Figure IV-6: Mix of Methods under Alternative R4

This pie chart shows generally the percentage of the methods we would use to maintain our rights-of-way under Alt. R4.

Herbicide use for tall-growing vegetation is dependent on the selection of Alternatives VS2 (noxious weeds or deciduous), and VS3 (any vegetation).



The next most-used methods would be localized herbicide and aerial herbicide treatments. Some spot herbicide treatment (not used in conjunction with cutting), broadcast herbicide applications, and mechanical methods would also be used. Half of the mechanical treatments would also receive a subsequent broadcast herbicide treatment ("cut-stubble" treatment of deciduous species).

Adding aerial spraying would reduce reliance on manual methods, manual-with-spot-herbicide treatments, and localized treatments.

This alternative offers the widest range of methods to be used—the greatest number of "tools" in the tool box—when determining the appropriate way to manage the vegetation along a right-of-way.

This alternative would be compatible with both the Time-driven management approach (MA1) and the Low-growing Plant Communities management approach (MA2).

Impacts

The environmental impacts of this alternative would be very similar to those of R2 and R3, with slightly fewer impacts from manual methods and somewhat more potential for herbicide contamination impacts (more herbicide would be used, and the aerial application technique added to this alternative is non-selective).

Because aerial herbicide applications are non-selective, non-targeted plants can *potentially* be affected and there is a greater potential for drift. Although aerial spraying is a non-selective application technique, the *type* of herbicide used can be species-selective—affecting only the plant species it is designed for.

As with R2 and R3, this alternative could in the long term control resprouting of deciduous plants and reduce the amount of regrowth along rights-of-way. If we were promoting low-growing plant communities, broadcast and aerial herbicide applications would be most appropriate for rights-of-way requiring corrective action (see Figure IV-2). Because these herbicide applications are non-selective, they would not be appropriate for maintaining rights-of-way with low-growing plant communities.

Other environmental impacts associated with this alternative include short-term helicopter or plane noise disturbance of wildlife and potentially of neighbors. This alternative would lessen some environmental impacts on those small portion of corridors that would be treated with aerial spraying, because aerial applications do not cause ground disturbance, non-target plants are not crushed, and soils are not disturbed.

As with R2 and R3, the worker health and safety issues associated with this alternative would include those for manual, mechanical, biological, and herbicide methods. However, because manual methods would be used slightly less, this alternative would have somewhat fewer manual safety issues for workers than R2 and R3.

The additional use of herbicides would entail more potential herbicide safety issues. However, because aerial herbicide application is done via a helicopter or plane (rather than by backpack or hand application), there is actually less potential for worker contact or exposure with the chemical with this application technique. There is some risk of aircraft accidents when flying over or under transmission lines.

As with R2 and R3, public health and safety impacts with this alternative would include those associated with manual, mechanical, and potential public exposure to herbicides. The potential for public exposure to herbicides with this alternative would be slightly more than with R2 and R3, because there is more potential for drift with aerial herbicide use and a slightly greater potential for accidentally spraying persons who could be on the right-of-way.

Alternative R4 allows the additional flexibility to choose aerial herbicide applications to treat noxious weed infestations (if the site and weed species would best be treated in this manner).

Cost

The costs of this alternative would be quite a bit less than those for R2 and R3—there would be some administrative efficiencies in the use of aerial applications (quicker right-of-way treatment of large areas), with relatively low costs for aerial methods. As with R2 and R3, the long-term costs of this alternative would be less than those of R1 because deciduous plants can be treated so that they don’t resprout.

Table IV-2, page 111, compares the methods packages alternatives.

Table IV-2: Comparison of the Methods Package Alternatives

Decision Factors	R1 **Manual, Mechanical, Biological**	R2 Manual, Mechanical, Biological, **+ Herbicide – *spot, localized* application** *(Environmentally Preferred Alternative)*	R3 Manual, Mechanical, Biological, Herbicide – *spot, localized* ***+ broadcast application*** *(current practice)*	R4 Manual, Mechanical, Biological, Herbicide – *spot, localized, broadcast* ***+ aerial application.*** *(Bonneville Preferred Alternative)*
Minimizes Adverse Environmental Impacts	**Mostly manual impacts** ▪ Resprout of deciduous species. ▪ Chainsaw noise disturbance (people & wildlife). ▪ More worker presence on ROW. ▪ Potential worker accidents. **Some mechanical impacts** ▪ Can cause resprout. ▪ Can disturb non-target vegetation. ▪ Possibly expose/compact/erode soils & subsurface artifacts. ▪ Noise. ▪ Safety machinery accidents, flying debris. **Small amount of Biological impacts** ▪ Potential feed for fish, wildlife. ▪ Insects not aesthetically pleasing. ▪ Difficult to treat noxious weeds.	**Manual impacts** same as R1, with the following difference: ▪ If herbicides are used on deciduous vegetation, no resprout impacts. **Mechanical impacts** same as R1. **Biological impacts** same as R1. **Herbicide impacts** ▪ If used on deciduous, lessens resprout, ROW not treated as intensively, less worker presence. ▪ Potential spill, drift, or leaching could affect water, fish, vegetation; slight potential to affect wildlife, public. ▪ Slight potential for soil microbes to be affected. ▪ Standing dead vegetation may reduce aesthetics. ▪ Worker impacts if careless repeat exposure. ▪ Greater ability to treat noxious weeds.	**Manual impacts** same as R2. **Mechanical impacts** same as R1, with the following difference: ▪ If follow-up broadcast herbicide is used, no resprout impacts. **Biological impacts** same as R1. **Herbicide impacts** same as R2, with the following differences: ▪ Additional *potential* for herbicide drift (broadcast applications). ▪ Greater ability to treat large areas of noxious weeds.	**Manual impacts** same as R2, with the following difference: ▪ Somewhat less impact—manual method used less. **Mechanical impacts** same as R3. **Biological impacts** same as R1. **Herbicide impacts** same as R3 with the following differences: ▪ Slight potential for aerially spraying unseen resources—wetlands, etc ▪ Less worker presence on ROW in aerially treated areas. ▪ Less soil disturbance in aerially treated areas. ▪ Slight potential for public exposure in aerially treated areas if unable to ensure no public on remote ROWs. ▪ Greater ability than R3 to treat large areas of noxious weeds.
Achieves Cost and Administrative Efficiency	**Higher costs than other alternatives due to the following:** ▪ Manual labor takes more time to carry out. ▪ Deciduous resprouts create more clearing required in future. ▪ However, some administrative efficiencies in environmental reviews (compared to determining buffers and mitigation for herbicide use).	**Less cost than R1 due to following** ▪ Spot stump treatment of manual cuts more expensive short-term, but lessens resprout & thus long-term cutting costs. ▪ Localized & spot herbicide applications used instead of manual reduces costs (less labor-intensive, requires little debris disposal). ▪ However, increased administrative costs (compared to R1) due to environmental reviews for herbicide use.	**Relatively similar to R2, with the following differences:** ▪ In small areas where broadcast used instead of manual, cost and administrative efficiencies. ▪ Use of broadcast on portion of mechanical cuts would lessen those resprouts.	**Relatively similar to R3, with the following differences:** ▪ Where aerial is used instead of manual, labor costs more, but also administrative efficiencies (fewer people to coordinate – large area done quickly). ▪ Increased environmental review costs for use of aerial compared to other herbicide application methods.
Complies with Laws and Regulations	Complies with all laws and regulations (may be difficult to comply with control of noxious weeds).	Complies with all laws and regulations.	Complies with all laws and regulations.	Complies with all laws and regulations.
Ensures a Safe and Reliable Power System	Electric reliability and safety could be compromised, with difficulty in keeping up with fast deciduous tree growth.	Electric reliability and safety possible.	Electric reliability and safety possible.	Electric reliability and safety possible.

ROW = Right-of-way

Vegetation Selection Alternatives

Methods package alternatives R2, R3, and R4 use herbicides. For these three alternatives, another decision needs to be made—**which vegetation** can be treated with herbicides. We have three Vegetation Selection Alternatives, based on the three groupings of vegetation types that are being considered for herbicide treatment:

Vegetation Selection	
VS1	**Noxious Weeds** only
VS2 *(environmentally preferred)*	**Noxious Weeds & Deciduous**
VS3 *(Bonneville preferred) (current practice)*	**Any Vegetation**

Alternative VS1: Noxious Weeds

With **VS1** (noxious weeds only), we would treat only noxious weeds with herbicides. With this alternative, we would be able to be in compliance with controlling noxious weeds.[2] However, deciduous species would not be treated. It would not be possible to implement the Promotion of Low-growing Plant Communities management approach (MA2) with VS1.

With this alternative, the environmental impacts from herbicide use would be limited to *only* those areas treated for noxious weed invasion. Because herbicides would not be used on deciduous species, there would be environmental impacts associated with the increased maintenance needed to clear densely vegetated areas.

Alternative VS2: Noxious Weeds & Deciduous *(Environmentally Preferred Alternative)*

With **VS2** (noxious weeds and deciduous), only noxious weeds and deciduous resprouting/suckering-type plant species could be treated with herbicides. With this alternative, noxious weeds could be adequately addressed, as could the major issue of treating deciduous resprouting vegetation. With the ability to treat those deciduous species, we could promote low-growing plant communities along the right-of-way.

[2] It is difficult to manage noxious weeds without herbicides, especially when a biological agent is not available for a particular weed species.

The environmental impacts of this alternative would include those associated with the use of herbicides in areas with deciduous species. However, there would be less impact (compared to Alternative VS1), because less maintenance would be needed on the right-of-way. Both the Time-driven management approach (MA1) and the Low-growing Plant Communities management approach (MA2) could be implemented with this VS alternative.

Alternative VS3: Any Vegetation *(current practice - Bonneville Preferred Alternative)*

With **VS3** (any vegetation), we would be able to choose to treat any targeted vegetation with herbicides. Noxious weed issues could be addressed, deciduous species could be controlled, and there would be added flexibility in how a right-of-way would be managed. Being able to treat any vegetation allows for the option to injection-treat a stand of conifers in the right-of-way and leave the dead trees standing for habitat, while also eliminating the costs and the impacts on non-target plants from felling trees, chopping them up, and disposing of them. **This alternative represents Current Practice for Vegetation Selection for Herbicide treatment.**

There would be more potential environmental impacts associated with herbicide use. The extent of maintenance needed and the associated environmental impacts would be the same as those under Alternative VS2 (because deciduous species could be treated) and less than those under Alternative VS1. Both the Time-driven management approach (MA1) and the Low-growing Plant Communities management approach (MA2) could be implemented with this VS3 alternative.

Table IV-3, following page, compares the impacts of selecting different groups of vegetation for herbicide treatment.

Table IV-3: Vegetation Selection for Herbicide Treatment Alternatives

Decision Factors	VS1 Noxious Weeds	VS2 Noxious Weeds and Deciduous *(Environmentally Preferred Alternative)*	VS3 Any Vegetation *(current practice-Bonneville Preferred Alternative)*
	Use herbicides to treat only noxious weeds	*Use herbicides to treat only noxious weeds & resprout-ing/ deciduous species*	*Use herbicides to treat any vegetation*
Minimizes Adverse Environmental Impacts	▪ Able to treat noxious weeds. ▪ Most impacts due to manual & mechanical. ▪ Resprout of deciduous vegetation; more human presence & maintenance-related impacts. ▪ Herbicide impacts limited to areas treated for noxious weeds.	▪ Able to treat noxious weeds. ▪ Most impacts due to manual & mechanical, some herbicide impacts. ▪ Deciduous treatments lessen resprout, ROW not treated as intensively, less human presence & maintenance-related impacts. ▪ Potential herbicide impacts greater than VS1, less than VS3.	▪ Able to treat noxious weeds. ▪ Impacts due to manual, mechanical, & herbicide. ▪ As with VS2, deciduous treatments lessen resprout, ROW not treated as intensively, less human presence & maintenance-related impacts. ▪ Potential herbicide impacts greater than VS1 & VS2.
Achieves Costs and Administrative Efficiency	**Higher costs than VS2, VS3** ▪ Manual labor takes more time to carry out. ▪ Deciduous resprouts create more future clearing. ▪ However, some administrative efficiencies in environmental reviews w/ no herbicides for tall-growing.	**Less cost than VS1, due to the following:** ▪ Herbicide treatment of deciduous less expensive than manual (VS1); also lessens resprout & thus long-term cutting costs. ▪ However, some increased administrative costs (compared to VS1) due to environmental reviews for herbicide use.	**Somewhat less cost than VS2** ▪ Herbicide treatment of tall-growing less expensive than other methods, also lessens resprout & thus long-term cutting costs. ▪ Additional potential savings compared to VS2 due to less debris disposal. ▪ Some administrative efficiencies due to increased flexibility to treat areas difficult to treat with manual methods. ▪ However, some increased administrative costs (compared to VS1) due to environmental reviews for herbicide use.
Complies with Laws and Regulations	Complies with all laws & regulations.	Complies with all laws & regulations.	Complies with all laws & regulations.
Ensures a Safe and Reliable Power System	Electric reliability & safety could be compromised with difficulty keeping up with fast deciduous tree growth.	Electric reliability & safety possible.	Electric reliability & safety possible.

Electric Yard Program Alternative

The electric yard program includes vegetation management in substations, electric yards and sectionalizing switches. All these areas need to be kept bare, with no vegetation at all.

There is one alternative for managing vegetation in our electric yards:

Electric Yard Program	
E1 *(current practice)*	**Herbicide Treatment**

One alternative was also eliminated from consideration for safety reasons (see below).

Alternative E1: Herbicide Treatment

Description

To control vegetation in electric yards we would mostly use pre-emergent herbicides—herbicides that are applied to the ground to keep vegetation from germinating. Herbicides would be applied about once a year. For the few cases where vegetation *has* been able to grow within the electric yard, we would use a follow-up post-emergent herbicide, weed burners, steamers, or selective hand-pulling. These post-emergent methods have potential safety issues, but are necessary in cases of sprouted vegetation. **This alternative represents current practice for electric yards.**

Impacts

Any potential environmental impacts associated with keeping an electric yard free of weeds would be those resulting if any herbicides were to migrate off-site. Any migration would be due to either leaching or run-off. Pre-emergent herbicides tend to be persistent—they stay active for a long time—and are therefore more likely still to be active after moving.

Pre-emergent herbicides, however, do not have any greater chance of causing health impacts compared to post-emergent herbicides (there is no relationship between persistence and toxicity).

Worker health and safety impacts could occur from potential exposure to herbicides during application and when a worker is present in the yard. Application exposure would be about once a year.

Potential public health and safety impacts from electric yard vegetation control could occur if there was herbicide movement off-site, such that it exposed a person to herbicides.

Eliminated from Consideration

For safety reasons, we **eliminated from consideration** the alternative that would *not* use pre-emergent herbicides in electric yards. If we did not use pre-emergent herbicides, people would have to treat all vegetation after it has sprouted. A plant in an electric yard has to grow up through a metal ground mat and could provide another grounding path for electricity. If a person were to come in contact with a plant in the yard during a fault in or near the substation, he or she could be electrocuted.

Non-electric Program Alternatives

The non-electric program includes vegetation management in or around facilities that have landscaping, gravel work yards or parking lots. It also includes the control of noxious weeds on property that we own (fee-owned land) such as acreage around a substation.

There are two alternatives for how to manage vegetation in and around our non-electric facilities:

Non-electric Program	
NE1 *(Bonneville preferred) (current practice)*	**Mixed Methods with Herbicides**
NE2 *(environmentally preferred)*	**Non-herbicide Methods**

Alternative NE1:
Mixed Methods with Herbicides
(current practice - Bonneville Preferred Alternative)

Description

Alternative NE1 would continue to control vegetation and maintain landscaping and work yards with a variety of methods including manual methods (hoes, saws, clippers), mechanical methods (lawn mowers), landscape material (permeable black plastic), herbicides, and fertilizer. **This alternative represents Current Practice for Non-electric Facilities.** The vegetation at most of our non-electric facilities is presently maintained by licensed, contract landscaping services.

Impacts

The potential environmental impacts associated with this alternative would be due to possible herbicide movement off lawns, gravel yards, and general landscaping; and to noise and pollution from lawn mowers, weed whackers, and leaf blowers. There is no potential environmental impact from hand hoeing, clipping, or weed pulling.

Health and safety impacts for workers, and to a much lesser extent for the public, would include exposure to herbicides, exhaust, and noise. Workers also have the potential to be hurt with sharp objects such as clippers, or to experience back injuries from hoeing or weed pulling.

Cost

This alternative would cost less to maintain vegetation around our non-electric facilities, because herbicide use is less labor-intensive and maintenance would not have to be conducted as often.

Alternative NE2: Non-herbicide Methods

(Environmentally Preferred Alternative)

Description

Alternative NE2 would manage vegetation landscaping and vegetation at other non-electric facilities without using any herbicides. We would use manual methods (hoes, saws, clippers), mechanical methods (lawn mowers), landscape materials, and fertilizer.

Impacts

Environmental impacts would include the potential spread of noxious weeds: it is difficult to treat noxious weeds without herbicides. Visual impacts could occur if facilities were not kept up very regularly (as they would have to be when using all-manual methods); weeds (any kind—noxious or non-noxious) growing in landscaped areas or in parking lots would not be visually appealing. Noise and pollution could occur from lawn movers, weed whackers, and leaf blowers.

Health and safety impacts would be limited to manual and mechanical methods (potential exposure to exhaust and noise). Because this alternative would rely more heavily on manual and mechanical labor than Alternative NE1, workers would have some increased potential to be hurt with sharp objects such as clippers, and to experience back injuries from hoeing or weed pulling. There would be no potential herbicide exposure impacts with this alternative.

Cost

This alternative would cost more to maintain vegetation around our non-electric facilities, because it would require more labor-intensive maintenance more often.

Table IV-4: Comparison of Non-electric Program Alternatives

Decision Factors	NE1 Mixed Methods with Herbicides *(current practice - Bonneville Preferred Alternative)*	NE2 Non-Herbicide Methods *(Environmentally Preferred Alternative)*
	Use manual, mechanical, and herbicide methods, and fertilizer.	*Use manual and mechanical methods, and fertilizer.*
Minimizes Adverse Environmental Impacts	▪ Potential herbicide movement off-site; noise and pollution from mechanical equipment use. No anticipated impacts from manual methods. ▪ Workers/Public: Potential exposure to herbicides, exhaust, noise. Workers could be hurt by equipment.	▪ No impacts associated with potential herbicide movement off-site. Without herbicide use, noxious weeds could spread in the area. If maintenance were not carried out frequently, visual appearance could degenerate. Noise and pollution impacts would be the same, but would be likely to occur more often. ▪ Worker/public: Same as under NE1, except that exposure to herbicides would not occur and there would be increased potential for injury because more mechanical and manual methods would be used.
Achieves Cost and Administrative Efficiency	Less costly alternative because it is less labor-intensive.	This alternative would cost more because it would require more labor-intensive maintenance, more often.
Complies with Laws and Regulations	Complies with all laws and regulations	Complies with all laws and regulations
Ensures a Safe and Reliable Power System	Would not affect electric reliability or safety.	Would not affect electric reliability or safety.

This page intentionally left blank.

Chapter V: Changes

In response to comments, we made these changes in Chapter V:

- Added a new map showing the Bonneville's current service regions and the counties within the states.
- Added information showing how much of our right-of-way crosses what kinds of vegetation (grasslands, shrublands, etc.).
- Updated the currently listed Threatened and Endangered Species Tables (including adding the newly listed Canadian lynx on Table V-6 and removing the American peregrine falcon from Table V-7).
- Added in a previously missing (unnamed) sole-source aquifer.
- Added discussion of "Other Federal Lands."
- Corrected names in the list of the Tribes on the ten Indian reservations crossed by Bonneville facilities and added list of other Tribes in the Pacific Northwest.

Some small changes were also made to make the document clearer and easier to read. For specific comments and responses, please see Chapter VII.

Chapter V
Affected Environment

In this chapter:

- **Setting**
- **Existing Environmental Resources**
- **Existing Land Use, Ownership & Management**
- **Existing Human Environment**

This chapter describes the existing environment that might be affected by Bonneville's use of various vegetation management methods.

Setting

Bonneville's service territory, the area crossed by our transmission-line system, covers 777,000 square km (300,000 square mi.) of the Pacific Northwest. This area includes the states of Oregon, Washington, Idaho, and western Montana, as well as small portions of Northwest Wyoming, Northern California and Utah. Currently, Bonneville has divided the service territory into seven regions for management purposes. (See Figure V-1, Bonneville Regions.)

The landscape of the Pacific Northwest varies tremendously. Dominant features include mountain ranges; fertile valleys; broad flat plains; the vast Columbia River basin and numerous rivers, streams and wetlands; vast rangelands; many thousands of acres of farmlands; large cities; sprawling suburbs; national forest; and Tribal lands.

Figure V-2 illustrates the Pacific Northwest geography.

The electric facilities that compose our electric transmission system fall into three basic categories:

1) rights-of-way (about 13,740 km or 8,540mi. of corridor) (including access roads),
2) electric yards (about 350 substations and switchyards), and

3) non-electric facilities (maintenance yards, parking lots, landscaping).

(See **Chapter I** for more detailed description of these facilities.) Our facilities are found in many different landscapes, but have this in common: the environment immediately in and around them has been managed through the years either to keep the vegetation cut close to the ground or to eliminate it, so that it does not interfere with operation or maintenance of the transmission system.

Because this EIS addresses vegetation management around facilities throughout the entire Bonneville service area (*not* at specific sites), the affected environment is discussed in general terms.

Vegetation

Vegetation within the Bonneville service territory is a diverse mix of varying species found in varying topography, climate, and soils. Most of the vegetation around Bonneville's facilities and on rights-of-way was cleared for construction and is managed to protect electric reliability or to maintain landscaping. The result is a highly complex pattern of natural and introduced vegetation in Bonneville's rights-of-way.

The vegetation within our service area can be broadly classified as grassland, shrubland, and forest. (See Figure V-3, Vegetative Cover.) (Please note that where rights-of-way cross residential areas, much of the landscape-type vegetation is usually taken care of by the people who own or manage the land. This practice is similar to that in farming areas, where the farmers manage the agricultural vegetation. See **Land Uses** for further discussion.)

Within each of these major vegetation zones (grasslands, shrubland, and forest) are riparian areas, which have vegetation specially adapted to growing next to streams and rivers. Specific plants designated by Federal, state or local agencies as threatened, endangered, or sensitive (TES) are also found in the service territory, as are noxious weeds (undesirable plants).

Grasslands

About 1,360 km (850 mi.) of our corridor crosses **grasslands.** Grasslands are naturally growing grasses found in the prairie communities of the southern Puget Lowlands and the Oregon Willamette Valley, as well as within the extensive rangelands of

eastern Washington, Oregon, Southern Idaho and intermountain valleys of Montana. These communities include orchard grass, ryegrass, Idaho fescue and wheatgrass, as well as forbs that are flowering plants such as yarrow, plantain, Arrowleaf balsamroot and lupine.

Shrublands

About 1790 km (1,120mi.) of corridor cross **shrublands.** These include shrubby areas located on mountains and in low-lying areas, rangeland, and shrub-steppe vegetation. Typically, these areas have few trees. Herbaceous plants (i.e., grasses, grass-like plants, and forbs) range from densely abundant to none. Some of these shrubs could include sagebrush, snowberry, bitterbrush, juniper, and willows.

Forests

About 7, 810 km (4,850mi.) of our corridors cross **forested** areas. These areas occur primarily where precipitation is highest: in the Coast Range; within the Willamette and Puget Sound valleys, along the Cascade Mountains; in the Blue Mountains of northeastern Oregon; and in the Rocky Mountains of Idaho, western Montana, and western Wyoming. These extensive forests include coniferous, deciduous, and mixed tree species.

Forested areas are a key concern for Bonneville's Vegetation Management Program because trees can resprout/reseed within the right-of-way or grow tall and fall into the line. Within most of our rights-of-way, trees that could interfere with the operation and reliability of the line have been removed. Remaining forested areas on the right-of-way are found within draws or along rivers and streams that the transmission lines span. It is in forested areas that the greatest changes in vegetation structure and composition have occurred as a result of building and maintaining Bonneville's facilities. See Table V-1 for Forest Types by Regional Distribution and Typical Dominants.

Riparian Areas

Within these major vegetation zones are **riparian areas** where the vegetation may be taller and more lush than the surrounding vegetation because more water is available. Riparian areas refer to the areas around streams, rivers, or other bodies of water. In dry locales, riparian areas and floodplains may support tree belts, where cottonwood and other deciduous trees grow within the area where water is available. Typical plants include willow, cattails, rushes, sedges, grasses and other grass-like plants.

Table V-1: Forest Types by Regional Distribution and Typical Dominants

Regional Distribution	Typical Dominants Without Disturbance	Typical Dominants After Disturbance	Typical on Wet Sites
Coastal Oregon and Washington	Sitka spruce*, western hemlock*, Douglas-fir*, western redcedar*	red alder*, Douglas-fir*, grand fir*, bigleaf maple*, salmonberry, elderberry	red alder*, western redcedar*, black cottonwood*, Oregon ash*, willows*, huckleberry, salmonberry
Coast ranges, western Cascade range, western Columbia Gorge	Douglas-fir*, western hemlock*, western white pine* (Puget Sound area), shore pine*	red alder*, bigleaf maple*, western hemlock*, snowbrush ceanothus, Douglas-fir*, vine maple, salmonberry, salal, huckleberry	red alder*, western redcedar*, bigleaf maple*, Oregon ash*, willows*, black cottonwood*
Subalpine areas of Cascade and Olympic ranges	silver fir*, mountain hemlock*, western white pine*, noble fir*	subalpine fir*, lodgepole pine*, huckleberry, salmonberry, elderberry, Englemann spruce* (Cascade range)	black cottonwood*, Sitka alder, quaking aspen*, thimbleberry
Eastside Cascade Range, mid-elevations of Blue Mountains	Douglas-fir*, western larch*, ponderosa pine*, lodgepole pine*	lodgepole pine*, western larch*, grand fir*, Englemann spruce*, mountain maple, huckleberry, ceanothus, elderberry	black cottonwood*, paper birch*, quaking aspen*, Sitka alder
Lower east side of Cascade Range, lower elevation of Blue Mountains and western Rocky Mountains	ponderosa pine*, bitterbrush, snowbrush, chokecherry, Idaho fescue, Oregon white oak (eastern Cascades), juniper	bunchgrasses, ceanothus, blackhawthorne	quaking aspen*, lodgepole pine*, black cottonwood*
Rocky Mountains of Northern Idaho & W. Montana (mid-elevations)	Western redcedar*, western hemlock*, western white pine*, ponderosa pine*	grand fir*, Douglas-fir*, birches*, western larch*, lodgepole pine, Sitka alder, thimbleberry	western redcedar*, devil's club, Sitka alder, willows, quaking aspen*
Subalpine areas of northern Rocky Mountains, Blue Mountains, Okano-gan Highlands	Englemann spruce*, subalpine fir*, subalpine larch*, mountain hemlock*	lodgepole pine*, Oregon boxwood, Englemann spruce*, rusty menziesia, huckleberry	black cottonwood*, Sitka alder, elderberry, quaking aspen*, paper birch*
Siskiyou Mountains of Southwestern Oregon	Douglas-fir*, incense-cedar*, sugar pine*, white fir*, tanoak, madrone, ponderosa pine*, Oregon white oak*, golden chinkapin	ceanothus, manzanita, tanoak, Douglas-fir*, Oregon white oak*, golden chinkapin	Oregon ash*, white alder*, bigleaf maple*
Willamette Valley of Western Oregon	Oregon white oak*, Douglas-fir*, grand fir*, ponderosa pine*, western hemlock*	Oregon white oak*, poison-oak, blackberry	black cottonwood*, Oregon ash*, red alder*, willows, western redcedar*

* Indicates tall-growing species.

Threatened and Endangered Plants

Threatened or endangered (T&E) plant species have declining populations due to various ecosystem pressures such as urban development, grazing, and logging. These species are protected by the Endangered Species Act (ESA), which requires Federal agencies to ensure that their actions do not jeopardize these species or their critical habitats. Table V-2 lists the Federally listed plants that potentially could occur in the Bonneville service territory. Figure V-4 (after page 126) shows T&E plant observation areas.

Table V-2: Currently Listed Threatened and Endangered Plants

Common Name	Scientific Name	Status	State
Ute ladies' tresses	*Spiranthes diluvialis*	T	MT, ID, WA
Water howellia	*Howellia aquatilis*	T	MT, ID, OR, WA
Nelson's checker-mallow	*Sidalcea nelsoniana*	T	OR, WA
Applegate's milk-vetch	*Astragalus applegatei*	E	OR
Golden paintbrush	*Castilleja levisecta*	T	OR, WA
Western lily	*Lilium occidentale*	E	OR
Bradshaw's desert parsley	*Lomatium bradshawii*	E	OR, WA
Malheur wire-lettuce	*Stephanomeria malheurensis*	E	OR
Marsh sandwort	*Arenaria paludicola*	E	OR, WA
Macfarlane's four-o'clock	*Mirabilis macfarlanei*	T	OR, ID
Howell's spectacular thelypody	*Thelypodium howllii ssp. Spectabilis*	T	OR

T = Threatened E = Endangered

The FS and BLM have also designated as *sensitive* those plants that need protecting on the lands the agencies manage. These plants are protected to ensure that they do not decline further in population.

Even though we routinely clear and control vegetation, T&E and sensitive plant species can grow within Bonneville's rights-of-ways and near electric yards.

Noxious Weeds

Noxious weeds are plant species designated by Federal or state law. These plant species have been found to harm crops, livestock, public health, and/or property. Some noxious weeds are native to the Northwest, but most are introduced from Europe or Asia. Disturbed areas such as transmission corridors often become infested with noxious weeds. These species take advantage of disturbed soils and the lack of competing vegetation in areas recently cleared. The weeds can be introduced and transported by vehicles, livestock, and natural elements such as wind, water, and wildlife. Bonneville works with local and state weed control districts and boards to combat noxious weed infestations. Common noxious weeds at which control programs are aimed include tansy ragwort, Canadian thistle, leafy spurge, bull thistle, dalmation toadflax, diffuse knapweed, gorse, scotch broom, and musk thistle.

Soils

The soil in which vegetation grows is a complex system of physical and biological elements and processes. It is essential for plant life, and has a major role in defining local ecosystems. It is vital for crop, forage, and timber production.

Soils form as weather and minute organisms act on mineral and organic materials over time, on particular landscapes. Because there is a wide variety of landforms and climates, soils are quite diverse throughout the program area. There is a total of eleven major soil categories (known as *soil orders).* Six of these are found within Bonneville's service territory (see Table V-3.)

Table V-3: Soil Types in Bonneville's Service Territory

Type	Description
Mollisols	Soils of grassland ecosystems that are important, productive agricultural soils; they occur in eastern Washington and Oregon, the Willamette Valley, and intermountain valleys of Idaho and western Montana.
Inceptisols	Soils of productive forestland that are often "young" (less developed) and found on fairly steep slopes, recent geomorphic surfaces, and material resistant to weathering. These soils occur in Puget Sound and in mountainous areas.
Ardisols	Soils of very dry regions. These soils are prevalent in central Washington and southern Idaho along the Snake River Plain.
Andisols	Formed in volcanic ash. These soils can store large volumes of water and are among the most productive forest soils in the Pacific Northwest. *(con't)*

Type	Description
	The soils often occur at higher elevations in the mountains of Washington, Oregon, and northern Idaho.
Entisols	Soils of relatively recent origins, and characterized by great diversity. These soils predominate on the pumice-mantled forested plateaus of central Oregon and floodplains and terraces.
Alfisols	Well-developed soils formed primarily in cool wet regions, usually under forest vegetation. They are productive for both commercial timber and agriculture. These soils occur in the mountains of western Montana and western Wyoming.

Water

Water is one of the most important resources present within Bonneville's service area. Water resources provide:

- irrigation,
- recreation,
- fish and wildlife habitat,
- transportation corridors,
- drainage and flood control,
- drinking water,
- power, and
- social and Tribal values and use.

Because water is so important, many local, state, regional, and Federal groups and agencies have strongly emphasized the protection and restoration of water resources, including many watershed-based planning efforts. The Clean Water Act provides some protection of Waters of the United States. This protection includes requiring permits for discharging dredge or fill material into rivers, streams, or wetlands. Downed trees or cut brush could be considered fill material if left in a stream, river, or wetland.

Bonneville transmission lines, access roads and microwave beam paths often must cross water resources, including wetlands, rivers and streams, and their associated floodplains. Substations and other electric yard facilities are sometimes found near these water resources.

Bonneville's transmission system also crosses or is adjacent to 10 sole-source aquifers: the Cedar Valley, Central Pierce County, Cross Valley, Eastern Columbia Plateau, Eastern Snake River Plain, Lewiston Basin, Missoula Valley, Newberg Area, North Florence Dunal, and Spokane Valley Rathdrum Prairie aquifers.

Because trees and shrubs often grow faster near water, these areas often need extra attention by Bonneville maintenance crews to make sure that vegetation does not grow into our lines. In other cases, transmission lines span well above deeply cut stream channels, leaving the channel and associated vegetation unchanged.

Water resources and the actions that affect them are closely related to **soils**, and **fish**.

Rivers and Streams

The Columbia River is the predominant river within Bonneville's service area. This river flows from British Columbia south through east and central Washington, and then west between Washington and Oregon, to the Pacific Ocean. Tributaries include the Snake River, which originates in Wyoming and flows through Idaho and along the Idaho-Oregon and Idaho-Washington borders, as well as the Kootenai, Pend Oreille, Spokane, Okanogan, Wenatchee, Yakima, Walla Walla, John Day, Deschutes, Hood, and Willamette rivers.

Other rivers not part of the Columbia River system but within Bonneville's service area include the Skagit, Skykomish, Snoqualmie, Nisqually, Chehalis, Nestucca, Flathead, Bitterroot, and Umpqua rivers.

At one or more points, Bonneville's transmission system crosses all of these rivers, as well as many smaller perennial and intermittent drainages. Rivers and streams are important not only as habitat for fish and other aquatic organisms, but also for transporting water, nutrients, minerals, and organic materials. Rivers also can transport pollutants and sediments, allowing negative elements to have far-reaching effects.

Precipitation in the Pacific Northwest ranges from 254 cm (100 in.) per year at the Cascade crest to less than 20 cm (8 in.) per year in low-elevation basins and plains east of the Cascades. The amount of sediment in rivers and streams varies with the season. In some areas, sediment is high during snowmelts in May and June; in other areas, sediment is high during heavy winter rains.

The water quality of rivers and streams is threatened by many sources and actions, including the following:

- soil disturbance (erosion from roads, timber harvest, development, agricultural production, and grazing),
- vegetation cover loss (crop production, commercial timber harvest, and grazing), and

- chemical pollution (agricultural chemicals, industrial wastes, human and livestock waste, and petroleum associated with urban runoff and car, truck, and boat traffic).

These actions affect water quality by depositing silt in the bottoms of streams, rivers, and lakes (sedimentation); by muddying the water (turbidity); by polluting the water; and by increasing water temperatures. Waters affected by point and/or non-point source pollution and not currently in compliance with or expected to satisfy applicable water quality standards are listed with the EPA as "water quality limited." (General surface water runoff from places such as parking lots and farmlands is called non-point pollution. Point pollution [e.g., industrial waste] comes from a defined place such as the end of a pipe.)

Wetlands

Wetlands are important because they provide wildlife habitat and help to control flooding and protect water quality. They are also protected under Federal, state, and local laws and policies.

Wetlands are defined as follows:

> *areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions (33 CFR 328.3, 40 CFR 230.3).*

Wetlands are often found within transmission-line rights-of-way; along Bonneville-maintained access roads; and next to substations, electric yards, and other Bonneville facilities. In the past, wetlands were considered wastelands, and Federal agencies were encouraged to build facilities in them so as not to compete with the public for more usable profitable lands. Therefore, many older Bonneville facilities are found located near wetlands.

Floodplains

Floodplains are low-lying areas associated with streams, rivers, and/or wetlands that have at least a one-percent chance of flooding each year. Under 10 CFR 1022 and Executive Order 11988, Federal agencies are required to avoid or minimize adverse impacts that might result from changing or occupying floodplains.

Many of Bonneville's transmission-line rights-of-way and access roads cross floodplains, while some substations and maintenance facilities are located next to floodplains.

Fish and Other Aquatic Species

Water supports fish and other aquatic species. Fish are an important resource to the Pacific Northwest, both for their economic value to the sport and commercial fisheries, and for their cultural and religious value to the region's Native American Tribes and others.

Rivers and streams in this region support a large number of anadromous fish (species that migrate downriver to the ocean to mature, then return upstream to spawn), as well as varied populations of resident fish (fish that live and migrate in fresh water).

The main anadromous fish runs in the Columbia Basin are Chinook, coho, chum, and sockeye salmon; steelhead and searun cutthroat trout; and American shad, white sturgeon, and Pacific lamprey. Pacific salmon and steelhead trout are especially important due to their commercial, sport, and cultural values. Popular resident game fish in the region include western cutthroat trout, rainbow trout, Dolly Varden, bull trout, sturgeon, and Kokanee salmon.

Other aquatic species include salamanders, turtles, frogs and invertebrates (insects, crayfish, snails, etc.).

Threatened and Endangered Species

Many fish, as well as other aquatic species, are presently listed under the ESA as threatened or endangered. Many other species of fish are candidate species. Currently, fish and wildlife agencies throughout the Pacific Northwest are engaged in recovery efforts for listed and other dwindling salmon stocks. Tables V-4 and V-5 show currently listed threatened or endangered fish and snails. Figure V-4 shows watersheds with T&E species.

Sensitive Fish Species

The FS and BLM have designated as sensitive those populations of fish that are in decline or that are considered likely to become threatened or endangered should current trends continue. Sensitive fish presently found in areas of Bonneville's facilities include white sturgeon; five species of lampreys; sockeye, chum, and coho salmon; coastal, Lohontan, and various other races of cutthroat trout; and pygmy whitefish, burbot, several species of minnows, suckers, and sculpins. Each state may also have sensitive species lists.

Table V-4: Currently Listed Threatened and Endangered Fish

Common Name	Scientific Name	Status	State
Pallid Sturgeon	*Scaphirhynchus albus*	E	MT
White Sturgeon (Kootenai River pop.)	*Acipenser transmontanus*	E	MT, ID
Borax Lake Chub	*Gila boraxobius*	E	OR
Hutton Tui Chub	*Gila bicolor*	T	OR
Oregon Chub	*Oreonichthys crameri*	E	OR
Foskett Speckled Dace	*Rhinichthys osculus ssp.*	T	OR
Lost River Sucker	*Deltistes luxatus*	E	OR
Warner Sucker	*Catostomus warnerensis*	T	OR
Shortnose Sucker	*Chasmistes brevirostris*	E	OR
Lahontan Cutthroat Trout	*Oncorhynchus clarki henshawi*	T	OR
Umpqua River Cutthroat Trout	*Oncorhynchus clarki clarki*	E	OR
Chinook Salmon	*Oncorhynchus tschawytscha*	T, E (depending on location)	ID, OR, WA
Coho Salmon	*Oncorhynchus kisutch*	T	OR
Sockeye Salmon	*Oncorhynchus nerka*	E	ID, WA
Chum Salmon	*Oncorhynchus keta*	T	OR, WA
Steelhead	*Oncorhynchus mykiss*	T, E (depending on location)	OR, WA, ID
Bull Trout (Klamath River pop.)	*Salvelinus confluentus*	T	CA, OR
Bull Trout (Columbia River pop.)	*Salvelinus confluentus*	T	MT, ID, NV, OR, WA

Table V- 5: Currently Listed Threatened and Endangered Aquatic Invertebrates

Common Name	Scientific Name	Status	State
Banbury Springs Limpet	*Lanx sp.*	E	ID
Bliss Rapids Snail	*Taylorconcha serpenticola*	T	ID
Utah Valvata Snail	*Valvata utahensis*	E	ID

Common Name	Scientific Name	Status	State
Bruneau Hot Springsnail	*Pyrgulopsis bruneauensis*	E	ID
Snake River Physa Snail	*Physa natricina*	E	ID
Idaho Springsnail	*Fontelicella idahoensis*	E	ID
Vernal Pool fairyshrimp	*Branchinecta lynchi*	T	OR

Wildlife

Pacific Northwest wildlife is diverse, ranging from creatures such as large mammals to birds, insects, and reptiles, all contributing to the ecological health and diversity of the region. Some gain special interest because of their economic and recreational value or because they are protected by a state or the Federal Government.

Transmission-line corridors, microwave beam paths, and access-road corridors contain a variety of wildlife habitats. Substations and other electric-yard facilities do not provide any wildlife habitat, but may be next to such habitat.

Open-land Habitat

Habitat conditions (the kind and amount of food, cover, and water) determine the wildlife species and number of individuals. Rights-of-way are dominated by habitats for open-land wildlife. These consist of cropland, pasture, meadows, and areas overgrown with grasses, herbs, shrubs, and vines. These areas produce grain and seed crops, grasses and legumes, berries, browse, and wild herbaceous plants. Winter cover crops and grain stubble fields also provide winter feeding areas for many wildlife species. Shrub and thicket habitats occur mostly when land has been recently cleared for human uses such as rights-of-way. Typical mammals include deer, coyote, fox, skunk, rabbit, and mice. Birds commonly observed in these areas include quail, pheasant, red-tailed and Swainson's hawk, owl, crows, meadowlarks, goldfinches, swallows, wrens, blackbirds, cowbirds, sparrows, and starlings.

Forest Habitat

Bonneville facilities are often located in the midst of forest wildlife habitats that consist of areas dominated by coniferous and/or deciduous tree cover, and associated forest understory vegetation. Typical mammals found in the forest habitat include elk, deer, black bear, cougar, bobcat, coyote, red fox, Douglas' squirrel, squirrel, chipmunk, and beaver. Common birds include ruffed grouse, hawks,

owls, ravens, jays, woodpeckers, towhees, and finches. Forest amphibians and reptiles include newts, salamanders, western toads and Pacific treefrogs.

Riparian Habitat

Riparian wildlife habitats and wetland habitats also occur within Bonneville rights-of-way and next to other Bonneville facilities. Riparian habitats occur in the zones that make a transition between aquatic and upland zones. Mammals found in riparian habitat include black-tailed deer, coyote, fox, beaver, otter, mink, raccoon, opossum, and bushy-tailed woodrats. Common riparian birds include bald eagles, hawks, owls, kingbirds, swallows, robins, blackheaded grosbeaks, juncos, bushtits, and starlings. Riparian reptiles and amphibians include northern alligator lizards, racer snakes, garter snakes, salamanders, rough-skinned newts, western toads, and several species of frogs.

Wetland habitats are permanently or intermittently flooded, and include such areas as freshwater marshes, swamps, bogs, seeps, wet meadows, and shallow ponds and lakes. Some of the wildlife attracted to these wetland habitats are beaver, muskrat, mink, raccoon, bald eagle, osprey, marsh hawk, ducks, geese, coots, rails, herons, kingfishers, snipe, sandpipers, plovers, killdeer, swallows, common yellowthroat, painted turtle, garter snake, newts, salamanders, toads, and several species of frogs.

Other Habitats

Special and Unique Habitats[1] are non-plant features that are found throughout the region and are used by wildlife. They include the following:

- **Snags** are standing dead trees. Snags provide cavities for shelter, and abundant insect populations for food.
- **Downed Woody Debris** includes large logs and root wads. Loose bark and areas under logs are used for cover and foraging spots for amphibians, reptiles and small mammals. Rootwads are used for nesting; and the entire log provides a food source for woodpeckers.
- **Exotic trees**, such as Lombardy poplar, black locust, and Siberian elm, are found at old homestead sites or existing rural homes and farms. These trees are used for perching, breeding, and shelter by raptors.

[1] As defined by Thomas (1979).

- **Talus** is an accumulation of rock fragments at the base of cliffs and steep slopes. Talus is used by variety of reptiles, small mammals, and rare species such as the Larch Mountain Salamander.
- **Cliffs** provide secure habitat for nesting hawks and falcons as well as lizards, snakes, and upland game birds (e.g., chukar). Steep terrain limits human and predator access, thus providing wildlife refuges.

Divided Habitat

Rights-of-way often cut through habitat types, thus dividing them and creating a contrast between what is *in* the right-of-way and what is *outside* it. Some species of wildlife take advantage of this difference in habitat. Edge species (species that tend to live where two differing habitats meet) use rights-of-way frequently. Red-tailed and Swainson's hawks, for example, will often nest in forested habitats next to transmission-line corridors, but feed in the open area within the corridor. Other edge species include barn swallow, common raven, western fence lizard, dark-eyed junco, common nighthawk, black-tailed deer, and eastern cottontail rabbit.

Deer and elk are often attracted to maintained Bonneville rights-of-way next to forested habitats. The low-growing shrubs and grasses within maintained corridors provide forage that is not available within shaded forests. The rights-of-way containing nutritious vegetation for forage can contribute to increased populations. Year-round deer use of rights-of-way is directly related to the amount of browse available (Goodwin, 1975; Cavanaugh et al.,1976; Eaton and Gates, 1979).

In urban and suburban areas, transmission-line corridors can serve as greenbelts, providing habitat for a variety of wildlife, including various songbirds, small mammals, and even larger mammals, such as deer and coyote.

Threatened and Endangered Animal Species

As with plant species, T&E animal species are protected by law, requiring Federal agencies to make sure that their actions do not jeopardize these species or their critical habitat. Figure V-4 (after page 126) shows T&E habitat in the Bonneville Service Area. Tables V-6 and V-7 show currently listed threatened or endangered mammals, birds and insects.

Table V- 6: Currently Listed Threatened and Endangered Mammals

Mammals Common Name	Scientific Name	Status	State
Grizzly Bear	*Ursus arctos*	T	MT, WA, ID, WY
Woodland Caribou	*Rangifer tarandus caribou*	E	WA, ID
Columbian White-tailed Deer	*Odocoileus virginianus leucurus*	E	OR, WA
Gray Wolf	*Canis lupus*	E	MT, WA, ID, WY
Canada Lynx	*Lynx canadensis*	T	OR, MT, WA, ID

Table V- 7: Currently Listed Threatened and Endangered Birds and Insects

Birds Common Name	Scientific Name	Status	State
Western Snowy Plover	*Charadius alexandrinus nivosus*	T	OR, WA
Bald Eagle	*Haliaeetus leucocephalus*	T	MT, OR, WA, ID, NV, UT, WY
Marbled Murrelet	*Brachyramphus marmoratos marmoratos*	T	OR, WA
Whooping Crane	*Grus americana*	E	MT, ID
Brown Pelican	*Pelecanus occidentali*	E	OR, WA
Aleutian Canada Goose	*Branta canadensis leucopareia*	T	OR, WA
Northern Spotted Owl	*Strix occidentalis caurina*	T	OR, WA
Piping Plover	*Charadrius melodus*	T	MT
Insect	**Scientific Name**	**Status**	**State**
Oregon Silverspot Butterfly	*Speyeria zerne hippolyta*	T	OR, WA

Of the presently listed threatened or endangered bird species present in Bonneville's service territory, the following four have habitat most likely to be affected by Bonneville's activities:

- northern spotted owl,
- marbled murrelet,
- peregrine falcon, and
- bald eagle.

The spotted owl and marbled murrelet nest in large old-growth trees in the forests of western Washington and Oregon. Some of these forests have nest sites; others may not have nests, but offer conditions suitable for nesting. These suitable areas are called Critical Habitat. As described under **Vegetation**, old-growth or mature trees are found next to, not in, transmission-line corridors. These potential nesting trees can become "danger" trees and threaten the transmission lines.

The peregrine falcon and bald eagle have breeding and wintering areas on the shorelines of the Washington and Oregon coasts, the Strait of Juan De Fuca, the Puget Sound area, and the larger rivers and lakes within Bonneville's service area. These birds often fly through transmission-line corridors, and sometimes perch and even nest on transmission towers.

Other presently listed threatened and endangered wildlife species that may live within Bonneville managed areas include the following:

- grizzly bear,
- gray wolf, and
- Columbian white-tailed deer.

Grizzly bears and gray wolves are wide-ranging species that may cross Bonneville rights-of-way and roads; however, they are more closely associated with wilderness and roadless areas. Grizzly bears and gray wolves are found in the Northern Cascades, Bitterroot Mountains, Lower Clark Fork, and Central Idaho Mountains. Bonneville has transmission lines that cross grizzly bear habitat.

Gray wolves also occur around transmission lines; however, there are no packs, and no denning or rendezvous sites known in the vicinity of Bonneville rights-of-way. Columbian white-tailed deer are found on

islands in the lower Columbia River and on the mainland along the river, as well as in the valley floors of the Umpqua River Basin.

Sensitive Animal Species

As with sensitive plants, the FS identifies sensitive animal species in each Forest Region. Many of these animals are closely tied to specific habitat types, especially to native habitat such as late-successional and old-growth forest, native shrub- and grasslands.

Those sensitive species that are associated with late-successional forest but that are not also threatened and endangered species include the following:

- birds such as the northern goshawk, several species of woodpecker, and other cavity-nesting birds, and
- small mammals, such as the marten and fisher.

Sensitive species associated with grasslands/shrubs of the relatively dry interior Columbia River Basin and portions of Idaho include the following:

- Colombian sharp-tailed grouse
- pygmy rabbit,
- kit fox, and
- Idaho ground squirrel.

Land Use

The two dominant land uses within or near Bonneville's transmission facilities are agriculture and commercial forest. Other land uses include recreation, residential, commercial, and industrial.

Agriculture

Agricultural lands generally include crops, orchards, and rangelands. Transmission lines and access roads cross agricultural areas. Some Bonneville land outside substation fences is used for agriculture.

Low-growing crops or grazing lands need little to no vegetation management by Bonneville (except for noxious weeds). Problems for transmission reliability can occur where orchards or Christmas tree farms along transmission corridors are left untrimmed or not harvested and trees grow too close to the lines.

Oregon

Agriculture is Oregon's second largest industry, after forestry. In the cool moist climate of the Willamette Valley, over 170 different crop and livestock items are produced, including grass and legume seeds, tree fruits and nuts, wine grapes, berries, vegetables, nursery stock, Christmas trees, and field crops such as wheat, oats, mint and hops, hay, livestock and poultry and miscellaneous field crops. On the coast, Tillamook County dairy farms are famous for their cheeses. Cranberries are harvested near Coos Bay.

East of the Cascades, haying and raising cattle on ranges and pastures is common. Crops in this area often require irrigation, but make for some of the highest crop yields in the nation for certain commodities.

Hood River County, amid the foothills of Mt Hood in north-central Oregon, produces high-quality tree fruit, particularly apples and pears; The Dalles, just to the east, produces sweet cherries. The Rogue River Valley in southern Oregon produces pears and other tree fruit.

In central Oregon around Madras, Redmond, and Prineville, rich soil irrigated by the Deschutes, Crooked, and John Day rivers produces potatoes, mint, hay, and other field crops in abundance. In south-central Oregon, on a high plateau with sandy volcanic soils, the Klamath Basin specializes in fresh market potatoes, sugar beets, and beef cattle.

Washington

Washington is divided into two regions. Farms to the west of the Cascades tend to be small. Dairy products, poultry, and berries are the primary commodities produced.

The eastern side of the state has larger farms. Small grains such as wheat and barley, potatoes, fruit and vegetables are the primary commodities produced. In 1996, Washington produced more than half of the nation's apple crop.

Idaho

Idaho has diverse agriculture. In the north part of the state, the primary crops are grain, dry pea, lentil, and hay. The southwest corner's traditional crops are mixed, with fruit orchards, vegetables, and specialized commodities such as mint, hops, and seed crops. Along the Snake River, the land is dotted with large irrigated fields of alfalfa hay, dry beans, potatoes, small grains, and sugar beets. The southeast and east are a mixture of dryland and irrigated grain, hay, and potato

fields. Cattle and sheep graze on the vast rangelands throughout the state.

Montana

Crops account for over half of Montana's agriculture products. Wheat is the largest crop (including four classes: hard red spring, hard red winter, durum, and soft white). Montana also produces sugar beets, alfalfa hay, and other crops such as apples, buckwheat, canola, cherries, potatoes, dry beans, field peas, flax, grapes, garlic, lentils, safflowers, sunflowers, oats, mustard, corn, rapeseed, mint, kabocha squash, Christmas trees, and many more crops.

California, Modoc County

Modoc County, California, the only county in California with Bonneville facilities, produces alfalfa hay, pasture and rangeland with cattle, potatoes, barley, sugar beets, onions, wheat, and horseradish.

Wyoming, Teton County

Teton County, Wyoming, the only county in Wyoming with Bonneville facilities, has wheat and barley fields as well as pastures near the transmission line and substation.

Forest Lands

Bonneville's facilities also cross private, commercial, and government-managed forests. Uses of these forests vary from wood product production to recreation and rural residential.

Timber production is common throughout western Oregon and western Washington, a region where precipitation and temperature are optimal for tree growth. These coniferous forests are some of the most productive in the world, exhibiting high growth rates and large tree sizes. Because there is less precipitation east of the Cascades, timber management is limited to the more moist and colder higher elevations. Here, tree growth rates are slower due to the less favorable conditions.

Under intensive management, forestlands are planted, competing species are controlled, and timber trees are harvested on short rotations. Maintaining site productivity and high tree-growth rates is a high priority. Because trees, especially those grown for timber, can grow too close to transmission lines, timber production does not occur within the transmission-line rights-of-way. An exception is where

conductors cross canyons with sufficient clearance for mature tree heights.

Recreation

Transmission-line rights-of-way and associated access roads are often used by recreationists such as hunters, anglers, and campers, especially on Federal lands. During winter, cross-country skiers and snowmobilers may also use transmission-line corridors and roads. In rural and urban areas, open cleared rights-of-way are often used as playing fields, bike trails, or hiking trails.

Residential, Commercial and Industrial

Many Bonneville electric facilities are located in cities, towns, suburbs, or in commercial or industrial areas. Substations, transmission lines, access roads, and maintenance facilities were often originally built on the outskirts of town; with growth, homes and business have built up around them. These areas include the following:

- Eugene, Salem, Portland, Redmond, Pendleton, and Bend (OR);
- Bellevue, Vancouver, Wenatchee, Yakima, Pasco, and Spokane (WA);
- Idaho Falls, Coeur d'Alene, and Lewiston (ID); and
- Kalispell, Missoula, and Butte (MT).

In these areas, businesses, homes, and other properties adjoin rights-of-way and substations, while lawns, gardens, playgrounds, bike paths, and parking lots may extend beneath the transmission lines.

Land Ownership/Management

This section describes the various ownerships crossed by Bonneville facilities. Figure V-5 shows the different categories of land ownership.

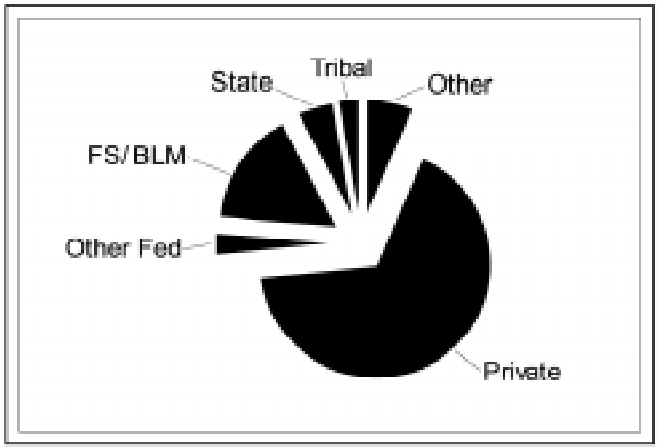
Bonneville and Private Lands

Bonneville owns most of the land under and around our substations, maintenance facilities, and microwave sites. We do not own land where these facilities are located on FS- or BLM-managed lands.

Bonneville usually obtains easements from the landowner for transmission-line rights-of-way and access roads. Sixty-six percent of the land crossed by Bonneville's rights-of-way is owned by private individuals or companies. Easements are generally written to be perpetual: they stay in effect even if the land is subdivided and/or sold.

The easements include rights for Bonneville to manage the line and right-of-way. The details of each easement vary, as do the rights Bonneville has on that land.

Figure V-6: Land Ownership by Percentage along Right-of-way Corridors



Bonneville establishes agreements with landowners to permit certain activities on rights-of-way (like Christmas tree farms) on condition of proper safety and vegetation control.

Because private lands are within counties or cities boundaries, some local government regulations can apply to Bonneville's vegetation management. (See below: **City, County, and State Lands**.)

FS- and BLM-managed Lands

About 1368 km (850 mi.) or 16% of Bonneville's transmission-line corridors are located on lands managed by the FS. About 837 km (520 mi.) or 10% of our corridors are located on lands managed by the BLM. There are 16 (or 5%) Bonneville substations and 44 Bonneville microwave/radio sites (or 33%) located on BLM *or* FS land.

Figure V-7 shows FS- and BLM-managed lands. Table V-8 shows the National Forests that have Bonneville facilities on them. Table V-9 lists the BLM districts that have Bonneville facilities on them.

The BLM and FS must comply (as Bonneville must) with many Federal laws such as NEPA and the ESA. Both these agencies have additional plans governing their land. Bonneville's vegetation management can be affected by these plans. The BLM and FS can be affected by Bonneville's vegetation management of electric facilities

on their lands. The FS and BLM are cooperating on this EIS as a step toward addressing each other's needs.

FS and BLM plans and regulations are both programmatic (general) and site-specific for the management of individual Forests or Districts. Often, land-managing plans give no specific guidance for Bonneville to manage vegetation within powerline corridors or other electric facilities. However, Bonneville's facilities often cross different designated habitat types that are addressed in the plans, and vegetation management is addressed indirectly with three general themes:

- protecting riparian areas,
- protecting old-growth/ late-successional habitat, and
- limiting herbicide use.

The number and nature of FS requirements vary from Forest to Forest, or District to District for the BLM. Vegetation management projects are covered by several different FS and BLM environmental documents and decisions. The primary documents are noted in **Chapter I** and described in greater detail in **Appendices F and G**, FS and BLM background.

Table V-8: FS National Forests with Bonneville Transmission Facilities

Forest	State and Forest
Region 1	**Idaho** Clearwater NF Coeur d'Alene NF Kaniksu NF St. Joe NF **Montana** Deerlodge NF Flathead NF Gallatin NF Kootenai NF Lolo NF
Region 4	**Wyoming** Bridger-Teton NF **Idaho** Caribou NF Boise NF Targhee NF Challis NF (2 microwave/ radio stations)
Region 5	**California** Modoc NF

Forest	State and Forest
Region 6	**Washington** Columbia River Gorge NSA** Colville NF Olympia NF ** Okanogan NF (1 radio sta.) ** Mt Baker - Snoqualmie NF ** Wenatchee NF **
Region 6 (con't)	**Oregon** Columbia River Gorge NSA ** Crooked River Grasslands Deschutes NF** Fremont NF Mount Hood NF ** Siuslaw NF ** Umatilla NF Wallowa-Whitman NF** Willamette NF ** Winema NF**

** included in regulations from Land Management Planning Documents Within the Range of the Northern Spotted Owl (USDA/USFS and USDOI/BLM, 1994b).

NF = National Forest NSA = National Scenic Area

Table V-9: BLM Districts with Bonneville Transmission Facilities

State	District
Idaho	Lower Snake River Upper Snake River Upper Columbia-Salmon/Clearwater
Washington	Spokane
Oregon	Coos Bay ** Eugene ** Medford ** Roseburg ** Salem ** Lakeview** Burns Prineville Vale
California	Susanville (Substation)
Montana	Butte

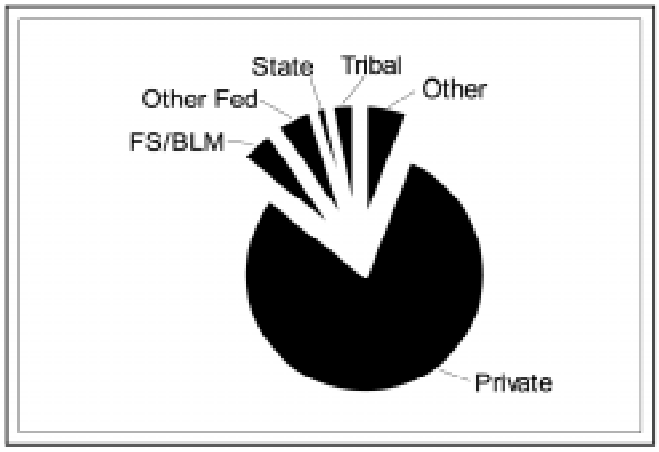
** included in regulations from Land Management Planning Documents Within the Range of the Northern Spotted Owl (USDA/FS and USDOI/BLM, 1994b).

Other Federal Lands

Bonneville's facilities are also found on a variety of other Federal lands, including National Recreation Areas, National Grasslands, National Wildlife Refuges, the Fort Lewis Army Base, the Umatilla Army Depot, and the Hanford Nuclear Reservation.

The federal agencies that manage these lands are also required to comply with Federal laws such as NEPA and the ESA. These lands may also have additional plans governing their uses.

Figure V-8: Land Ownership by Percentage around Substation Property



Tribal Lands

Bonneville's facilities also cross the reservations of ten Indian Tribes, as follows:

- Confederated Salish and Kootenai Tribes of the Flathead Indian Reservation,
- Yakama Nation,
- Nez Perce Tribe,
- Nisqually Indian Tribe of the Nisqually Reservation,
- Kootenai Tribe of Idaho
- Confederated Tribes of the Colville Indian Reservation,
- Confederated Tribes of the Warms Springs Reservation,
- Confederated Tribes of the Umatilla Reservation,
- Puyallup Tribe of the Puyallup Reservation, and
- Muckleshoot Indian Tribe of the Muckleshoot Reservation

About 357 km (222 miles) of transmission corridor cross reservations. There are 10 Bonneville substations (3%) and 1 microwave tower (less than 1%) located on Tribal land.

Most of these Tribal Reservations have plans that include guidelines for vegetation management. Also, Native American Tribes hold and exercise legal rights to activities and resources both within and beyond Reservation boundaries. These rights notably include fishing, hunting, gathering wild plant materials, and religious practices. Below is a list of Tribal Reservations in the Pacific Northwest (excluding those

Tribes with lands crossed by Bonneville facilities—see list above). Tribal reservations are shown on Figure V-5, after page 140.

Blackfeet Tribe of the Blackfeet Indian Reservation

Burns Paiute Tribe of the Burns Paiute Indian Colony

Cedarville Rancheria of the Northern Paiute Indians

Coeur d'Alene Tribe of the Coeur d'Alene Reservation

Confederated Tribes of the Chehalis Reservation

Confederated Tribes of Coos, Lower Umpqua and Siuslaw Indians

Confederated Tribes of the Grand Ronde Community

Confederated Tribes of the Siletz Reservation

Coquille Tribe

Cow Creek Band of Umpqua Indians

Crow Tribe

Fort Bidwell Indian Community of Paiute Indians of the Fort Bidwell Reservation

Fort McDermitt Paiute and Shoshone Tribes of the Fort McDermitt Indian Reservation

Hoh Indian Tribe of the Hoh Indian Reservation

Hoopa Valley Tribe of the Hoopa Valley Reservation

Jamestown S'Klallam Tribe

Kalispel Indian Community of the Kalispell Reservation

Klamath Indian Tribe

Lower Elwha Tribal Community of the Lower Elwha Reservation

Lummi Tribe of the Lummi Reservation

Makah Indian Tribe of the Makah Indian Reservation

Nooksack Indian Tribe

Northwester Band of Shoshoni Nation

Pit River Tribe (includes Big Bend, Lookout, Montgomery Creek and Roaring Creek Rancherias, and XL Ranch)

Port Gamble Indian Community of the Port Gamble Reservation

Quileute Tribe of the Quileute Reservation

Quinault Tribe of the Quinault Reservation

Samish Indian Tribe

Sauk-Suiattle Indian Tribe

Shoalwater Bay Tribe of the Shoalwater Bay Indian Reservation

Shoshone-Bannock Tribes of the Fort Hall Reservation

Shoshone-Paiute Tribes of the Duck Valley Reservation

Skokomish Indian Tribe of the Skokomish Reservation

Spokane Tribe of the Spokane Reservation

Squaxin Island Tribe of the Squaxin Island Reservation

Stillaguamish Tribe

Summit Lake Paiute Tribe

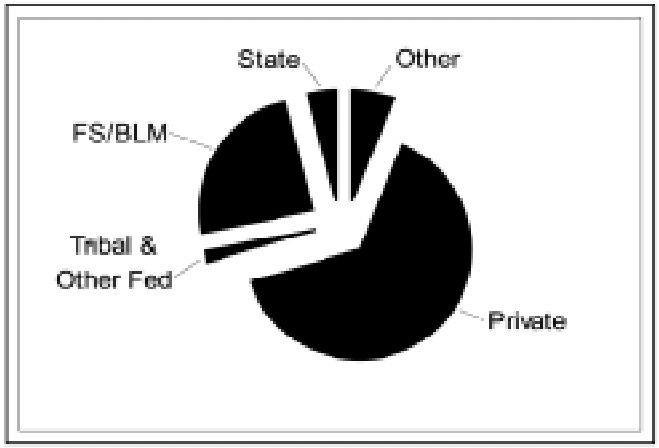
Suquamish Indian Tribe of the Port Madison Reservation

Swinomish Indians of the Swinomish Reservation

Tulalip Tribes of the Tulalip Reservation

Upper Skagit Indian Tribe

Figure V-9: Land Ownership by Percentage around Radio/Microwave Stations



City, County, and State Lands

Bonneville's service area crosses many jurisdictions, including cities, counties, and states, that have ordinances and plans defining land use. As a Federal agency, Bonneville does not apply for local permits from state, county or city governments unless a local government has been designated as the regulator for a Federal law. Bonneville tries to consider consistency with state and local ordinances, plans, and policies associated with adjacent land uses.

Cultural and Historical Resources

Cultural and historic resources can be generally categorized into three groups:

1) historic sites, including historic architecture, engineering and archeological sites;
2) Native American archeological sites; and
3) traditional cultural properties.

Most identified cultural resources in the Columbia River Basin are archeological sites such as campsites, housepit villages, rockshelters, rock art (petroglyphs and pictographs), lithic (stone) quarries and workshops, burial grounds and cemeteries and isolated rock cairns, pits and alignments. Archeological sites are valued for:

- information they contribute to understanding past events and cultures,
- public recreational and educational interest, and

- their significance as part of the heritage of contemporary Native American cultures.

Sites of historic significance relate to early Euro-American exploration, the fur trade, military history, mining, navigation, agriculture, and early settlement.

Native American traditional cultural properties include a broad range of features from the natural environment and the sacred world, such as distinctive shapes in the landscape, traditional use plants and animals (including game animals, livestock, and food and medicinal plants), ceremonial sites, and places of spiritual renewal and guidance.

These cultural resources are found throughout the Pacific Northwest, along transmission-line corridors and next to other electric facilities that cross Tribal reservation, Federally managed, and private lands.

Public Health and Safety

Transmission facilities provide electricity for heating, lighting and other services essential for public health and safety. Contact with the electric equipment can injure people and cause property damage.

Managing vegetation around electric transmission facilities keeps the electricity from flashing to ground or other objects. This same vegetation management can potentially harm humans. Exposure to herbicides, use of sharp tools, machinery and heavy equipment, and burning slash piles can injure people.

National Electrical Safety Code

Bonneville's vegetation management program is based on portions of the National Electrical Safety Code 1997 Edition (NESC, 1997). In general, the NESC requires tree trimming and removal to prevent " . . . grounding of the circuit through the tree." Electric contact between a tree and an energized conductor can occur even though the two do not actually touch. In the case of high-voltage lines, electricity will arc across an air gap. The distance varies with the voltage at which the line is operated. Bonneville has established minimum distances that a tree can be to a transmission line; the NESC designates how close a worker can come to energized lines. (Please see **Appendix E** for more information on this subject.)

The NESC specifies factors that should be considered if a tree is to be removed or trimmed: tree growth, movement of the tree and

conductors in wind, voltage, and sagging of the conductor at high temperatures.

Equipment Use

Workers (and potentially the public) are at risk of physical harm resulting from tree felling and topping, use of sharp tools, driving on unimproved roads, and work conducted near high-voltage lines and transformers.

Herbicides

All herbicides sold or distributed in the United States must be registered by the Environmental Protection Agency (EPA). This means that the EPA must conclude that the particular agent in question can be used without posing unreasonable risks to people or the environment, based on scientific evidence.

Current law also mandates that older registered herbicides be reregistered based on advances in scientific knowledge. EPA lists recently reregistered herbicides in a Reregistration Eligibility Decision (RED).

Pertinent facts about herbicides, including controls for proper use, safety requirements, toxicity data, and application restrictions developed by EPA are summarized in **Appendix H.** EPA also imposes these regulations by including them on container labels to direct the proper use of a herbicide. It is illegal *not* to follow label instructions and restrictions.

Smoke/Fire

Another potential issue related to public health and safety and vegetation management is smoke from burn piles. Bonneville has two burning techniques: we sometimes use a burner to kill weeds in substations and/or we burn vegetative debris piles created from right-of-way vegetation maintenance. For safety and reliability reasons, burn piles are located away the transmission line unless the line is de-energized.

Smoke can reduce local air quality and can cause health concerns for people—particularly people with respiratory problems—who live near the place where burning is occurring.

Visual Resources

Visual quality varies tremendously throughout the Pacific Northwest: from forests, mountains, ocean views, and rolling hills to picturesque and cosmopolitan cities. For the most part, Bonneville facilities and

rights-of-way have been part of the visual landscape for many years and, in some cases, decades.

Bonneville ’s Vegetation Management Program most affects visual quality where vegetation within maintained rights-of-way contrasts with surrounding vegetation, primarily forested areas. Areas where Bonneville transmission lines cross forested areas include the Olympics, Cascades, Northern Rockies, and Coast Range. In such areas, maintained rights-of-way can create a visibly sharp, linear edge between forest and right-of-way.

Towers are also typically visible within forested areas, although trees can often block or soften the views of most towers, leaving those exposed on hill tops or within valley gaps as the most visible. In non-forested areas, the towers exert much more visual presence than does the maintained vegetation beneath them.

Major factors that determine corridor visibility include existing soils, vegetation, the view from viewpoints, adjacent settings, and contrasts between surfaces (vegetation and exposed soils) inside and outside the corridor.

Bonneville electric yards can be very visible, with their structures, light colored gravel, fencing, and lighting. In residential neighbor- hoods, visual screening becomes an important management consideration. Because typical shade trees near substations can cause safety and reliability problems, Bonneville has often “visually softened” some of these facilities with fencing, low-growing vegetation, and slow-growing trees.

Air Quality

Within Bonneville’s service area, many airsheds either do not currently or have not in the past met Federal air quality standards. Those that currently do not meet the standards are called “nonattainment areas.” Those areas listed as "nonattainment" are either taking measures to reduce air pollution or are gathering better data, so that they can be reclassified as “maintenance areas.” If they do not receive redesignation by the Federal government’s deadline (varies with designation status), the Federal government withholds highway funds.

The status of **nonattainment** designations is constantly being reviewed by state authorities with the hope that those areas will

achieve redesignation as maintenance areas—thus lifting the strict standards imposed on them. Most of the nonattainment areas in the Northwest are scheduled for redesignation in the near future. A few that will probably not be redesignated in the near future include Pocatello, ID (particulates), and Spokane and Yakima, WA (both: carbon monoxide).

Many airsheds presently listed as "nonattainment" are eligible for redesignation to maintenance areas because they have not exceeded the standards for at least 3 years. Bonneville will treat these airsheds as nonattainment areas, but will watch for changes in designation. These areas include the following: Montana (Butte, Columbia Falls, Kalispell/Whitefish and Flathead County, Flathead Indian Reservation (Poulson/Ronan), Libby, Missoula, and Thompson Falls); Idaho (Boise, Pinehurst and Shoshone County, and Sandpoint), and Oregon (Eugene/Springfield and Lane County, Grants Pass, Klamath Falls, La Grande, Lakeview, Medford, Oakridge, and Salem). “Maintenance areas” include Eugene and Portland (OR), Vancouver (WA), and Seattle-Tacoma-Everett (WA).

Socioeconomics

Population centers range from small rural communities to major metropolitan areas, with much of the population occurring within the urban centers of the Puget Sound and Willamette Valley regions. McGinnis and Christensen (1994, citing U.S. Bureau of Census 1990 data, 1991) report that counties in the Interior Columbia River Basin had a 1990 population of 2.9 million. As a comparison, 6.3 million people reside in western Oregon and Washington. Washington counties comprise 38% of the population; southern Idaho counties, 27%; Oregon counties, 12%; Montana counties, 11%; and northern Idaho counties, 7% (counties in the Interior Columbia River Basin in Wyoming, Utah, and Nevada comprise the remaining 5% of the study area population). Within the interior Columbia Basin, the most populated county in 1990 was Spokane, Washington (361,364); the least was Camas, Idaho (McGinnis and Christensen 1994).

Economic Conditions

Major resource-based economies include crop, forage, and timber production. Within urban centers, more industrial- and service-based economies exist, including manufacturing, production, and retail.

Over the past 13 years, the Pacific Northwest has evolved from a resource-based economy to a more diversified economy with growing trade and service sectors. The manufacturing share of the regional nonfarm employment was 15.5% in 1993. Resource-based manufacturing made up 24.2% of the manufacturing employment and high technology industries' (aerospace and electronics) share was 38.6%.

The lumber and wood products industry held 2.6% of the total regional employment in 1993. Food processing was 2.0%, while transportation equipment was 3.2% (1993). Aluminum production is economically important to the region, but its employment is relatively small; it had a 0.5-percent share of total employment in 1993. Employment in wholesale and retail trade was 24.7% in 1993, while employment in the services sector was 24.9%.

Bonneville's system supplies electric power for many municipalities and industries. Industrial customers such as aluminum plants or high-tech manufacturers count on very reliable electric service. Unexpected electric interruptions can cause negative economic repercussions from down-time, re-setting equipment, and lost revenues.

The affected area, in terms of potential economic effects, can extend beyond the Pacific Northwest. Power on Bonneville's transmission system can flow north to Canada or south to California. Because transmission systems are linked together, the same power can end up being used in New Mexico, Arizona, Texas, Utah, or Nevada. Therefore, when power is interrupted in one place, a chain of interruptions can occur several states away. An example is the August 10, 1996, power outage referenced in Chapter I: it caused power outages in ten states, interrupting electric service for a period of time from several minutes to nine hours for 7-½ million customers (residents and businesses).

This page intentionally left blank.

Chapter VI: Changes

In response to comments, we made these changes in Chapter VI:

- Added information on grasslands and shrublands.
- Made changes in mitigation measures to parallel those noted under Chapter III, including the revision of the tables on buffer widths and herbicide-free zones.
- Added discussion on inerts and adjuvants in the Water section.
- Revised the discussion on Fish and Other Aquatic Species to include a discussion of aquatic toxicity and bioaccumulation. Noted that Bonneville is not proposing to use insecticides as a management tool. Revised the table on Herbicide Ecological Toxicities and Characteristics (now Table VI-7) to reflect changes in the number and kinds of herbicides Bonneville proposes to use, as well as to indicate where they would be used. Similarly, revised the table on Human Health Toxicology Assessment (now Table VI-9) to reflect latest information and places where specific herbicides would be used.
- Noted the need for input from appropriate state and federal agencies for guidance to limit impacts on locally listed or sensitive species.
- Revised the discussion on NEPA compliance of FS- and BLM-managed lands to reflect the respective agencies' responsibilities.
- Included consultation with the THPO as well as the SHPO regarding cultural impacts.
- Added a table that compares the relative cumulative impacts of the alternatives.

Some small changes were also made to make the document clearer and easier to read. For specific comments and responses, please see Chapter VII.

Chapter VI Environmental Consequences

In this chapter:

- **Impacts of the Methods**
- **Impacts of the Alternatives**
- **Cumulative Impacts**

This chapter describes the potential environmental impacts of the various methods and program alternatives, by environmental resource (vegetation, water wildlife etc.) and human resource (land uses, visual, health and safety, etc.).

Vegetation

The following section discusses general impacts of vegetation management on vegetation.

General Impacts

Target Vegetation

Bonneville is aiming to control the growth of target vegetation. Target vegetation includes the following:

- tall-growing vegetation in the right-of-way or microwave beam path;
- tall-growing vegetation that is *off* the right-of-way but that could fall or bend into the line (danger trees);
- noxious weeds on our rights-of-way or other Bonneville land;
- trees or woody stemmed shrubs on access roads;
- any vegetation within substations, switchyards, or radio/microwave sites; and
- trees that are outside substations but that could fall into the substation or onto the substation fence.

While we are aiming to control target vegetation, impacts could also occur on non-target vegetation. Changes could also occur to the overall vegetation structure and diversity on the right-of-way.

Non-target Vegetation

Impacts on non-target vegetation from general vegetation management (regardless of the method used) could include the following:

- trampling, crushing, or accidental removal of plant species;
- increased exposure to direct sun and weather;
- change in plant community composition and diversity;
- changes in soil moisture, nutrient level, and soil structure due to compaction; and
- increase in noxious weed invasion.

While workers conduct vegetation maintenance along the right-of-way, they or their vehicles could trample or crush non-target vegetation. Non-target plant species also could be accidentally removed or parts of the plant cut. The vegetation would be more affected by these impacts if they were to occur during the growing season than during the winter, when plants are dormant and usually less affected by disturbances. Regardless of maintenance timing, many species would recover from the impacts by the following season. Plants that are plentiful in the area would re-establish themselves through roots or seed dispersal.

Structure and Diversity

Controlling tall-growing vegetation can also affect vegetation structure (plant community composition) and diversity. **Grasslands** and **shrublands** are naturally occurring low-growing plant communities that usually need little vegetation control. Brush or grass may need to be cleared around tower legs for access or fire protection. Sometimes there are tall-growing junipers that need to be cut and noxious weeds that need treatment. Overall, the vegetation control needed in these areas has little potential to affect the structure or diversity of the plant community.

In **forested areas**, the dynamics of the plant community on the right-of-way change constantly. Trees in adjacent forests send a continuous flow of tree seeds to the right-of-way, pushing the succession of plant development on the right-of-way toward a forest condition (Bramble and Byrnes, 1983). This trend toward a developing forest is found more along the edge of the right-of-way. By contrast, plants

associated with open areas that have developed since initial right-of-way clearing are found more abundantly at the center of the right-of-way (Brisson et al., 1997).

Where tree seedlings on the right-of-way are allowed to develop and grow to the point that they become a threat to the line, **plant diversity can be reduced**. The many young developing trees will compete with striving meadow-plant species and reduce the overall diversity of plant species in the area—leaving only forest or developing forest-type plant species.

When big trees that have provided a canopy are removed, plants living below are exposed to sunlight and weather. Some plants might die from this exposure; some plants, more tolerant of varying conditions, would survive but could suffer from sunburnt foliage for a growing season or two. Still others might use the opportunity of open space to reproduce and dominate the area.

In some cases, this change in conditions and subsequent plant development might reduce the diversity of species in the plant community. This would happen under two main conditions: (1) if those plant species taking over were the same as those within the forest, or (2) if those species were aggressive invasive plants (such as blackberries or noxious weeds) that could dominate and out-compete other plant species.

Noxious weeds are non-native plants that act as pioneer species: they colonize and take over disturbed sites such as newly cleared rights-of-way. (The amount of ground disturbance and, consequently, the extent of the opportunity depend on the method of control used.) Noxious weeds threaten the existence of most native plants and greatly reduce plant diversity. (Noxious weed invasions can occur in grasslands, shrublands, and or forested areas.)

In forested areas, maintaining rights-of-way so that only small or no trees can grow can **increase the overall diversity** of plant species in the area. This right-of-way open space, when surrounded by shaded woods, provides a habitat for meadow-type plants—shrubs and grasses—to flourish. These meadow plants do not grow in shaded forests and could be species that lie dormant until favorable growing conditions arise (Bramble and Burns, 1983).

When trees (such as unstable danger trees) in a forested area are removed along the right-of-way, the remaining trees, formerly inside the forest, are exposed to weather, which can cause the foliage to sunburn or the trees to freeze. The trees that make up the new “edge” are vulnerable to being blown down by winds because their root mass

is not as strongly developed for resistance. (This fact is often considered when trees are being reviewed for removal—it is important to leave an edge of trees that are more stable and resistant to blow-down.)

Threatened, Endangered, and Sensitive (TES) Plants

In the last several years, Bonneville has discovered TES plant populations on various portions of our rights-of-way. Those plants include the Federally listed *Lomatium bradshawii* (Bradshaw's desert parsley) and two species recently proposed for listing: *Erigeron decumbens var. decumbens* (Willamette Valley daisy) and *Lupinus sulphureus ssp. Kincaidi* (Kincaid's sulfur lupine). Within National Forests, the FS gives Regional and Forest designations to plant species. Through plant surveys, Bonneville has identified several sensitive plant species that are listed as "Forest Sensitive" within National Forests in Wyoming, California, and Oregon.

BLM also has designated as "sensitive" plants that need protection on the lands that the agency manages. Bonneville develops plans to protect sensitive species in coordination with either the land manager or responsible Federal agency to prevent impacts from our vegetation management program.

TES plants can be affected by change in vegetation structure on rights-of-way. Plants that are shade-tolerant can be adversely affected when the trees are removed. Most shade plants are sensitive to sunlight, and would die.

However, controlling certain vegetation types in some environments can actually encourage TES plants species to grow. This phenomenon might result from controlling other vegetation that would normally out-compete TES plants. A study conducted in Georgia, Maryland, and Virginia uncovered a significant number of rare plants on powerline easements, in comparison to those in surrounding landscapes (Sheridan et al., 1997). In central Oregon, on our own rights-of-way, *Astragalus peckii* (Peck's milk vetch) has been identified on our access roads. It appears that the site disturbance has favored the establishment of this species in some areas.

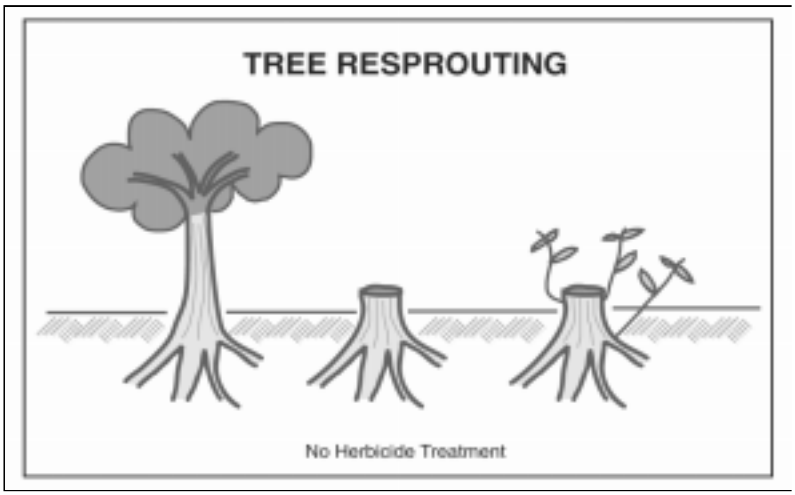
The following sections discuss method-specific impacts of vegetation management on vegetation.

Manual Impacts

Manual techniques are very selective: they generally affect only the vegetation that has been targeted for cutting. As noted above, surrounding vegetation could be crushed or damaged by workers or

debris. The main (negative) impact of manual brush-cutting is that it encourages regrowth of multiple-stemmed sprouts for certain species.

Figure VI-1: Resprouting Consequences of Cutting without Herbicide Follow-up



Most deciduous trees will resprout when cut; some will also send up suckers through the roots. In Bonneville's service territory, these types of trees include alder, cottonwood, maple, and willow. To kill these trees, the roots must be killed also. Otherwise, with every cycle of tree cutting, more sprouts (or stems) grow; over time, the tree stem density increases. Resprouts grow back thick and keep low-growing shrubs from establishing themselves. Therefore, it is difficult to try to convert to a low-growing plant community using manual techniques alone (no follow-up herbicide treatments) to eliminate tall brush in plant communities that have re-sprouting species.

A study by Nowak et al. (1993) compared tree densities and species composition on powerline corridors in New York State over a 16-year period and across a wide range of management schemes, environmental conditions, and plant communities. On corridors where managers used periodic selective hand-cutting with no herbicide treatments, an increase in tree density was observed. On corridors where managers used herbicides to remove trees periodically and selectively, they observed tree populations remaining at constant low density.

Conifers (cone-bearing trees such as pines, fir, cedar, spruce, and hemlock) tend not to sprout or send up suckers when cut. However, if the conifer is cut above the lowest branch, the branch will become the "leader" and the tree will continue to grow.

For landscaped areas at non-electric facilities, such as around substation offices or maintenance headquarters, manual techniques (weed pulling, hoeing, trimming) would have no impact on non-target vegetation—unless the wrong plant were pulled or hoed.

Mechanical Impacts

Mechanical techniques (e.g., using mowers or troller-choppers) are non-selective or much less selective than manual methods: they tend to clear or cut all vegetation within the path. This could have impacts on any species that Bonneville would want to encourage to grow (such as low-growing brush, forbs, and grasses) or would need to avoid (such as TES plants).

Using some kinds of mechanical equipment (especially blading and roller-chopper types) can disturb the ground (rutting and compaction), which could adversely affect soil productivity and potentially affect plant growth or encouraging noxious weeds to invade and grow. Other types, such as walking brush controllers, have minimal impact on soil. Noxious weeds tend to be extremely resilient and opportunistic species, with quick germination and regeneration rates. Any change in the environment that affects the composition of vegetation or exposes the soil can allow noxious weeds or other undesirable species to dominate.

Mechanical methods usually encourage deciduous species to resprout. Therefore, if the right-of-way is dominated by deciduous species, the use of mechanical clearing would most likely increase the tree-stem density of the right-of-way over time.

Grounds maintenance at non-electric facilities would consist mostly of mowers for lawns. Lawn mowing would have no impacts on non-target vegetation.

Biological Impacts

Insects and pathogens used to eat or control vegetation are highly selective for specific plants (usually noxious weeds) and therefore would not affect non-targeted vegetation. These biological controls are tested to ensure they are host-specific (Pacific Northwest Weed Control Handbook, 1997), and that they will not switch to crops, native flora, or endangered plant species in the absence of their host weed.

Herbicide Impacts

Note: Because the body of research on herbicides effects in general, and on specific herbicides, is so large, references are not listed in the herbicide discussions in this chapter. A comprehensive listing of all herbicide references is found in the second half of the References Chapter. Detailed reporting on uses, precautions, and effects of each of the herbicides that could potentially be used for Bonneville facilities are found in Appendix H.

The degree to which herbicides affect non-target vegetation depends on two factors: (1) the specific herbicide used (whether it is selective or non-selective), and (2) whether the herbicide comes in contact with non-target vegetation. Such contact can occur through the application technique, drift (when herbicide drifts through the air or blows away from the area), water or soil movement, and accidental spills or accidental or careless applications. Effects of the specific herbicide on non-target vegetation depend on the "selectivity" of the herbicide. A selective herbicide kills only one type of vegetation (e.g., broadleaf plants). A non-selective herbicide might kill a number of plant types (e.g., broadleaf and grasses). The more selective a particular herbicide, the less the potential for non-targeted vegetation to be harmed.

Whether the herbicide comes in contact with non-targeted vegetation can depend on the application technique. Because **spot herbicide applications** treat individual plants (stump treatment or injection), there is little-to-no potential for the herbicide to contact non-targeted vegetation.

Localized herbicide applications, which treat individual or small patches of plants, might possibly spray non-target plants in the process of treatment or come in contact with the herbicide through direct application and/or drift. Localized treatments are not likely to cause much drift because relatively small areas are treated and the person who applies the herbicide (the applicator) has a high degree of control.

Aerial and broadcast applications treat large areas, rather than individual plants; if there were any non-target plants in the area, the herbicide would come in contact with them. These two application categories also have a greater potential to cause herbicide drift, because there is usually a relatively long distance between the spray source (e.g., a truck or helicopter) and the plants or area treated. If there is any wind or other drift-causing factor during application, the herbicide might blow off-target and potentially come in contact with non-targeted plants. Adhering to label instructions and weather restrictions and using adjuvants in the herbicide to increase droplet size would minimize or eliminate this potential drift.

Rain or erosion can sometimes move herbicides off-site through soil or water, allowing the herbicide to come in contact with vegetation outside the intended treatment area. The likelihood of this happening depends on the mobility of the particular herbicide, its persistence, the soil type, the proximity to water of the initial application, and the amount of rain (if any) present during and/or immediately after application. For a more detailed discussion of herbicide migration, please see the **Water** and **Soil Resource** sections of this chapter.

Regardless of technique, accidental spills of herbicide could cause herbicides to come in contact with non-targeted vegetation. However, legal requirements and applicator training emphasize prevention of such spill. The impacts of herbicide spills could range from low to high, depending on the persistence and mobility of the herbicide involved, as well as on how quickly and thoroughly a spill is cleaned up.

In electrical and non-electric facilities, *all* vegetation is targeted because no vegetation can be allowed (for safety reasons). Therefore, any "non-target" vegetation effects from electrical and non-electric facility vegetation management would occur only if herbicides were to move off the treatment area. The likelihood of the herbicides moving off-site and the impacts of that movement would be the same as discussed above and later in the **Water** and **Soil** sections of this chapter.

Debris Disposal Impacts

Large amounts of woody debris scattered on the surface of the ground can crush vegetation, shade the vegetation surroundings and increase soil moisture, and temporarily lower the quantity of soil nitrogen available for plant growth until decomposition of the material is nearly complete.

Burning vegetation debris can in some cases help seeds (including noxious-weed seeds) to germinate. Bare or blackened soil from burnt slash piles could expose soil to noxious weed invasion. The ash from burning can increase nutrient levels needed by some plants. However, burning of plant debris also causes nitrogen and carbon to evaporate, which can diminish soil productivity.

In the rare event that fire escapes from a burn pile, surrounding vegetation would definitely be affected by a potential wildfire. Careful monitoring of slash-pile burns and adherence to safety procedures would reduce the likelihood of such events.

If tractors or other heavy equipment were used to stack debris, rutting and compaction, which could adversely affect soil productivity, could potentially affect plant growth.

Chipped debris can crush, smother, and shade plants if the chips are laid on the plant. Using heavy equipment for chipping can also crush non-targeted vegetation or affect the soil in which it grows through compaction and rutting.

Mitigation Measures

The following mitigation measures would be observed to reduce impacts on vegetation:

- Consider the following steps or mitigation measures to promote a semi-stable low-growing plant community:
  1. Remove existing tall-growing vegetation. If using manual methods to eliminate deciduous (resprouting-type) species, do follow-up herbicide treatments to ensure that the roots are killed.
  2. Replant or reseed with ground cover if none exists or if there is a low potential for natural revegetation by low-growing species (and a high potential of natural revegetation by tall-growing species).
  3. Maintain, by selectively eliminating tall-growing vegetation before it reaches a height or density to begin competition with low-growing species.
  4. As much as practical, be careful not to disturb low-growing plants. When possible, use only selective vegetation control methods (such as spot herbicide applications) that have little potential to harm non-target vegetation.
- Avoid removing vegetation where it will not grow up into the safety zones for the transmission line.
- Cut conifers below the lowest live limb to eliminate the continued growth of lateral branches.
- Use only those biological control agents (insects) that have been tested to ensure they are host-specific.
- Take full responsibility for controlling noxious weeds on fee-owned property.
- Enter into active noxious weed control programs with land owners/managers or county weed control districts where Bonneville activities may have caused or aggravated an infestation.
- *Where appropriate*, provide herbicides or biological control agents to landowners.

- *When possible,* wash vehicles that have been in weed-infested areas (removing as much weed seed as possible) before entering areas of no known infestations.
- *Consider, if appropriate,* reseeding after noxious weed treatments.
- *Where cost-effective and to the extent practicable,* use regionally native plants for landscaping.
- Use seeds, seedlings, or plants that are consistent with management objectives and adapted to climatic conditions, soils, landscape position, and the site itself.
- Use native seed/plants if the species meet the objectives of the revegetation project, if the costs are reasonable, and if the seeds/plants are readily available in the quantity and quality needed to perform the project.
- *If native seed mixes are not reasonably priced or available in needed quantities,* consider a seed mix with some percentage of native seeds.
- Use high-purity seed; take actions to prevent purchase of seed contaminated with noxious weeds.
- Determine whether any T&E plant species are potentially present in the project area, using T&E maps, specialist's determination, or T&E list from the USFWS.
- *If T&E plant species are potentially present in the project area,* determine whether they are likely to be affected. If project is likely to affect but not *adversely* affect T&E species, obtain concurrence from the USFWS.
- *If it is determined that the project is likely to adversely affect T&E plant species,* initiate formal consultation with the USFWS and prepare a Biological Assessment according to 40CFR Part 402.
- Apply mitigation measures (such as timing restrictions, or specific method use) resulting from T&E determinations or consultations.
- Follow herbicide product label directions for appropriate uses, restrictions etc.
- Use herbicide-thickening agents (as appropriate), label instructions, and weather restrictions to reduce the drift hazard to non-target plants.
- Do not apply pellet herbicides within three times (3X) the crown width (or dripline) of an off-right-of-way tree.

- *In the rare case of an herbicide spill*, follow all herbicide spill requirements, including containment and clean-up procedures.
- Visit rights-of-way after treatments to determine whether target vegetation was controlled and whether non-target plants were affected.

Water

Controlling the growth of vegetation can affect surface water (such as streams, rivers, ponds, lakes, and wetlands) and can potentially affect groundwater (aquifers and wells). Vegetation management is not expected to affect floodplains (it would not change land contours or affect floodwater flow).

The following section discusses general impacts of vegetation management on surface water and groundwater resources.

General Impacts

Removal of streamside (or riparian) vegetation, regardless of the method used, can affect surface water by the following:

- increasing surface runoff;
- promoting erosion and sedimentation, which reduces water quality;
- reducing shading and increasing water temperatures; and
- limiting organic plant debris, and thus the amount of nutrients, entering the water.

Any impacts on water can in turn affect fish and other aquatic species (such as invertebrates, beavers, nutria, salamanders, turtles, and plants), as well as people (drinking water, swimming, fishing, etc.).

Potential groundwater impacts would be herbicide-method-specific, and impacts are discussed under that section.

The following sections discuss method-specific impacts of vegetation management on water.

Manual Impacts

Manual techniques, especially hand methods, are very selective and have a low potential to affect aquatic resources. The greatest potential impacts would be the chance of minor fuel or oil spills from power tools and the release of bar oil during operation of the equipment.

Mechanical Impacts

Because some large machinery used to control vegetation disturbs the soil (either by scraping it or by compaction or rutting from the wheels of the tractors), this method has the greatest potential to cause erosion,

which can directly or indirectly affect water quality. Erosion can affect water quality by causing increased turbidity (sediments suspended in water), sedimentation (sediments that settle to the bottom), and/or surface-water run off.

Wetlands can be affected by machines compacting the typically soft, saturated soils. Small, non-distinct streams and wetlands have the greatest potential to be affected because they are small and can be overlooked.

As with manual techniques (chainsaws), mechanical machinery has the potential for oil leaks and spills that could contaminate water.

Biological Impacts

Insects that are used to eat target vegetation would have little or no effect on the aquatic environment.

Herbicide Impacts

Herbicides could affect water resources if the herbicide were to reach those resources. The herbicides proposed for Bonneville use are limited to terrestrial use and would not be applied to water. The potential for a land-applied herbicide to reach water would depend on the herbicide's physical properties and the site conditions. Using herbicide-free buffer zones around water sources is an effective means of keeping herbicides out of water bodies (Norris and Charlton, 1995).

The four most significant means of offsite movement are runoff, leaching, drift, and misapplication/spills. **Runoff** is the surface or lateral migration through rainfall or erosion. **Leaching** is the downward (or vertical) migration through the soil. **Drift** is the airborne movement of herbicides through wind or evaporation.

Misapplications and **spills** are caused by not following the label instructions/restrictions or by the accidental spilling of a herbicide during mixing, application or equipment cleaning.

Surface water could be affected by any of these means of herbicide movement, whereas groundwater would be potentially affected only by leaching.

Runoff and Leaching

There are three physical properties which, when combined with site conditions such as climate and geology, determine the runoff and leaching potential of a herbicide. They are:

- **Persistence** - Persistence is the length of time a chemical stays active. It is measured by its half-life. The longer the half-life of a chemical, the more persistent it is. The half-life is affected by

many variables, including sunlight, microorganisms, chemical degradation, etc.

- **Soil Adsorption** - Soil adsorption is the tendency of a chemical to bind to soil particles. Soil adsorption is expressed as: K(oc) = conc. adsorbed/conc. dissolved/% organic carbon in soil.
- **Solubility** - Solubility is the tendency of a chemical to dissolve in water. Solubility is expressed as the amount of a chemical dissolved in a known amount of water measured in mg/l (ppm).

Herbicides have to be relatively persistent in order to have either leach or runoff potential (non-persistent herbicides do not stay active long enough to create a risk). If an herbicide has a high soil adsorption, it is more likely to run off with soil movement. If it has low soil adsorption, it is more likely to leach down through the soil. If a herbicide is highly soluble in water, it is more likely to leach; with low solubility, it is more likely to run off. Table VI–1 shows how the various factors combine for leach or runoff potentials. See Table VI-7 (page 185) for the physical properties and off-site movement potentials (leaching and runoff) for each proposed herbicide.

Table VI-1: Runoff and Leach Potential

Main Physical Properties	Leach Potential	Runoff Potential
Persistence	Persistent *half-life greater than 100 days*	Persistent *half-life greater than 100 days*
Soil Adsorption	Low soil adsorption *K(oc) less than 500*	High soil adsorption *K(oc) greater than 500*
Solubility	High solubility *greater than 30 mg/l*	Low solubility *less than 30 mg/l*

Even if an herbicide has runoff or leaching potential, the likelihood of it reaching a water body also depends on site characteristics such as climate and geology. For example, if a persistent herbicide with a high potential for leaching to groundwater were used at a site with low annual precipitation, and the depth to groundwater was over 30 m (98 ft.), the overall potential for that herbicide ever to reach groundwater before complete degradation is quite low. Conversely, the same herbicide, applied at a site with high annual rainfall, coarse underlying soils, and groundwater depths less than 30 m (98 ft.) would have a higher relative potential of reaching groundwater. No one

factor can be used to anticipate the ultimate behavior of a herbicide. By understanding these factors, following label instructions and restrictions and applying herbicide-free buffers, applicators can virtually eliminate the potential of herbicides reaching water bodies.

Herbicides used at the level and intensity typical for Bonneville vegetation management do not tend to pose substantial risks of leaching into groundwater. In western Oregon and Washington, the many soil microorganisms and high precipitation levels combine to degrade and/or dilute herbicides to the level where little or no trace would occur in groundwater. In other portions of Bonneville's service area, low precipitation, combined with deep groundwater aquifers, prevents herbicides from reaching ground water (BLM, 1985: p. 40).

Application technique can also have a slight impact on leaching and runoff potential. Applications that are applied to an area (broadcast and aerial techniques) tend to also have herbicide applied to soils and are more likely to run off or leach than techniques that apply herbicide to the plant only (spot or localized techniques).

Drift

Herbicides can also reach water through drift—the airborne movement of herbicides beyond the intended contact area. The three primary factors that contribute to drift are as follows: (1) application technique, (2) weather conditions, and (3) applicator error. Aerial and broadcast applications are more likely to reach water through drift, because the herbicide is sprayed from a helicopter/plane or through a large hose and must settle through the air to reach the target. Spot and localized applications are less likely to cause drift because these applications are targeted to specific plants and the volume of herbicide sprayed through the air is less.

Wind speeds and air temperatures (and their effect on herbicide evaporation) affect the potential for herbicides to drift. With winds over 5 mph and/or high temperatures, drift is likely.

Misapplications and Spills

Misapplications and spills are caused by failure of the applicator to follow label instructions and restrictions and by applicator carelessness. Most experts agree that misapplications and spills are the leading cause of impacts on non-target resources. The impacts of herbicide spills would depend on the persistence and mobility of the spill, as well as on how quickly and thoroughly a spill is cleaned up.

Site Conditions

Site conditions also determine the likelihood of herbicide reaching water resources. **How close herbicides are applied to water resources** determines the potential for herbicides to reach water. Buffers (defined widths of non-treated land) are the most common mitigation measure used to protect such environments. Bonneville must use prescribed no-spray or limited-herbicide-use buffers. Because of this, herbicide use generally does not occur near water systems, thereby reducing greatly the potential for contamination.

The **type of water resource** determines the potential for contamination if herbicide were to reach the water body. Small, still water bodies (such as ponds and small wetlands) are the most likely to be affected: if herbicide were to reach the water, there would be little movement or volume of water to help disperse or dilute the chemical. By contrast, large fast-moving rivers would be less likely to be affected because the amount and turbulence of the water would help dilute the herbicide quickly.

Rainfall is a major factor: with heavy rainfall, herbicides are more likely to be washed from the targeted site toward water bodies, particularly when granular formulations of herbicides are used.

The vegetation, ground cover, or soil type between a sprayed area and a water body can affect whether herbicide movement will reach water. Thick vegetation might block drift or absorb an herbicide moving through water or ground before it reaches a water body. On the other hand, if no vegetation existed, the herbicide would have a greater potential to wash toward the water body.

From a watershed perspective, the **concentration and amount of the herbicide applied** can influence the risk of water contamination. Because powerlines are linear in nature, the area of land treated with herbicides would be relatively small (narrow strips across the landscape) compared to the surrounding area. The ratio of treated to untreated surface area in any given watershed is usually sufficiently low to permit rapid dilution. This ratio is much lower than that for the concentrated areas or blocks of land typical of herbicide treatments in agricultural and forestry practices.

For example, across a “section” (a 259-ha or 640-ac. block of land), aerial application of herbicides on a right-of-way (30 m or 100 ft. wide) would result in about 2-to-3% of the section being treated. By contrast, treatment areas of 10-to-25% per section can occur in forestry practice, and areas greater than 75% per section are common in agricultural treatments.

A right-of-way treatment using spot or localized applications would result in an even lower percentage of treated area.

If an herbicide does reach water, the toxicity determines what kind of impact it might have. For example, all chemicals can be toxic to aquatic organisms if present in high enough concentrations (please see **Fish** for more information on impacts of herbicides in surface water, and Table VI-7, page 185, for herbicide ecological toxicity).

Bonneville has also reviewed the toxicological data for inert ingredients and adjuvants.

Inert Ingredients *are anything added to an herbicide active ingredient when it is formulated by the manufacturer. Inert ingredients can be solid (e.g., clay) or liquid (e.g., water) depending on the end use of the formulation. The inert ingredients of the herbicide formulations considered in this EIS have been reviewed and are not classified by EPA as inert ingredients of toxicological concern to humans or the environment.*

Adjuvants *are any non-herbicidal materials added to formulated products to improve their effectiveness and/or minimize handling and application problems. EPA does not require registration of adjuvants, but for any particular herbicide, the herbicide label must indicate whether and what types(s) of adjuvants can be used. The relative toxicity of adjuvants varies greatly between end uses and manufacturer formulations. Table VI-8 describes the more popular adjuvants and their generalized toxicities.*

Debris Disposal Impacts

Debris disposal would affect surface water if the cut vegetation or wood chips were put into the water. Clumps of vegetation could cause or contribute to debris torrents (rapid flows of a mixture of water, soils, rock, and organic debris). These debris torrents tend to occur during heavy rainfall, where tree-clearing operations have taken place on mountainsides or where stream channels have been clogged by debris. Vegetation debris should not be disposed of in water.

Mitigation Measures

The following mitigation measures would be applied for water resources.

- In riparian areas, use selective control methods and take care not to affect non-target vegetation.
- In riparian areas, leave vegetation intact, where possible.
- Recognize that any discharge of material (displaced soils and, in certain circumstances, vegetation debris) within a water of the U.S. may be subject to U.S. Army Corps of Engineers regulations under the Clean Water Act.
- Do not permit debris from tree falling, cutting, or disposal to fall into or be placed in any watercourse, spring, pond, lake, or

reservoir, *unless* there is approval from the appropriate authorities for stream habitat projects.

- *If burning piled vegetative debris*, do not burn in or next to watercourses.
- *For all methods using machinery or vehicles (i.e. chainsaws, trucks, graders)* keep the equipment in good operating condition to eliminate oil or fuel spills.
- Do not wash equipment or vehicles at a stream.
- Follow herbicide product label directions for appropriate uses, restrictions etc.
- Use herbicide thickening agents (as appropriate), label instructions, and weather restrictions to reduce the drift hazard to water resources.
- Ensure that there is no danger of granular herbicides being washed from the areas of application.
- Notify inspector and the State of any amount of herbicide spill in or near water.
- Always use siphon prevention devices/methods when filling herbicide tanks from domestic water supplies.
- Consider climate, geology and soil types in selecting the herbicide with lowest relative risk of migrating to water resources.
- Protect surface water and groundwater by observing all riparian buffer widths and herbicide-free zone guidelines in Tables VI-2, VI-3, and VI-4 (unless other agencies, local authorities, or T&E consultations require stricter buffers).
- *Before herbicide application*, thoroughly review the right-of-way to identify and mark, if necessary, the buffer requirements.

Table VI-2: Buffer Widths to Minimize Impacts on Non-Target Resources

Herbicide/Adjuvant Ecological Toxicities and Characteristics	Buffer Width from Habitat Source per Application Method (i.e., stream, wetland, or sensitive habitats)				
	Spot	Localized	Broadcast[1]	Aerial[2]	Mixing, Loading, Cleaning
Practically Non-toxic to Slightly Toxic	Up to Edge[3,4]	Up to Edge[3,4]	10.7 m[3,4] (35 ft.)	30.5 m[4] (100 ft.)	30.5 m[5] (100 ft.)
Moderately Toxic, or if Label Advisory for Ground/ Surface Water	7.6 m[3,4] (25 ft.)	10.7 m[3,4] (35 ft.)	30.5 m[3,4] (100 ft.)	76.2 m[4] (250 ft.)	76.2 m[5] (250 ft.)
Highly Toxic to Very Highly Toxic	10.7 m[3,4] (35 ft.)	30.5 m[3,4] (100 ft.)	Noxious weed control only. Buffer as per local ordinance.	Noxious weed control only. Buffer as per local ordinance.	76.2 m[5] (250 ft.)

[1] Using ultra low volume (ULV) nozzles with orifice size and spray pressure set to produce droplets at a minimum of 150 microns, boom or nozzle heights at the lowest possible height, and cross-wind speed of less than 10 mph.[3]

[2] Using ULV nozzles with orifice size and spray pressure set to produce droplets at a minimum of 150 microns, minimizing air shear relative to nozzle angle and aircraft speed, boom length at 70% or less of wingspan/rotor, swath adjustment not to exceed 60 feet based on maximum cross-wind speed of less than 10 mph, minimum safety clearance application height, and herbicide tank mixture dynamic surface tension is less than 50 dynes/cm.[3]

[3] Goodrich-Mahoney, J.W., Determination of the Effectiveness of Herbicide Buffer Zones in Protecting Water Quality, Electric Power Research Institute, Report No. TR-113160, September 1999

[4] Calculated from: A Summary of Ground Application Studies, Spray Drift Task Force, 1997

[5] BPA Best Management Practice

Table VI-3: Herbicide-free Zones for Rights-of-way, Substations, Electric Yards, and Non-electric Facilities

Zone	Buffer Width
Agricultural Irrigation Source of Any Kind (Wet or Dry)	15m (50 ft.) from each bank (linear) or well (radius) for Gny herbicide.
Domestic/Public Drinking Water Well	50m (164 ft.) radius for any herbicide having a ground/surface water advisory* 15m (50 ft.) radius for any other herbicide
Domestic/Public Drinking Water Intakes/Spring Developments	For slopes <10% 50-m (164- ft.) radius for any herbicide having a ground/surface water advisory* 15-m (50-ft.) radius for any other herbicide For Slopes >10% <30% 150-m (492-ft.) radius for any herbicide having a ground/surface water advisory* 50-m (164-ft.) radius for any other herbicide For slopes >30% 300-m (984-ft.) radius for any herbicide having a ground/surface water advisory* 100-m (328-ft.) radius for any other herbicide
Sole Source Aquifers	As per local aquifer management plan.

*as stated on the label

< means "less than" > means "more than"

Table VI-4: Additional Herbicide-free Zones for Substations, Electric Yards, and Non-electric Facilities

Zone	Buffer Width
Secondary Containment Liners, Vaults, and Lagoons	2-m (6-ft.) radius for any herbicide having a ground/surface water advisory* Up to edge of containment feature for any other herbicide
Storm Drains that Discharge Offsite	2-m (6-ft.) radius for any herbicide having a ground/surface water advisory*, or, if moderately/highly/very highly toxic to any aquatic vertebrate or invertebrate Up to edge of drainage feature for any other herbicide

- Monitor to determine whether desired results for water resources were achieved or whether follow-up mitigation measures are necessary (e.g., erosion control measures).
- *For electric yards within 100 m (328 ft.) of wells, streams, rivers, or wetlands,* determine whether the water body should be monitored for potential herbicide contamination.
- *Where cost-effective and to the extent practicable,* seek to minimize runoff from non-electric facilities' landscaping.
- *Where cost-effective and to the extent practicable,* implement water-efficient practices at non-electric facility landscaping, (such as the use of mulches, efficient irrigation systems, audits to determine exact landscaping water-use needs, and recycled or reclaimed water and the selecting and siting of plants in a manner that conserves water and controls soil erosion).

Soils

The following section discusses general impacts of vegetation management on soils.

General Impacts

The removal of vegetation, regardless of the method used, can affect soil through erosion and by altering soil nutrients.

Erosion

The degree of soil erosion varies throughout the Bonneville service area: erosion depends on differences in climate, vegetation, soil properties, and land-use patterns. Climate affects erosion primarily through intense individual storms rather than by yearly precipitation totals.

West of the Cascade Mountains, the climate is maritime. The moist and relatively warm climate fosters the development of deep soils, while rainfall rates are generally slow enough to allow water to soak into the soil. However, slopes cleared of vegetation are susceptible to erosion by water; mass movement is also a dominant erosion process.

East of the Cascades, a drier, more continental climate predominates. Vegetation is a mosaic of grasslands, with coniferous forest present at higher elevations. Intense storms are common; they produce

significant amounts of rainfall during a relatively short time. Soils in the eastern, more arid portions of the Bonneville service area are also subject to wind erosion from strong steady winds over areas of sparse ground cover.

Erosion is a natural ongoing process. However, erosion rates can markedly increase when vegetation is cleared, regardless of the method used. Vegetation cover is important in controlling erosion. The vegetative canopy and the organic layers covering the soil dissipate the erosive energy of raindrops and reduce runoff. Plant roots also strengthen and bind the soil together.

If a great deal of vegetation were cleared or damaged on steep slopes, soils could destabilize and cause erosion in a variety of ways. Both runoff and soil moisture content can increase. Increased runoff, combined with the removal of vegetation and protective soil organic layers, can result in elevated erosion levels. In addition, more water would stay in the soils (instead of being taken up by the plants that have been removed) and add to the soil mantle weight, heightening the potential for mass movement.

Erosion from direct physical disturbance during vegetation clearing depends on the control method that is used. **See discussions of the methods below.**

Nutrients

Vegetation management can alter the chemistry of the soil. For example, removing nitrogen-fixing plants, such as red alder or ceanothus, can reduce soil nitrogen and associated plant productivity. Removing brush cover can eventually reduce the quantity of carbon in the soil if revegetation does not occur. Removing logs and other plant material deprives soils of the nutrients and structural components provided by decaying organic material. Removing vegetation can also reduce evapotranspiration (if revegetation does not occur) which allows more water to leach soluble nutrients from the soil and decomposing organic matter, reducing productivity. In addition, soil erosion often increases after removing vegetation. Erosion can transport organic matter and nutrients off-site.

The following sections discuss method-specific impacts of vegetation management on soils.

Manual Impacts

Manual impacts on soil include disturbance of the duff layer in only a very small area, not enough to cause substantial impacts on the soil as a resource. There is some potential for soil contamination from chainsaw oil.

Mechanical Impacts

Mechanical techniques, especially blading or soil-disturbing type equipment, have the greatest impacts on soils. Ground-disturbing heavy equipment can expose soils, compact soils, and disturb the physical arrangement of soils.

Exposing soils can make them vulnerable to erosion and/or drying out. Soil compaction increases soil density by compressing soil particles together, reducing the volume of unoccupied air spaces. Compaction reduces the soil's ability to take in water, thus increasing surface runoff and higher erosion levels. Compaction also possibly inhibits growth of beneficial fungi (known as mycorrhizal fungi) that provide nutrients to plant roots. Plant development is also restricted in compacted soils: aeration is poor and root growth is impeded. As a result, soil productivity is adversely affected.

Disturbing the physical arrangement of soils (e.g., displacing topsoil or removing the organics-rich duff layer) can both increase erosion and slow plant growth and regeneration potentials.

Mowers are one of the most common mechanical techniques used to clear vegetation along Bonneville-maintained access roads. The vehicle (typically a tractor) generally remains on the road while the mower swings to the side to cut roadside shrubbery to the desired level. While soils can be disturbed, they tend to be less disturbed than if equipment were driven directly over vegetation (as it can be when using mowers on the right-of-way).

Biological Impacts

Insects used to control noxious weeds would not affect soils.

Herbicide Impacts

When herbicides are used, some of the chemical can end up in the soil. Once in the soil, herbicides can reduce soil microbes' numbers and/or change species composition. This reduction and change can affect soil productivity, including the ability of soils to support certain vegetation. Many herbicides, such as 2,4-D, glyphosate, and mefluidide, break down quickly and have very temporary effects on soil microbes. Herbicides that do not break down relatively quickly (e.g., isoxaben, tebuthiuron) may have longer-lasting effects. For instance, if an area is re-treated often and regularly, herbicides may build up in the soils and can reduce soil productivity before breaking down.

The potential effects on soil microbes can also depend on the application technique. Since aerial broadcast application typically covers a much broader treatment area, affected microbe populations might take longer to recover because there will be fewer adjacent

populations to recolonize. Conversely, spot and localized applications affect much smaller areas: microbes might quickly recolonize affected soils from adjacent, unaffected areas.

The effect on soil microbes also depends on the existing vegetation, climatic factors, and soil properties.

Rights-of-way would be treated with relatively small amounts of herbicide with long-time spans between treatments, so there would be little potential for impacts on soil microbes.

In electrical yards, the soil is treated intentionally to keep plants from growing, and the regular use of herbicides would affect the microbes within the electrical yard. If herbicides were to migrate offsite into adjacent soils, microbes (and thus soil productivity) could be affected.

Debris Disposal Impacts

Large amounts of woody debris scattered on the surface can decrease the amount of soil nitrogen available for plant growth until debris decomposition is nearly complete, and can temporarily (a year or so) increase soil moisture.

Burning piles of debris would affect the small pile area by possibly killing soil microbes, making soils hydrophobic (unwettable), and creating a bare exposed area vulnerable to erosion. If tractors were used to pile debris, equipment traffic could compact soils and reduce soil productivity. Rutting caused by heavy equipment traffic could also concentrate runoff and cause localized increases in erosion. Destruction of soil organic matter from hot slash fires also reduces the soil stability, which can lead to substantial localized erosion. Ash created from burning can add to soil nutrients, but burning of organic matter also causes nitrogen and carbon to evaporate, which can diminish soil productivity.

Adding large amounts of organic debris from chipping might reduce the availability of soil nitrogen to plants and inhibit plant growth until decomposition of organic debris is almost complete. Equipment traffic could also cause compaction and rutting and result in a localized loss of productivity and increased erosion.

Mitigation Measures

The following mitigation measures would be observed to reduce impacts on soils:

- Do not use ground-disturbing mechanical equipment to clear on slopes over 20%.

- Use mechanical clearing or heavy equipment when the ground is sufficiently dry to sustain the equipment and excessive rutting will not occur.
- Reseed or replant seedlings on slopes with potential erosion problems and/or take other erosion control measures as necessary.
- *If burning vegetative debris piles,* keep piles relatively small to keep intense and prolonged heat from damaging the soil horizons.
- *For non-electric facilities and where cost-effective and to the extent practicable,* implement water-efficient practices at non-electric facility landscaping in a manner that controls soil erosion.

Fish and Other Aquatic Species

General Impacts

Potential impacts on aquatic species are closely related to those just described under **Water Quality** and **Soils**. Erosion impacts on soil cause water-quality problems; whenever the water quality of a fish-bearing stream is affected, so are fish. Specifically, fish are affected by turbidity, sedimentation, loss of large organic debris, loss of shading (and associated temperature increases), and exposure to hazardous substances.

As with water-quality and soil impacts, general vegetation control causes loss of tree-shading and some erosion impacts, regardless of the method used. Erosion increases turbidity and sedimentation that can reduce fish feeding success. In severe cases, sedimentation can keep fry (early-stage fish) from emerging, or fill in or reduce the deeper pools preferred by fish, especially trout.

If large trees are cut down and removed within riparian zones, stream shading could be lost immediately, and the large woody debris that would later fall into streams and provide shelter for fish (an important component of aquatic systems) would be removed. Reduced shading can increase stream temperatures.

However, because rights-of-way are linear, they tend to have little impact on stream temperatures—usually less than a hundred meters (about 300 feet) of any stream is typically affected. Loss of shading generally gains importance only if it occurs where other activities are also causing losses in riparian shading at a watershed level. A study of right-of-way crossings in forested areas in New York found that water temperatures were not significantly greater in right-of-way reaches than in forested reaches (Peterson, 1993).

Loss of in-stream woody debris can reduce salmonid population, eliminate spawning beds (the debris plays a role in sedimentation storage), reduce pool area, reduce fish cover, and cause sudden flows of sedimentation (Burns, 1972; Heede, 1972; House and Boehne, 1985; Lisle, 1986).

A study conducted on right-of-way crossings of headwater trout streams in forested areas in New York (Peterson, 1993) found a greater abundance of fish within rights-of-way stream reaches than in forested reaches. This was attributed to the greater water depth and pools in the right-of-way.

The study suggested that removal of the forest canopy in rights-of-way caused the significant increase in sunshine, which in turn encouraged dense low-growth vegetation on streambanks and in-stream bars. In contrast, the forested streambanks usually held only scattered herbs and an occasional sapling or mature tree, and in-stream bars were unvegetated. Added rootmass of the forb and shrub layer appears to have stabilized the streambank and increased resistance to erosion.

The stabilized banks restricted increases in stream width during peak flows and instead probably resulted in increased streambed erosion. That increase is the probable cause of the observed increase in depth and pools.

The following sections discuss method-specific impacts of vegetation management on water.

Manual Impacts

Power-tool use near water can potentially cause water contamination with minor amounts of chainsaw oil or minor fuel spill. An oil skim on water, while highly unlikely, can deplete oxygen levels and cause fish kills. This impact is more likely for fish living in ponds than for fish living in rivers or streams, since the flow of water in streams would move and disperse small amounts of oil.

Mechanical Impacts

Because some mechanical methods of clearing or cutting vegetation can disturb or compact soils, these methods are most likely to cause erosion-related fish impacts (in addition to the potential erosion caused by general tree removal). Fish are temporarily affected when water is affected by turbidity, sedimentation, and local increases in surface-water runoff from mechanical techniques. Some kinds of equipment, such as walking brush-cutters, minimize ground disturbance.

Biological Impacts

No additional impacts would result from this technique. Insects used for noxious weed control could potentially be an additional food source for fish.

Herbicide Impacts

If herbicides were to reach water bodies, fish and other aquatic species could potential be affected. (Please see **Water** for the potential for herbicides to reach water bodies.) The potential for an herbicide to have detrimental effects on fish or aquatic species depends on the toxicity of the herbicide and the sensitivity of the species, and the amount of herbicide present and how much the fish is exposed (how quickly the herbicide dissipates or is broken down).

Many of the herbicides proposed for Bonneville use are *low in toxicity* to fish and other aquatic species. Table VI-5 shows the ratings used by scientists in determining the toxicity categories for aquatic species. The ratings are based on the amount of herbicide product (in milligrams) that would be needed in a liter of water in order create a toxic impact on fish. Generally, the more herbicide that it takes to kill a fish, the less toxic the herbicide is to that fish. Please see Table VI-7 (page 185), for the toxicity ratings of the proposed herbicides on aquatic species.

Table VI-5: Herbicide Toxic Ratings for Aquatic Species

Risk Category	Aquatic (mg/l)
Very Highly Toxic	<0.1
Highly Toxic	0.1 - 1
Moderately Toxic	>1 – 10
Slightly Toxic	>10 – 100
Practically Non-toxic	>100

There is a potential for fish to be exposed to herbicides, however that potential risk is limited because mitigation measures would help keep herbicide out of water (buffer zones and label instructions), and because only a relatively small amount of area would be treated within a landscape (a linear right-of-way strip of land, or an electrical facility). Not all herbicides have detrimental effects on wildlife, nor do herbicide residues necessarily lead to serious consequences for fish or other aquatic species. Bonneville plans to use only those herbicides that are practically non-toxic to slightly toxic (shown in Table VI-7) near watery environments where fish or other aquatic species may reside. In the rare event that herbicides accidentally enter water through either drift or misapplication, the potential impact would be mitigated by the low toxicity of the chemical, coupled with natural degradation and dilution. Natural degradation is the ability of the chemical to be broken down by its natural half-life, exposure to

sunlight and microbial action, as well as aeration and dilution through moving and standing water. In addition, Bonneville has selected herbicides that represent slight to no bioaccumulation factors for fish or aquatic species.

Chemical Bioaccumulation

Bioaccumulation - Bioaccumulation is an increase in the concentration of a chemical in an organism compared to the chemical's concentration in the environment. Terms used in conjunction with bioaccumulation are as follows:

Bioconcentration - the bioaccumulation process where the concentration of a chemical in an organism becomes higher than that of the air, water, or soil around the organism.

Biomagnification - the process that results in the accumulation of a chemical in an organism at higher levels than are found in its food. It occurs when a chemical becomes more concentrated as it moves up the food chain. (EXTOXNET, 1993)

An example is the herbicide, trifluralin. Initially, Bonneville proposed to use trifluralin. However, we found that it had a high bioaccumulation factor. After reviewing all of the proposed herbicides for bioaccumulation factors, Bonneville rejected trifluralin from further consideration. The bioaccumulation potential of each of the remaining herbicides can be found in individual herbicide fact sheets found in Appendix H of this document.

An herbicide's label is its primary communication to users. It reflects the numerous scientific studies and regulatory reviews generated by EPA's registration process, which provides assurance that the potential benefits of use outweigh any potential risks: that, when used according to label directions, it will not cause unreasonable adverse effects on humans, fish, or the environment. The law requires herbicide users to read and follow label specifications. Through specific and general language, the label addresses potential and actual risks to fish (e.g., a label might state that drift and runoff from treated areas may be hazardous to aquatic organisms in neighboring areas).

Debris Disposal Impacts

Debris disposal techniques have little additional impact on fish (as long as the debris does not get into the water), because a small portion of the area is treated. Deliberate placement of large woody debris in streams can, in some cases, benefit fish. Large logs create cover and sediment storage, helping to offset the loss of trees naturally falling into the water.

However, large masses of small, leaf-bearing branches can completely block channels and reduce dissolved oxygen levels by rapid decomposition of leaves (Bryant, 1983), a negative impact for fish.

Mitigation Measures

The following mitigation measures would apply for fish and aquatic species.

- Apply all appropriate mitigation measures outlined in the **Water** section of this chapter.
- Apply all appropriate T& E mitigation measures outlined in **Wildlife** section of this chapter.
- (Bonneville is currently in consultation with NMFS and the USF&W Service for T&E anadromous and resident fish species. Protocols developed through this consultation shall be applied to vegetation management activities.)

Wildlife

The following section discusses general impacts of vegetation management on wildlife.

General Impacts

Managing vegetation along rights-of-way and access roads can affect wildlife in two fundamental ways: (1) by directly disturbing or harming animals during treatments and/or (2) by changing habitat conditions.

Direct Disturbances

General direct disturbances from managing the vegetation on the right-of-way include removing trees that have nesting birds in them or other animals that use them for shelter. The presence of humans can scare animals and birds, causing them to flee or be stressed.

Animals such as deer, elk, and moose can be affected if clearing interrupts their wintering or birthing habitats.

Habitat Changes

The most obvious habitat changes from vegetation management occur in forested areas. About 7,810km (4,850 mi.) of Bonneville's transmission-line corridors cross forested areas. Removing trees changes habitats if the trees have been used for nesting, perching places, homes for small animals (such as squirrels), a food source, or protection or cover. Trees might be removed in forested areas along rights-of-way, and in riparian and wetland habitat where trees that were allowed to grow too close to the conductors need to be cut.

An obvious habitat change is where mature trees or snags (standing dead trees) used for nesting or cover need to be cut. Large trees are more likely to provide nesting habitat than saplings growing in the right-of-way.

During maintenance, any large mature trees that we would remove would, in most cases, be those that had become "danger trees" and were next to the right-of-way. These trees might have developed root-rot (their roots weakened and the tree becoming susceptible to falling) and/or might have been struck by lightning and now lean toward the transmission line.

In forested areas, maintaining low-growing plants within a right-of-way maintains an **edge effect,** a place where two differing habitats meet, which was created when the transmission line was built. For some animals that live in the forest, but like to use adjacent open areas such as a right-of-way for foraging and hunting, this edge effect is beneficial.

For some animals, a treeless swath through a forest can divide or fragment their habitat. The animals might be unlikely to cross through the right-of-way to get to the other side, especially in the winter. Without tree cover, winter snow depth can increase (because there is no tree canopy to catch and hold the snow), as can exposure to wind, lessening protective hiding places.

In Québec, white-tailed deer use of a 30-m-wide right-of-way was restricted in winter, presumably due to increased snow depth and exposure to wind (Doucet et al., 1987). Another study (Doucet and Brown, 1997) suggests that a denuded right-of-way might represent a barrier to small animal (hares, red and grey squirrel) movements in winter. However, rights-of-way are rarely, if ever, completely denuded of vegetation. Activity levels were higher when some vegetation was showing through the snow.

Questions have been raised about whether rights-of-way create a clear corridor in which animals are more prone to being shot by hunters. One study on moose found that there were no more moose killed within the right-of-way than off. This nine-year study in Québec (Ricard and Doucet, 1993) showed that the number of moose harvested by recreational hunters in rights-of-way was not statistically different from that in control areas.

As noted under **Vegetation**, noxious weeds tend to invade newly disturbed ground. Noxious weed infestations can cause long-term reductions in wildlife habitat values as native vegetation on which the

native wildlife depend for food or cover decreases. Some noxious weeds are palatable but have no nutritional value. When animals eat these plants they become full, but might suffer depletion of necessary vitamins and minerals (akin to humans consuming "junk food").

Threatened and Endangered (T&E) Species

Federal- or state-listed threatened and endangered or sensitive bird and animal species could potentially be affected, as are the bird and animal species discussed above. The T&E bird species (such as the northern spotted owl, marbled murrelet, peregrine falcon, bald eagle, northern goshawk, Colombian sharp-tailed grouse, and several species of woodpeckers) could be affected by eliminating habitats (cutting of nesting trees) or disturbing during courting or nesting times. The peregrine falcon and bald eagle tend to forage in open areas and have been seen perching on transmission towers within our rights-of-way. The creation of the edge effect in forested areas might be slightly beneficial to these species.

The threatened and endangered animal species include the grizzly bear and gray wolf. Presence of human activity could make these animals temporarily leave the area.

Vegetation maintenance in threatened and endangered species habitats would be scheduled for times that would not disturb these species; Bonneville would consult with the USFWS for timing or action restrictions. Also, Bonneville has standards for conducting tree removal within the range of the northern spotted owl (Beak Consultants, 1993) and for marbled murrelets.

Bonneville would request input from the appropriate state or Federal agency for guidance to limit impacts on locally listed or sensitive species.

Wildlife species with limited home ranges (i.e. within a right-of-way corridor) are most affected by the habitat changes from vegetation management. Because of the narrow, linear nature of rights-of-way, species whose home ranges are well beyond the managed area would be only temporarily displaced.

The following sections discuss method-specific impacts of vegetation management on wildlife.

Manual Impacts

The main impact directly associated with manual methods of clearing (primarily chainsaw) is noise. Chainsaw noise could disturb animals, causing them to flee the area. Because manual clearing is very selective, with little-to-no long-term impact on non-target vegetation,

this method would potentially have less impact on the right-of-way habitat than other methods of clearing.

However, if manual cutting of deciduous trees were used *without* follow-up herbicide applications to kill the trees, the right-of-way would require more frequent maintenance cutting cycles, increasing the human presence and animal disturbance.

Mechanical Impacts

Generally, the impacts from mechanical methods are short-term, so long as soils are not compacted and/or severely disturbed. Mechanical methods (especially blading) can disturb soil, and therefore can disturb and potentially kill soil-dwelling species such as ground squirrels, pocket gophers, moles, and salamanders. Ground-nesting birds, such as ruffed grouse, dark-eyed junco, and several species of sparrows, can also be disturbed during mechanical vegetation removal.

Because most mechanical techniques are non-selective and can cause losses of non-target vegetation, they also cause losses in wildlife habitat, including reduced or eliminated food sources, cover, and perches within treated areas.

As with manual methods, if mechanical cutting of deciduous trees were used *without* follow-up herbicide applications to kill the trees, the right-of-way would require more frequent maintenance cutting, increasing the human presence and animal disturbance.

Biological Impacts

In some cases, insects brought in to control weeds might provide additional forage for birds and other wildlife, but, in most cases, this effect would be negligible.

Herbicide Impacts

Some herbicides can potentially affect wildlife. The potential for wildlife to be affected depends on whether the animal is exposed, whether the exposure amount is enough to cause effects, and the toxicity of the herbicide to the animal species.

EPA standards for formula registration and application methods are intended to reduce risks in the environment to an acceptable level.

Animals can be exposed to herbicides by the following means:

- being directly sprayed,
- inhaling spray mist or vapors,
- drinking contaminated water,
- feeding on or otherwise coming into contact with treated vegetation or animals that have been contaminated, and

- directly consuming the chemical if it is applied in granular form.

The potential for an animal exposed to herbicide to experience toxic effects depends on the toxicity of the herbicide and the amount of chemical the animal was exposed to. Many of the herbicides proposed for Bonneville use are *low in toxicity* to wildlife. Herbicides are designed to be toxic to plants—not animals—and contain chemicals that target plant physiological processes. *Insecticides,* on the other hand, usually involve chemicals that react with the central nervous system of animals and are therefore potentially much more toxic to animals than herbicides. Bonneville is not proposing to use insecticides as a management tool.

Table VI-6 shows the ratings used by scientists in determining the toxicity categories for mammal and bird species. The ratings are based on the amount of herbicide product (in milligrams) that would be needed per kilogram of animal body weight in order create a toxic impact on the animal. Generally, the more herbicide that it takes to kill an animal, the less toxic the herbicide is to that animal. Please see Table VI-7 (page 185) for the toxicity ratings of the proposed specific herbicides on mammals and birds.

Table VI-6: Herbicide Toxic Ratings for Mammals and Birds

Risk Category	Mammals (Acute Oral mg/kg)	Birds (Acute Oral mg/kg)	Birds (Dietary mg/kg)
Very Highly Toxic	<10	<10	<50
Highly Toxic	10 – 50	10 – 50	50 – 500
Moderately Toxic	51 – 500	51 – 500	501 – 1,000
Slightly Toxic	501 – 2,000	501 – 2,000	1,000 – 5,000
Practically Non-toxic	>2,000	>2,000	>5,000

< means "less than" > means "more than"

Table VI-7: Herbicide Ecological Toxicities and Characteristics

Herbicide & Facility Where Used	Acute Toxicity				Physical Properties[4,5]			Off-site Movement Potential[4,5]	
	Mammals[1]	Avian[1]	Aquatic[1]	Microorganisms[2,3]	Persistence	Solubility (mg/l)	Adsorption (K(oc))	Groundwater Leaching	Surface Water Runoff
2,4-D right-of-way non-electric	Moderately Toxic to Practically Non-toxic Depending on Formulation and Species	Slightly Toxic to Practically Non-toxic Depending on Formulation and Species	Highly Toxic to Practically Non-toxic Depending on Formulation and Species	Bees: Practically Non-toxic	Moderate: <1 - >21	$3.39x10^4$	19 - 109	Moderate	Low
Azafenidin right-of-way electric yard non-electric	Practically Non-toxic	Practically Non-toxic	Slightly Toxic	Bees: Practically Non-toxic	Moderate	18	382	Low	Low
Bromacil right-of-way electric yard	Slightly Toxic	Practically Non-toxic	Slightly Toxic	Bees: Practically Non-toxic	Moderate: 60 days	700	32	High	Moderate
Chlorsulfuron right-of-way	Practically Non-toxic	Practically Non-toxic	Practically Non-toxic	Bees: Practically Non-toxic	Moderate: 40 days	7000	40	High	Low
Clopyralid right-of-way non-electric	Practically Non-toxic	Slightly Toxic	Practically Non-toxic	Bees: Practically Non-toxic	Moderate: 40 days	300,000	6	High	Low
Dicamba right-of-way non-electric	Slightly Toxic	Practically Non-toxic	Practically Non-toxic to Aquatic Invertebrates; Slightly Toxic to Fish and Amphibians	Bees: Practically Non-toxic Earthworm: Low	Low: 14 days	400,000	2	High	Low
Dichlobenil non-electric	Slightly Toxic	Slightly to Moderately Toxic	Moderately Toxic	Bees: Practically Non-toxic	Moderate: 60 days	21	400	Moderate	Moderate
Diuron right-of-way electric yard	Slightly Toxic	Slightly Toxic	Moderately Toxic to Fish and Highly Toxic to Aquatic Invertebrates	Bees: Practically Non-toxic	Moderate: 90 days	42	480	Moderate	High
Fosamine ammonium right-of-way	Practically Non-toxic	Practically Non-toxic	Practically Non-toxic	Bees: Practically Non-toxic	Low: 8 days	Completely Soluble	79	Low	Low
Glyphosate right-of-way electric yard	Practically Non-toxic	Practically Non-toxic	Moderately Toxic	Bees: Practically Non-toxic	Moderate: 47 days	900,000	24,000	Low	High
Halosulfuron-Methyl non-electric	Slightly Toxic	Slightly Toxic	Practically Non-toxic	Bees: Practically Non-toxic	Low: 25-30 days	1630	75	Moderate	Moderate
Hexazinone right-of-way	Slightly Toxic	Practically Non-toxic	Practically Non-toxic to Slightly Toxic Depending on Species	Bees: Practically Non-toxic	High: 175 days	33,000	40	High	Moderate
Imazapyr right-of-way	Practically Non-toxic	Practically Non-toxic	Practically Non-toxic	Bees: Slightly Toxic	Moderate: 90 days	>11,000	100	High	Low
Isoxaben right-of-way electric yard non-electric	Practically Non-toxic	Practically Non-toxic	Moderately Toxic	Earthworm: Practically Non-toxic	High: 100 days	1	1400	Low	High
Mefluidide non-electric	Slightly Toxic	Practically Non-toxic	Practically Non-toxic	Earthworm: Practically Non-toxic	Low: 4 days	180	200	Low	Moderate
Metsulfuron-Methyl right-of-way	Practically Non-toxic	Practically Non-toxic	Practically Non-toxic	Bees: Practically Non-toxic	Moderate: 30 days	9500	35	High	Moderate

Herbicide & Facility Where Used	Acute Toxicity				Physical Properties[4,5]			Off-site Movement Potential[4,5]	
	Mammals[1]	Avian[1]	Aquatic[1]	Microorganisms[2,3]	Persistence	Solubility (mg/l)	Adsorption (K(oc))	Groundwater Leaching	Surface Water Runoff
Oryzalin non-electric	Practically Non-toxic	Slightly Toxic	Moderately Toxic	Bees: Practically Non-toxic	Low: 20 days	2.5	600	Low	High
Paclobutrazol right-of-way	Slightly Toxic	Practically Non-toxic	Slightly Toxic	Bees: Practically Non-toxic	High: 200 days	35	400	High	
Picloram right-of-way	Practically Non-toxic	Practically Non-toxic	Moderately Toxic.	Bees: Practically Non-toxic	Moderate: 90 days	200,000	16	High	Low
Sulfometuron-Methyl electric yard	Slightly Toxic	Practically Non-toxic	Slightly Toxic	Bees: Practically Non-toxic	Low: 20 days	70	78	Moderate	Moderate
Tebuthiuron right-of-way electric yard	Moderately Toxic	Slightly Toxic	Slightly Toxic	Bees: Slightly Toxic	High: 360 days	2500	80	High	Low
Triclopyr right-of-way non-electric **TEA** **BEE**	 Practically Non-toxic Practically Non-toxic	 Slightly Toxic Slightly Toxic	 Practically Non-toxic Highly Toxic	 Bees: Practically Non-toxic Earthworm: Practically Non-toxic	 Moderate: 46 days Moderate: 46 days	 2,100,000 23	 20 780	 High Low	 Low High
Trinexapac-Ethyl non-electric	Practically Non-toxic	Practically Non-toxic	Slightly Toxic	Bees: Practically Non-toxic	Moderate	*data not available*	*data not available*	Moderate	Moderate

[1] See individual herbicide references in **References.** [2] Tew, James E, Protecting Honeybees from Pesticides, Alabama Cooperative Extension System, ANR-1088, April 1998 [3] Townsend, Lee, et al., Earthworms: Thatch-Busters, University of Kentucky, January 1994
[4] Mahler, Robert L., et al., Pesticides and Their Movement in Soil and Water, University of Idaho, Quality Water For Idaho CIS 865, September 1998 [5] Vogue, P.A., et al., Oregon State University Extension, Pesticide Properties Database, July 1994

Table VI-8: Adjuvant Ecological Toxicities and Characteristics

Type	Use[1]	Ingredient[2]	Toxicity Concerns[3]		
			Humans	Terrestrial	Aquatic
Crop Oil	Surfactant	Highly Refined Petroleum	Slightly Toxic	Slightly Toxic	Slightly - Moderately Toxic
Seed Oils	Surfactant	Seed Oil (i.e. soy)	Practically Non-toxic	Practically Non-toxic	Practically Non-toxic
Methylated Seed Oils	Surfactant, Increased Efficacy	Methylated (Refined) Seed Oil	Practically Non-toxic	Practically Non-toxic	Practically Non-toxic
Limonene	Surfactant	Limonene	Practically Non-toxic	Practically Non-toxic	Practically Non-toxic
Organosilicone	Surfactant, Increased Efficacy	Organosilicone	Slightly Toxic	Slightly Toxic	Practically Non-toxic
Inorganic Salts	Increased Efficacy	Ammonium-salts	Slightly Toxic	Slightly Toxic	Practically Non-toxic
Dyes	Application Marker	Various FDA-Approved Food Dyes	Practically Non-toxic	Practically Non-toxic	Practically Non-toxic
Foam Retardant	Disperse Foam	Acetic Acid	Practically Non-toxic	Practically Non-toxic	Practically Non-toxic
Drift Control Agent	Droplet Size Control	Polyacrylamide copolymers	Slightly Toxic	Slightly Toxic	Practically Non-toxic

[1] The end use for these products may differ depending on manufacturer and user.
[2] The ingredients may differ from product to product depending on formulation.
[3] EPA does not require registration for adjuvants. The toxicity concerns expressed in this table are generalized due to the difference in formulations. Data was gathered from various chemical data sources and material safety data sheets, and may vary from product to product.

Raptors (e.g., hawks and owls), small herbivorous mammals, medium-sized omnivorous mammals, and birds that feed on insects are more susceptible to herbicide exposure. These animals either feed directly on vegetation that might have been treated or they feed on animals that feed on the vegetation. In general, smaller animals are more at risk because it takes much less substance to affect them.

Generally, wildlife is prevented from entering in electrical and non-electric sites (although birds and small mammals are sometimes able to enter these facilities). Most potential impacts on wildlife from vegetation management in these areas would occur only if herbicides were to move off the treatment area and affect habitat or wildlife in surrounding areas. Those impacts would be the same as those discussed above.

Debris Disposal Impacts

Lopping and scattering vegetation that is cut, including stacking or dragging logs to areas just off the right-of-way, creates woody debris (fallen, rotting logs) used by a variety of wildlife. These include amphibians, reptiles and small mammals, as well as numerous other types of organisms (e.g., plants and fungi).

Burning vegetation debris would have little impact on wildlife. Animals might flee the area while the pile is burning.

Noise from chipping machines would most likely disturb animals, causing them to temporarily leave the immediate area.

Mitigation Measures

The following mitigation measures would apply for wildlife species.

- Coordinate with state departments of fish and wildlife or the appropriate federal agency for potential impacts on and mitigation measures for locally listed T&E or sensitive species.
- Where possible and appropriate, leave brush piles for small animal habitats.
- Where possible and appropriate, top and leave tall dead trees (snags) in place for wildlife habitat.
- Determine whether any T&E species or designated T&E critical habitats are potentially present in the project area.
- *If T&E species or designated critical habitats are potentially present in the project area,* determine whether they are likely to be affected. If project is likely to affect but not adversely affect T&E species, obtain concurrence from the USFWS and/or NMFS.
- *If it is determined that the project is likely to adversely affect T&E species or their designated critical habitats,* initiate formal

consultation with the USFWS and/or NMFS and prepare a Biological Assessment according to 40CFR Part 402, or follow measures developed through existing programmatic consultations.

- Apply mitigation measures (such as timing restrictions, or specific method use) resulting from determinations or consultations.

Marbled Murrelet

- *If a tree needing removal is greater than 80 cm (32 in.) diameter at breast height and has suitable nest tree characteristics,* initiate formal consultation with the USFWS.
- *During core breeding season, from April 1- August 5,* do not carry out maintenance activities (e.g., chainsaw work) that produce noise above ambient noise levels, within 0.4 km (0.25 mi.) of known marbled murrelet habitat or occupancy (based on marbled murrelet maps).
- *During the late breeding season, from August 6 - September 15,* do not carry out maintenance activities using motorized equipment within 0.4 km (0.25 mi.) of marbled murrelet habitat or occupancy within two hours after sunrise or within two hours before sunset.
- *If planning herbicide use in marbled murrelet habitat,* further consultation is required.

Spotted Owl

- *Where opportunity exists,* suspend vegetation management activities within 0.4 km (0.25 mi.) of spotted owl critical habitat between March 1 and June 30, unless the owls are shown not to be nesting.
- Examine any large trees (greater than 8” diameter at breast height East of the Cascades or 11” diameter at breast height West of the Cascades) that need to be removed in spotted-owl habitat for evidence of owls. If a tree has evidence of owl nesting activity, conduct formal consultation with the USFWS.
- *In case of an emergency danger tree removal—a tree suddenly becoming an imminent threat to the line, posing a danger to life and property*—immediately examine the felled tree for evidence of owl nesting. If such evidence is found, start emergency consultation with the USFWS, or, if the situation occurs during off-duty hours, conduct after-the-fact emergency consultation the next business day.
- *If planning herbicide use in spotted owl habitat,* further consultation is required.

Agriculture

The following section discusses general impacts of vegetation management on agriculture.

General Impacts

Bonneville minimally manages vegetation in crop, range, or orchard areas. Where these land uses are actually within the right-of-way (such as when a transmission line crosses a grass turf field), the farmer is the one who manages the grass or other crop on the right-of-way.

On these farmed lands, the issue is the vegetation that grows around the base of the tower legs. Because tilling and farming close to the tower legs are difficult, and could potentially damage wood-pole transmission structures, these small areas are left unfarmed. The unfarmed areas become a prime spot for noxious weed invasion or growth of other nuisance plants, such as blackberries.

Where agricultural lands are next to the rights-of-way, care needs to be taken so that the agricultural plants are not harmed while vegetation on the right-of-way or access road is controlled. Also, if noxious weeds are allowed to spread on the right-of-way, they might spread into agricultural areas and invade crops. For agricultural landowners who have Bonneville right-of-way easements crossing their lands, Bonneville has a program that allows them to obtain herbicide to treat noxious weeds in the right-of-way.

Other issues, not specific to a method, are the maintenance of Christmas tree farms and orchards within the right-of-way. If the farmer does not keep the Christmas trees harvested or orchard trees trimmed, these trees can grow into or close to the lines, causing safety problems and outages—technically not an environmental problem caused by our maintenance, but a problem caused by failure to maintain. Landowner agreements are very important in these areas to insure that tree height criteria are maintained. (See **Appendix E** for more information on clearance criteria.)

The following sections discuss method-specific impacts of vegetation management on agriculture.

Manual Impacts

Manual techniques would have no additional impact.

Mechanical Impacts

Bonneville would not use mechanical techniques *in* agricultural areas, but might use them *next* to agricultural areas. Impacts would be the potential for increased water runoff or soil movement into agricultural fields from disturbed or compacted soils.

Biological Impacts

Biological methods would not be used *in* areas of agriculture.

Herbicide Impacts

Bonneville minimally manages vegetation in crop, range, or orchard areas, as described above, under **General Impacts**. If herbicides were used near crop- or rangelands, drift or potential herbicide migration through water runoff could kill crop plants or expose range animals (sheep, cows, and horses). In areas of organic farming practices, where often strict testing is carried out to ensure the crops are not exposed or grown with the use of chemicals, potential drift of herbicides from an adjacent right-of-way could severely affect crop fields.

If landowners obtain herbicide from Bonneville to treat noxious weeds on rights-of-way crossing their lands, the landowner can ensure that the herbicide will not affect their crops or livestock. Bonneville considers whether the landowner has an herbicide applicator's license (when determining appropriate herbicide for use), documents the herbicide and user, and provides labels and guidance information regarding noxious weeds and herbicide use.

Debris Disposal Impacts

There would be little debris disposal necessary in agricultural lands. Care would need to be taken to ensure that debris from right-of-way maintenance would not be left in an adjacent farmland. On grazing lands, pine needles left on the ground can cause 1) a reduction in grass growth due to their acidic property, and 2) abortion in cows if the cows consume a significant amount of the needles (Gardner, 1996, 1998).

Mitigation Measures

The following mitigation measures would apply to agricultural areas.

- Prevent the spread of noxious weeds by cleaning seeds from equipment before entering cropland.
- *If on grazing lands and there is potential for pine needle poisoning*, do not lop and scatter pine tree vegetative debris—machine-chip or haul debris off-site.
- *If using herbicides on grazing lands*, comply with grazing restrictions as required per herbicide label.
- *For rights-of-way adjacent to agricultural fields*, observe appropriate buffer zones necessary to ensure that no drift will affect crops.
- *If using herbicides near crops for consumption*, comply with herbicide-free buffer zones, if any, as per label instructions.

- *For rights-of-way near organic farms*, observe appropriate buffer zones, or provide for the owner to maintain the right-of-way, by way of a vegetation management agreement.
- *If reseeding*, determine whether any of the adjacent properties are being, or will in the immediate future be, used for growing grass seed, especially high-purity strains.
- *If reseeding near grass seed fields*, consult with the area seed certification and registration authority to determine whether buffer zones are necessary, appropriate grass mixtures allowed, and appropriate modes of seeding used.

Timber Production

The following section discusses general impacts of vegetation management on timber production.

General Impacts

Maintaining the vegetation on a right-of-way that crosses timber-producing lands means that periodically some trees must be cut. Trees next to the corridor that have become danger trees might need to be cut before they are ready for harvest.

The following sections discuss method-specific impacts of vegetation management on timber production.

Manual/ Mechanical/ Biological Impacts

There would be no additional impact on timberlands by using manual, mechanical or biological methods of controlling vegetation on the right-of-way.

Herbicide Impacts

Herbicide use on these lands could potentially affect timber production if any drift, overspray or spills were to move off the right-of-way and affect timber trees. The potential of drift or overspray is greater with broadcast or aerial spraying than with spot or localized application methods. On other electric facilities, herbicides that potentially could run off or leach out of the yard to surrounding timber areas could have an effect.

Debris Disposal Impacts

Debris disposal would cause no additional impacts on timberlands.

Recreation

The following section discusses general impacts of vegetation management on recreation.

General Impacts

Transmission lines often cross rivers or are near developed recreational sites (such as campgrounds and parks). Even rights-of-way and access roads that are not near developed parks are used for recreation: hiking, ATV use, snowmobiling, and cross-country skiing.

Most vegetation management activities take place during the growing season; conflicts with winter recreationists (cross-country skiers and snowmobilers) are therefore unlikely to occur. Summer recreationists, on the other hand, might be displaced or excluded from active or recent work sites, might be annoyed by noise and disturbance associated with vegetation management, and might encounter hazards or nuisances resulting from vegetation management.

The following sections discuss method-specific impacts of vegetation management on recreation.

Manual Impacts

Manual techniques are often the method of choice within or near developed recreation sites. The use of power tools, such as chainsaws, can be noisy and annoying to recreationists and can detract from outdoor experiences. However, manual techniques are generally less intrusive and less intensive than mechanical techniques.

Mechanical Impacts

Heavy equipment also can disturb recreationists through noise and exhaust fumes. There is also some danger of people in the area being hit by rocks or pieces of wood that might be thrown by the equipment. (See also the discussion under **Public Health and Safety**.)

Mechanical cutting or chopping machines cut all vegetation in the vicinity and leave slash cut up in varying sizes, from finely shredded/mulched bits (most often) to long pieces. In a few cases, the remaining debris can be difficult to cross by walking, biking, all terrain vehicles (ATVs), motorcycles, and so on.

Biological Impacts

Biological methods of vegetation management would have little impact on recreation. However, aesthetics might be affected if large numbers of insects were present on noxious weeds.

Herbicide Impacts

The recreational experience of a site might be diminished because the landscape becomes less attractive as the vegetation turns brown after being treated. These impacts are generally temporary, as desired

vegetation replaces undesirable vegetation that has been killed. (See **Public Health and Safety** for any potential impacts on people from exposure to herbicides.)

Debris Disposal Impacts

Slash burn piles would generate smoke and unsightly burnt areas. Lopped-and-scattered vegetation is difficult to walk or ride bikes over and might discourage recreational activities until the vegetation debris begins to break down.

Residential, Commercial, and Industrial

General Impacts

The following section discusses general impacts of vegetation management on residential, commercial, and industrial resources.

Visual, health and safety, noise, and landscaping effects are the potential impacts of managing vegetation on rights-of-way in residential, commercial, and industrial areas. (See **Visual** and **Public Health and Safety** for impacts on those resources.)

Noise or presence of maintenance crews can disturb people in homes or businesses. Routine vegetation maintenance work would take place during normal worktime (8am to 5pm). These disturbances would be relatively short-term, one or two days in any specific location.

Bonneville's clearing needs can often conflict with a property owner's landscaping needs or desires. Property owners have powerline easement documents that outline provisions for Bonneville's legal right and obligation to clear "on" right-of-way trees that threaten the lines. Trees that are located "off" the right-of-way might also pose a threat to the power line. Once identified, these "off" the right-of-way danger trees are marked, and we start a process with the property owner to have them removed.

Removing these trees can have varied effects on property owners. Some people are happy to have someone else pay to have a tree removed. In other cases, a tree might have personal history or an emotional tie, or might be highly valued for aesthetic or other reasons. The impact on the property owner, in this case, can be great.

To lessen this impact, we are in some cases using herbicides that are growth regulators—they slow the growth of vegetation—on landscape trees so they don't become a threat to the line. Bonneville also sometimes offers to replace a tree with a low-growing species. Trimming or topping trees is often not very feasible because it is very labor-intensive and might require yearly trimming.

The following sections discuss method-specific impacts of vegetation management on residential, commercial, and industrial resources.

Manual Impacts

Noise generated from chainsaws and other hand tools might temporarily disturb people.

Mechanical Impacts

Mechanical techniques are also noisy, and often generate dust and can disturb people in houses, schools, and businesses.

Biological Impacts

Biological techniques have no effect on land uses, other than potentially reducing noxious weeds on adjacent lands.

Herbicide Impacts

Some land uses that might occur next to Bonneville facilities might preclude the use of herbicides, especially aerial application. For example, we would consider it a major impact if accidental spraying or spray were to drift onto residential areas, schools, recreation sites, and other land uses where people are concentrated—even if the chemicals involved were benign. Because of this, chemical techniques must be very controlled when necessary in or near areas where people are concentrated (for example, spot chemical treatments rather than broadcast).

Debris Disposal Impacts

Most debris in these areas would be removed from and disposed of off-site. Burning would probably not be appropriate in these areas because of the nuisance and potential health and safety effects of the smoke. (Please see **Visual** and **Public Health and Safety** for impacts of burning vegetation debris.)

Mitigation Measures

The following mitigation measures would apply in residential/ commercial or industrial areas.

- Evaluate, generally, existing land uses (e.g., agriculture, residential) along a right-of-way or surrounding a facility needing vegetation control to determine any constraints on vegetation control.
- *To the extent practicable*, identify casual informal use of the right-of-way by non-owner publics to determine any constraints on vegetation control.
- Determine, generally, landowners or land managers (e.g., private residential, timber company, Federal, state) in or around the facility needing vegetation control.
- Determine whether there are any existing landowner agreements with provisions that need to be followed regarding the vegetation maintenance of a specific portion of line.

- *During planning for vegetation control activities,* use an appropriate method (i.e., doorhanger, letter, phone call, e-mail, and/or meeting) to 1) notify landowners where Bonneville has a right-of-way easement to inform them of upcoming activities, 2) request any information that needs to be considered.
- Determine whether there are *other* potentially affected people or agencies that need to be notified or coordinated with; determine appropriate method(s) of notification and coordination.
- *Where appropriate*, assign responsibility for tall-growing species on the rights-of-way to the underlying property owner (e.g., to owners of orchards or Christmas tree farms).
- *If appropriate*, offer to replace trees (with a low-growing species), or use tree growth regulators instead of removing a tree.

FS- and BLM-managed Lands

The following section discusses general impacts of vegetation management on FS- and BLM-managed lands.

General Impacts

The FS and BLM manage lands for a variety of functions, including habitat, riparian reserve and ecosystem protection. Because much of the management is for protection or enhancement of the environment, these lands are often pristine and contain lots of natural resources and species, including wildlife, protected habitat, threatened, endangered, or protected plant and animal species, and high-quality rivers or streams. The vegetation control impacts on these natural resources would be no different than the impacts discussed under the natural resource sections in this EIS. However, the potential of encountering these resources is greater on these lands.

Management Areas

There are also potential impacts on how an area within a Forest or BLM district is managed.

The FS and BLM have many plans, guidance, and regulations to help ensure appropriate land and resource management. Other land users (such as Bonneville transmission corridors) are to abide by those plans and guidance. Plans specify how various areas of the Forest or District are to be managed.

For example, a Forest might have a resource management area for grizzly bear habitat. This area will have standards and guidelines

specifying acceptable actions in that area to maintain or restore the habitat for grizzly bears.

In some cases, controlling vegetation along a right-of-way may conflict with the management of an area, especially if the management requires that tall-growing vegetation cannot be removed.

In other cases, such as the grizzly bear habitat, vegetation control would be consistent with the management as long as seasonal and timing restrictions were followed so as not to disturb the animals.

Some Forest Plans designate Resource Management Areas for utility corridors, such as one of our rights-of-way. Utility Resource Management Areas have standards and guidelines specific to maintaining a safe reliable right-of-way, including the cutting of trees or brush that might threaten the operation of the line. In these areas, although potential resources in the area still are considered, because there is a common goal for utility corridor management, there is no potential management conflicts or impacts.

Compliance with NEPA

Bonneville, the FS, and the BLM all have decisions to make regarding vegetation management of rights-of-way across National Forests or Management Areas. Typically, as the owner and operator of the transmission facility, Bonneville will propose the vegetation management action. Under NEPA regulations and agreements between the agencies, this means Bonneville will usually have primary responsibility for completing the environmental impact analysis needed. Each agency will then use this analysis in its own NEPA compliance process and base its decisions upon it. Bonneville's decision will most often be on how to manage vegetation on a right-of-way. The Forest Service or BLM will decide whether Bonneville's proposed action triggers their need for NEPA, and if so, whether the action is consistent with their Forest or Management Area plans.

Method-specific impacts related to BLM- or FS-managed lands are listed below.

Manual Impacts

Manual cutting is often the preferred method of vegetation management on National Forests or BLM lands. Because manual methods can be very selective, there is minimal potential to affect non-target resources.

Mechanical Impacts

Mechanical vegetation clearing is an available treatment method on the FS and BLM land; however, it is to be used primarily on relatively flat terrain, and relatively dry stable soils.

Controlling noxious weeds with insects is promoted by the FS and BLM.

Biological Impacts

Herbicide Impacts

Herbicide use is also possible on most FS and BLM lands. Both these agencies have their own list of herbicides approved for use on their lands. The list can vary by region, and even by Forest. Some BLM lands are still under an injunction that does not allow any herbicide use. Both agencies also have additional direction (such as buffer zones, and reporting requirements) regarding the use of herbicides.

Debris Disposal Impacts

Debris disposal depends on the need of the Forest. In some places there is concern about leaving vegetation debris on the right-of-way because of the potential for forest fires—dead vegetation adds fuel to the fire. In other places, leaving large woody debris is promoted for wildlife habitat.

Mitigation Measures

The following mitigation measures would apply to FS-managed lands.

- Use, update, or develop site-specific vegetation management plans for rights-of-way that cross FS-managed lands.
- Review existing site-specific vegetation management plans for consistency with this EIS (including measures specific to Forest Service-managed lands). See **Appendix F** for examples. This EIS does not supercede or revoke any existing agreements or site-specific vegetation management plans. However, if appropriate, work with local Forest Officer in revising existing plans to achieve consistency.
- Develop site-specific vegetation management plans (where they do not exist) using the Planning Steps and mitigation measures in this EIS, including the FS-specific measures in **Appendix F**. Conduct appropriate NEPA analysis and documentation (see Chapter III, Planning Step #7).
- Contact the local Forest Supervisor's or District Ranger's office, in advance of any proposed vegetation management activity (non-emergency) on national Forest System lands (or follow direction in site-specific vegetation management plans for notification procedures). Notification should be made as far in advance of the planned date of on-the-ground implementation as is reasonably possible in order for appropriate environmental compliance to be conducted.
- *If expecting the FS to conduct environmental data collection or analysis*, allow more than one year for completion, and be prepared to reimburse the FS for the costs in conducting such activities.

- Comment on and engage in Forest Service proposals to revise or amend Forest Land and Resource Management Plans, to assure that the designation and management of utility corridors are adequately addressed wherever appropriate.

The following mitigation measures would apply to BLM-managed lands.

- Use, update, or develop site-specific vegetation management plans for rights-of-way that cross BLM-managed lands.
- Contact the local BLM office, before implementing vegetation management activities on BLM lands (or follow direction in site-specific vegetation management plans for notification procedures). Notification should be made as far in advance of the planned date of on-the-ground implementation as is reasonably possible.
- *For NEPA compliance on BLM-managed lands,* use the Planning Steps and mitigation measures in this EIS, including the BLM-specific mitigation measures (see **Appendix G**) and appropriate NEPA analysis and documentation (see Chapter III, Planning Step #7*)*.
- Consult with the appropriate BLM office regarding presence of natural resources and features and appropriate buffers or other mitigation measures.

Other Federal Lands

The potential impacts on resources found on other federal lands would be no different than the impacts discussed throughout this chapter. However, as with the FS or BLM lands, other federal lands may have land management plans and requirements that need to be considered when planning for vegetation management around facilities on their lands. The federal agencies that manage these lands will have the same requirements as Bonneville does, regarding NEPA and other environmental regulations. Coordination is needed to ensure that compliance will be possible for all parties involved.

Mitigation Measures

The following mitigation measure would apply to other federal lands.

- Notify and cooperate with other federal agencies when scheduling site-specific right-of-way vegetation control activities on their lands.

Tribal Lands

The following section discusses general impacts of vegetation management on Tribal lands.

General Impacts

On ceded Tribal lands and in usual and accustomed areas, vegetation management could encroach on Tribal rights to traditional use activities. (See the section on **Cultural and Historical Resources** in this chapter for discussion of potential impacts on traditional cultural plants and places.)

Additionally, on Tribal reservations, vegetation management must be consistent with applicable Tribal land-management policies and plans. Tribes might elect to exercise rights to employ Tribal members for work performed on Tribal reservations.

Potential encroachment on Tribal rights could be avoided, and consistency with Tribal policies and plans ensured, by consulting with local Tribal governments and traditional leaders in developing site-specific vegetation management plans.

The following sections discuss method-specific impacts of vegetation management on Tribal lands.

Manual Impacts

The more labor-intensive methods of manual vegetation management would have greater potential for employment of Tribal workers on reservations.

Mechanical Impacts

Except as described in the section on **Cultural and Historical Resources** in this chapter, there are no known impacts unique to Tribal lands.

Biological Impacts

Methods involving natural biological selection might be favored by some Tribes.

Herbicide Impacts

Use of herbicides might be inconsistent with Tribal land management policies, and might encroach on Tribal rights if herbicides should adversely affect traditional use plants.

Debris Disposal Impacts

Except as described in the section on **Cultural and Historical Resources** in this chapter, there are no known impacts unique to Tribal lands.

Mitigation Measures

The following mitigation measures would apply for Tribal Reservations.

- If possible and practical, develop a cooperatively written right-of-way vegetation management plan with the Tribe. The plan should address specific land-use or environmental resources along the corridor that need consideration, including appropriate mitigation measures identified in this EIS.
- If possible, consider working with Tribes for replanting of traditional use plants. Low-growing traditional-use plants may include blue camas, bitter root, wild celery, biscuit root, Canby's desert parsley, Indian carrot/false caraway, field mint, blue huckleberries.
- Also see mitigation measures for **Cultural Resources**.

City, County, and State Lands

Cities, counties and states might have their own plans or requirements for managing vegetation or for the use of herbicides. If those plans are consistent with the Federal requirements to which Bonneville would adhere, then there would be no conflict. If they are much more stringent, then there might be conflicts in management.

Letters to these governments when their lands are crossed should elicit potential inconsistencies to be considered.

Most issues or concerns would not be unique to local government-owned lands.

Cultural and Historical Resources

The following section discusses general impacts of vegetation management on cultural and historic resources.

General Impacts

Vegetation management activities could damage or expose Native American or historical archeological sites, could harm plants having traditional cultural value, or could visibly or audibly impose on places of traditional cultural value. Vegetation management methods that could cause erosion have a relatively greater potential to disturb subsurface cultural and historical resources (see the section on **Soils** for discussion of erosion potential). Similarly, noisy activities could

audibly impose on ceremonies or other uses of places with traditional cultural values (please see the section on **Noise** for more information).

Potential adverse impacts on cultural and historical resources could be substantially reduced or avoided by (1) consultation with the State (or Tribal) Historic Preservation Office (SHPO/THPO) and local Tribal leaders in developing site-specific vegetation management plans; and (2) adoption of site-specific geographic and/or timing constraints on vegetation management activities.

The following sections discuss method-specific impacts of vegetation management on cultural and historic resources.

Manual Impacts

Pulling vegetation from the soil could lead to erosion and could disturb sub-surface artifacts. Cutting and steaming methods would have less potential for disturbing the sub-surface. The more labor-intensive methods of manual vegetation management would have greater potential for vandalism or inadvertent damage by workers.

Mechanical Impacts

Mechanical vegetation management methods that disturb soils could also erode soils and disturb sub-surface artifacts. Some kinds of heavy machinery might also compact soils and sub-surface cultural and historical resources.

Biological Impacts

Biological methods of vegetation management have little potential to adversely affect cultural or historical resources because those methods target noxious weeds and do not disturb soils.

Herbicide Impacts

Herbicides could harm traditional-use plants, or threaten the health of people gathering, handling, or ingesting recently treated plants. The less selective broadcast application methods, especially aerial broadcast, would have greater potential to inadvertently affect non-target traditional-use plants.

Debris Disposal Impacts

Lopping and scattering cut vegetation might visually intrude on a traditional-use place. Because it contrasts in color with surrounding live vegetation, the unnatural appearance of large vegetation debris could incrementally increase the visibility of unnatural features from places where nature has traditionally spiritual significance.

Mitigation Measures

The following mitigation measures would apply to cultural resources.

- Contact tribes with traditional-use areas and Trust or Treaty resources in the project area (even when not crossing reservation lands) to determine the potential presence of traditional-use plants or cultural resources and to determine the desired level of Tribal

involvement in planning efforts. (Restrictions such as seasonal constraints for vegetation control, avoidance of certain areas, or using methods that do not affect non-target plants may be required.)

- *When using mechanical ground-disturbing vegetation control methods,* review the right-of-way for potential existence of historic and cultural resources. The SHPO or THPO is to be consulted, as appropriate.

Worker Health and Safety

The following section discusses general impacts of vegetation management on worker health and safety.

General Impacts

This section addresses the potential health and safety impacts on workers managing the vegetation on our facilities. Some of these workers are Bonneville employees; some of them are under contract to do the work for us. The impacts can be divided into physical injury risks and health risks. In general, all techniques carry some degree of physical injury risks. Risks to health include herbicides, exhaust gasses, fuels, and smoke from burning.

Indirect impacts on workers include the following: dehydration, heat exhaustion, insect stings, falls, and exposure to poisonous snakes and plants.

The following sections discuss method-specific impacts of vegetation management on worker health and safety.

Manual Impacts

Manual techniques include use of non-powered and powered hand-operated tools. Non-powered tools include axes, brush hooks, hoes, hand girdlers, and hand clippers. Powered tools include chainsaws and motorized brush cutters.

Use of these tools can result in worker injuries such as minor cuts, blisters, sprains, abrasions, bruises, muscle strains, exposure to equipment noise, exposure to exhaust gases and fuel vapors, flying debris, and falling trees.

Minor injuries from use of manual techniques will occur; however, severe injuries are rare when standard safety procedures are followed. From 1993 to 1997, Bonneville employees had 22 recorded injuries while using manual techniques on the rights-of-way. They varied from lower back pain, to poison oak reaction, to cuts requiring stitches.

In 1997 there were two separate contractor accidents during manual vegetation management, resulting in one fatality and one electrocution with disability.

Mechanical Impacts

Potential direct impacts on worker health and safety from operating heavy equipment include injuries as a result of equipment malfunctions, equipment overturns, loss of control of the equipment, equipment noise, equipment vibration, exposure to exhaust gases and fuel vapors, flying debris, and falling trees.

Minor injuries are bound to occur when mechanical techniques are employed. On the other hand, according to the FS (USDA/FS, 1991a), severe injuries are relatively rare if workers adhere to standard safety procedures associated with heavy machinery operation. From 1993 to 1997, there was one recorded Bonneville employee accident associated with mechanical brush control.

Biological Impacts

There are no specific worker health or safety impacts associated with the use of biological controls. Injury could result from the use of equipment such as trucks or aircraft.

Herbicide Impacts

Herbicide methods may require use of heavy machinery, which could involve the potential impacts described above for mechanical methods. The main potential impact associated with the use of herbicide methods is exposure to the compounds (herbicides, carriers, dyes, and adjuvants).

Twenty-three different herbicide compounds would be used to various degrees to control vegetation. See Tables VI-8 (page 186) and VI-9 (pages 209-210).

Carriers used by Bonneville include mineral oil and limonene (Bonneville does not use diesel oil or kerosene, two carriers in relatively common use in the United States). See Table VI-8, page 186.

Appendix H contains fact sheets that provide herbicide human health risk assessment information, plus application and safety guidelines.

Information on the carriers' limonene and mineral oil are also provided. Each fact sheet provides an assessment of the general and systemic toxicity (both acute and chronic), including potential effects on reproduction, carcinogenicity, teratogenicity and mutagenicity. Table VI-9 summarizes this data.

These chemicals can all be toxic to workers, to varying degrees. (Any chemical poses a health risk at a sufficient dose.) Most clinical reports of herbicide effects are of skin and eye irritation. Some herbicides,

such as dicamba, hexazinone, chlorsulfuron, and triclopyr, can be severe skin irritants; others, such as 2,4-D and metsulfuron methyl, can be severe eye irritants.

Short-term effects of excessive exposure to herbicides include nausea, dizziness, or reversible abnormalities of the nervous system (reversible neuropathy). In extreme cases of prolonged, repeated, and excessive exposure (resulting from careless and/or negligent work habits), longer-term health problems can result, including: organ damage, immune system damage, permanent nervous system damage, production of inheritable mutations, damage to developing offspring, and reduction of reproductive success. It is important to note that EPA evaluates and registers herbicides according to a uniform, health-based standard to ensure a "reasonable certainty of no harm" to consumers. The EPA is responsible for restricting a product's use according to its potential impacts on human health and the environment. Much of that restriction is done through the product label, which states the precautions that must be taken, and how and where to apply a certain herbicide. In most cases, the hazards involved are comparable to or less than the risks associated with other methods.

Herbicides have an added safety advantage over insecticides: since herbicides are designed to be toxic to plants, not animals, most herbicides present little risk to workers when used properly. One of the herbicides available for use on Bonneville facilities is a possible carcinogen (bromacil).

Occupational exposure to herbicides varies with the method of application. The greatest risk occurs when the worker must directly handle and/or mix chemicals. Spot and localized herbicide applications—including use of backpack sprayers, aerial mixers/loaders, and stem injection—require the most hands-on use of herbicides and, therefore, carry the greatest risk of exposure (and require the greatest amount of worker precaution and use of safety equipment, such as respirators).

Under all application categories, workers can be exposed to herbicides from accidental spills, splashing, leaking equipment, contact with the spray, or by entering treated areas. Exposure can occur either through skin or through inhalation. Adherence to operational safety guidelines, use of protective clothing, equipment checks, and personal hygiene can prevent incidents from occurring. The herbicide label and corresponding Material Safety Data Sheets detail these application requirements in addition to safety guidelines.

Debris Disposal Impacts

Risks of lopping and scattering could occur from flying debris from use of machines.

Workers involved in pile-burning of vegetative debris can experience short-term effects, such as minor burns, smoke irritation of the eyes and throat, coughing, and shortness of breath. In extreme cases, workers can experience more severe, long-term effects, such as permanent tissue damage from serious burns, inhalation of toxic agents from poison oak and/or fire-starting material, and inhalation of particulates that can have acute irritant effects. The small size of the slash pile burns would help preclude such impacts.

Between 1993 and 1997, three injuries occurred while Bonneville employees were in the process of chipping brush on the right-of-way.

Mitigation Measures

The following mitigation measures would apply for worker health and safety.

- *For safety,* cut all brush stumps flat where possible. (Angular cuts leave a sharp point that could cause injuries if workers fell on them.)
- *For cutting trees close to "live" power lines,* use only qualified personnel.
- *If burning vegetation debris piles,* burn off the right-of-way. Do not burn debris close enough to the right-of-way or facility where smoke could provide a conductive path from the transmission lines or electric equipment to the ground.
- Ensure that all herbicide applicators have received training and are licensed in appropriate application categories.
- Follow all herbicide label and material safety data sheet (MSDS) instructions regarding worker safety standards. These include the following:
  - Wear appropriate protective equipment;
  - Do not eat, drink, or smoke when handling herbicides;
  - Avoid spilling herbicides on skin or clothing (promptly change any clothing substantially contaminated by a herbicide);
  - Cleaning and wash protective equipment daily;
  - Have ready access to clean water and first aid supplies;
  - Have access to emergency medical facilities; and
  - Observe specified restricted entry intervals.

- Use self-contained herbicide handling equipment when appropriate and available to reduce worker exposure during herbicide mixing and handling.

Public Health and Safety

The following section discusses general impacts of vegetation management on public health and safety.

General Impacts

This section discusses the potential health and safety impacts on the general public from managing vegetation around our facilities. The impacts can be divided into two categories: physical injury risks and exposure risks. In general, all techniques carry some degree of physical injury risks. Risks of exposure include herbicides from chemical techniques and smoke from burning.

The following sections discuss method-specific impacts of vegetation management on public health and safety.

Manual Impacts

People who come near workers clearing a right-of-way can be exposed to exhaust gases and fuel vapors, flying debris, and falling trees.

Impacts on the public's health and safety are negligible because the public has limited access to Bonneville facilities and because manual clearing is closely supervised and would prevent exposure.

Mechanical Impacts

As with manual techniques, people near the right-of-way during clearing operations can be exposed to exhaust gases and fuel vapors, flying debris, and falling trees. However, heavy equipment could also run over people if the operator does not see them. Proper supervision would prevent exposure to the public.

Impacts on the general public's health and safety would be minor because of limited access and remote location of many of the activity sites. However, use of equipment on access roads used by the public presents an increased risk in vehicle accidents.

Biological Impacts

Biological techniques pose little health or safety risk to workers or the general public.

Herbicide Impacts

While most chemical techniques require use of heavy machinery and thus incur similar basic risks, the major concern with herbicide application is accidental exposure to the compounds (herbicides, carriers, dyes, and adjuvants). Exposure can occur from being

accidentally sprayed, from entering areas soon after treatment (eating berries or other foods collected from the right-of-way, touching sprayed vegetation), drinking contaminated water, or accidental exposure to downwind drift. The general public, both visitors and residents, is less likely to receive repeated exposures than vegetation management workers: the right-of-way locations are remote, a variety of herbicides would be used, and the timing of treatments would be widely spaced.

If the public were exposed to herbicides repeatedly, the impacts would be like those described in **Worker Health and Safety**.

Risks of Accidental Drift/Spraying

Members of the public, both visitors and nearby residents, could potentially be exposed to herbicides from drift or accidental spraying, if they were in the area at the time of application. Since aerial and broadcast applications have a higher *potential* for drift, these application techniques might create a higher potential for public exposure. However, aerial spraying would only be done in more remote unpopulated areas, and broadcast herbicide spraying would not be done in highly populated areas or suburbs. Potential public exposure from spot or localized drift is extremely low because the application usually takes place close to the target plant, so the herbicide is airborne for only a very short moment.

Should a person be accidentally sprayed, then the person's skin and/or eyes might be irritated, depending on the particular herbicide formula. Individuals have reported chronic nausea, dizziness, and other symptoms following accidental exposure to herbicides. Laboratory tests on animals have shown that most herbicides are not carcinogenic, even at doses and repeated exposures well above that which could occur accidentally as part of vegetation management activities. As stated under **Worker Health and Safety,** herbicides are designed to act on plants, not animals, so that the toxic effects generally do not affect the central nervous system or other vital functions.

Risks of Contact after Spraying

Regardless of application method, the general public might also be exposed through contact with recently sprayed vegetation, consumption of recently sprayed berries or other plant materials, drinking contaminated water, or through consumption of contaminated fish. The application guidelines are designed to prevent such accidental exposures to water and fish.

Debris Disposal Impacts

There would be little potential impact on public health or safety due to debris disposal. Potential impacts on people from pile-burning smoke and decreased air quality are discussed in the **Air Quality** section. Wildfires that start by escaping burn piles pose a risk to nearby residents. With close supervision, the potential for vegetation debris pile burns to escape and cause wildfires would be low.

Mitigation Measures

The following mitigation measures would apply for public health and safety:

- Evaluate, generally, existing land uses (e.g., agriculture, residential) along a right-of-way or surrounding a facility needing vegetation control to determine any constraints on vegetation control.
- *To the extent practicable*, identify casual informal use of the right-of-way by non-owner publics to determine any constraints on vegetation control.
- Determine, generally, landowners or land managers (e.g., private residential, timber company, Federal, state) in or around the facility needing vegetation control.
- Determine whether there are any existing landowner agreements with provisions that need to be followed regarding the vegetation maintenance of a specific portion of line.
- *During planning for vegetation control activities,* use an appropriate method (i.e., doorhanger, letter, phone call, e-mail, and/or meeting) to 1) notify landowners where Bonneville has a right-of-way easement to inform them of upcoming activities, 2) request any information that needs to be considered.
- Determine whether there are *other* potentially affected people or agencies that need to be notified or coordinated with; determine appropriate method(s) of notification and coordination.
- Protect drinking water sources by following all buffer zone restrictions.

Table VI-9 Human Health Toxicology Assessment

Herbicide	Acute Toxicity								Chronic Toxicity			
	Primary Irritation		Oral		Dermal		Inhalation					
	Eye	Skin	LD50 (mg/kg)	Comments	LD50 (mg/kg)	Comments	LC50 (mg/l)	Comments	Carcinogenicity	Teratogenicity	Reproductive	Mutagenicity
2,4-D right-of-way non-electric	Toxicity Category I - III: Highly Toxic to Slightly Toxic	Toxicity Category III Slightly Toxic	Rat 50 - >5000	Toxicity Category 1 - IV Highly Toxic to Practically Non-toxic	Rabbit >2000 - >20,000	Toxicity Category III - IV Slightly Toxic to Practically Non-toxic	Rat (4-hour) >1.0 - >100	Toxicity Category II - IV Moderately Toxic to Practically Non-toxic	Group 2B by IARC Possibly carcinogenic to humans	Animal studies indicate limited ability to cause birth defects	Evidence suggests adverse effects at moderate doses	Evidence suggests adverse effects to human chromosomes
Azafenidin right-of-way electric yard non-electric	Toxicity Category IV Practically Non-toxic	Toxicity Category IV Practically Non-toxic	Rat >5000	Toxicity Category IV Practically Non-toxic	Rabbit >2000	Toxicity Category III Slightly Toxic	Rat (4-hour) >5.3	Toxicity Category III Slightly Toxic	Not listed by EPA as a carcinogen	Increased resorptions and bone abnormalities	Fetal toxicity observed in absence of overt maternal toxicity.	No adverse effects.
Bromacil right-of-way electric yard	Toxicity Category III Slightly Toxic	Toxicity Category IV Practically Non-toxic	Rat 5126	Toxicity Category IV Practically Non-toxic	Rabbit >5000	Toxicity Category III Slightly Toxic	Rat (1-hour) >14.4	Toxicity Category III Slightly Toxic	Group C by EPA-OPP – Possible human carcinogen	Repeated high doses caused fetal abnormalities in rats.	No adverse effects	No adverse effects
Chlorsulfuron right-of-way	Toxicity Category III Slightly Toxic	Toxicity Category IV Practically Non-toxic	Rat (female) 2341	Toxicity Category III Slightly Toxic	Rabbit >2000	Toxicity Category III Slightly Toxic	Rat (4-hour) 5.9	Toxicity Category III Slightly Toxic	No adverse effects	No adverse effects	Slightly decreased fertility at high doses	No adverse effects
Clopyralid right-of-way non-electric	Toxicity Category II Moderately Toxic	Toxicity Category IV Practically Non-toxic	Rat >5000	Toxicity Category IV Practically Non-toxic	Rabbit >5000	Toxicity Category IV Practically Non-toxic	Rat >3.0	Toxicity Category III Slightly Toxic	No adverse effects	Caused birth defects in animals at greatly exaggerated doses	No adverse effects	No adverse effects
Dicamba right-of-way non-electric	Toxicity Category I Highly Toxic	Toxicity Category IV Practically Non-toxic	Rat >757	Toxicity Category III Slightly Toxic	Rabbit >2000	Toxicity Category III Slightly Toxic	Rat (4-hour) >5.3	Toxicity Category III Slightly Toxic	No adverse effects	No adverse effects	No adverse effects	No adverse effects
Dichlobenil non-electric	Toxicity Category IV Practically Non-toxic	Toxicity Category IV Practically Non-toxic	Rat 4250	Toxicity Category III Slightly Toxic	Rabbit >2000	Toxicity Category III Slightly Toxic	Rat (4-hour) >3.3	Toxicity Category III Slightly Toxic	Group C by EPA-OPP – Possible human carcinogen	No adverse effects	No adverse effects	No adverse effects
Diuron right-of-way electric yard	Toxicity Category III Slightly Toxic	Toxicity Category III Slightly Toxic	Rat (female) 1300 Rat (male) 2300	Toxicity Category III Slightly Toxic	Rabbit >2000	Toxicity Category III Slightly Toxic	Rat (4-hour) >3.5	Toxicity Category III Slightly Toxic	Proposed EPA-OPP as a Known/Likely Carcinogen	Teratogenic in mice and rats at doses of 250 mg/kg/day	Significant decrease in weight of offspring at highest doses	No adverse effects
Fosamine Ammonium right-of-way	Toxicity Category IV Practically Non-toxic	Toxicity Category III Slightly Toxic	Rat >24,000	Toxicity Category IV Practically Non-toxic	Rabbit >5000	Toxicity Category III Slightly Toxic	Rat (4-hour) >42	Toxicity Category IV Practically Non-toxic	Not listed by EPA as a carcinogen	No adverse effects.	No adverse effects.	Clastogenic; Chromosome breakage at highest doses.
Glyphosate right-of-way electric yard	Toxicity Category III Slightly Toxic	Toxicity Category IV Practically Non-toxic	Rat >4320	Toxicity Category III Slightly Toxic	Rabbit >2000	Toxicity Category II Moderately Toxic	Rat (4-hour) >1.3	Toxicity Category III Slightly Toxic	Group E by EPA-OPP – evidence of human non-carcinogenicity.	Diarrhea; decreased body weight, nasal discharge and death in high doses.	Kidney and digestive effects and decreased body weight gain in high doses.	No adverse effects
Halosulfuron-Methyl non-electric	Toxicity Category III Slightly Toxic	Toxicity Category IV Practically Non-toxic	Rat 1287	Toxicity Category III Slightly Toxic	Rat >5000	Toxicity Category IV Practically Non-toxic	Rat (4-hour) >5.7	Toxicity Category IV Practically Non-toxic	No adverse effects	Decrease in mean body weight; soft tissue; skeletal variations	No adverse effects	No adverse effects
Hexazinone right-of-way	Toxicity Category I Highly Toxic	Toxicity Category IV Practically Non-toxic	Rat 1200	Toxicity Category III Slightly Toxic	Rabbit >5278	Toxicity Category IV Practically Non-toxic	Rat (4-hour) 3.94	Toxicity Category IV Practically Non-toxic	Group D by EPA-OPP – not classifiable as a human carcinogen	Some effects at high dose levels	Some effects at mid- and high dose levels	Positive in one study and negative in others.
Imazapyr right-of-way	Toxicity Category I Highly Toxic	Toxicity Category IV Practically Non-toxic	Rat >5000	Toxicity Category IV Practically Non-toxic	Rabbit >2000	Toxicity Category III Slightly Toxic	Rat (4-hour) >1.3	Toxicity Category III Slightly Toxic	Group E by EPA-OPP – evidence of human non-carcinogenicity	No adverse effects	No adverse effects	No adverse effects
Isoxaben right-of-way electric yard non-electric	Toxicity Category II Moderately Toxic	Toxicity Category III Slightly Toxic	Rat >5000	Toxicity Category IV Practically Non-toxic	Rabbit >2000	Toxicity Category III Slightly Toxic	Rat (4-hour) >2.6	Toxicity Category III Slightly Toxic	Group C by EPA-OPP – Possible human carcinogen	Has caused birth defects in animals at high doses	Shown to interfere with reproduction in animals	No information available
Mefluidide non-electric	Toxicity Category III Slightly Toxic	Toxicity Category IV Practically Non-toxic	Mice 1920	Toxicity Category III Slightly Toxic	Rabbit >4000	Toxicity Category III Slightly Toxic	Rat (4-hour) >8.5	Toxicity Category III Slightly Toxic	Possible oncogenic effects in tests on mice	No adverse effects	No adverse effects	No adverse effects
Metsulfuron-Methyl right-of-way	Toxicity Category II Moderately Toxic	Toxicity Category III Slightly Toxic	Rat >5000	Toxicity Category IV Practically Non-toxic	Rabbit >2000	Toxicity Category III Slightly Toxic	Rat (4-hour) >5.3	Toxicity Category III Slightly Toxic	No adverse effects	No adverse effects	No adverse effects	No adverse effects
Oryzalin non-electric	Toxicity Category III Slightly Toxic	Study requested by EPA	Rat >10,000	Toxicity Category IV Practically Non-toxic	Rabbit >2000	Toxicity Category III Slightly Toxic	Rat >3.17	Toxicity Category III Slightly Toxic	Group C by EPA-OPP – Possible human carcinogen	Reduced maternal and fetal body weight	Increase in liver, body, kidney weights	No adverse effects
Paclobutrazol	Toxicity Category II	Toxicity Category III	Rat 2150	Toxicity Category III	Rabbit >4000	Toxicity Category III	Rat (4-hour) >250	Toxicity Category IV	No adverse effects	Caused birth defects in	No adverse effects	No adverse effects

Herbicide	Acute Toxicity								Chronic Toxicity			
	Primary Irritation		Oral		Dermal		Inhalation					
	Eye	Skin	LD50 (mg/kg)	Comments	LD50 (mg/kg)	Comments	LC50 (mg/l)	Comments	Carcinogenicity	Teratogenicity	Reproductive	Mutagenicity
right-of-way	Moderately Toxic	Slightly Toxic		Slightly Toxic		Slightly Toxic		Practically Non-toxic		lab animals at doses toxic to the mother		
Picloram right-of-way	Toxicity Category II Moderately Toxic	Toxicity Category IV Practically Non-toxic	Rat >5000	Toxicity Category IV Practically Non-toxic	Rabbit >2000	Toxicity Category III Slightly Toxic	Rat (4-hour) >8.11	Toxicity Category III Slightly Toxic	Group E by EPA-OPP – Evidence of non-carcinogenicity	Body weight gains/losses, excess salivation	Effects not reported	No adverse effects
Sulfometuron-Methyl electric yard	Toxicity Category III Slightly Toxic	Toxicity Category IV Practically Non-toxic	Rat >5000	Toxicity Category IV Practically Non-toxic	Rabbit >2000	Toxicity Category III Slightly Toxic	Rat (4-hour) >5.1	Toxicity Category III Slightly Toxic	No adverse effects	No adverse effects	Decreased number of off-spring at levels toxic to the mother	No adverse effects
Tebuthiuron right-of-way electric yard	Toxicity Category III Slightly Toxic	Toxicity Category IV Practically Non-	Rat (male) >2000 Rat (female) >1000	Toxicity Category III Slightly Toxic	Rabbit >2000	Toxicity Category III Slightly Toxic	Rat (4-hour) >2.0	Toxicity Category III Slightly Toxic	Group D by EPA-OPP – not classifiable as a human carcinogen	No adverse effects	No adverse effects	No adverse effects
Triclopyr right-of-way non-electric												
TEA	Toxicity Category I Highly Toxic	Toxicity Category IV Practically Non-toxic	Rat 1847	Toxicity Category III Slightly Toxic	Rabbit >2000	Toxicity Category III Slightly Toxic	Rat (4-hour) >2.6	Toxicity Category IV Practically Non-toxic	Group D by EPA-OPP – not classifiable as a human carcinogen	Positive for adverse developmental effects	Positive for adverse reproductive effects	No adverse effects
BEE	Toxicity Category III Slightly Toxic	Toxicity Category IV Practically Non-toxic	Rat 803	Toxicity Category III Slightly Toxic	Rabbit >2000	Toxicity Category III Slightly Toxic	Rat (4-hour) >4.8	Toxicity Category IV Practically Non-toxic	Same as above	Same as above	Same as above	No adverse effects
Trinexapac-Ethyl non-electric	Toxicity Category II Moderately Toxic	Toxicity Category III Slightly Toxic	Rat >5000	Toxicity Category IV Practically Non-toxic	Rabbit >2000	Toxicity Category III Slightly Toxic	Rat (4-hour) >2.7	Toxicity Category III Slightly Toxic	Slight increase in stomach tumors in male mice at high doses	Effects not reported	None observed	None observed
Mixtures												
2,4-D + Dicamba	Toxicity Category I Highly Toxic	Toxicity Category III Slightly Toxic	Rat 1150	Toxicity Category III Slightly Toxic	Rabbit >2000	Toxicity Category III Slightly Toxic	Rat (4-hour) >20	Toxicity Category IV Practically Non-toxic	See individual chemical above	See individual chemical above	See individual chemical above	See individual chemical above
2,4-D + Glyphosate	Toxicity Category I Highly Toxic	Toxicity Category III Slightly Toxic	Rat 3860	Toxicity Category III Slightly Toxic	Rabbit >6366	Toxicity Category IV Practically Non-toxic	Rat (4-hour) >1.8	Toxicity Category II Moderately Toxic	See individual chemical above	See individual chemical above	See individual chemical above	See individual chemical above
2,4-D + Picloram	Toxicity Category II Moderately Toxic	Toxicity Category II Moderately Toxic	Rat >2600	Toxicity Category III Slightly Toxic	Rabbit >2000	Toxicity Category III Slightly Toxic	Rat (4-hour) >1.8	Toxicity Category II Moderately Toxic	See individual chemical above	See individual chemical above	See individual chemical above	See individual chemical above
2,4-D + Triclopyr	Toxicity Category III Slightly Toxic	Toxicity Category III Slightly Toxic	Rat >2000	Toxicity Category III Slightly Toxic	Rabbit >2000	Toxicity Category III Slightly Toxic	Rat (4-hour) >4.9	Toxicity Category III Slightly Toxic	See individual chemical above	See individual chemical above	See individual chemical above	See individual chemical above
Bromacil + Diuron	Toxicity Category III Slightly Toxic	Toxicity Category III Slightly Toxic	Rat >1200	Toxicity Category III Slightly Toxic	Rabbit >2000	Toxicity Category III Slightly Toxic	Rat (4-hour) >2.6	Toxicity Category III Slightly Toxic	See individual chemical above	See individual chemical above	See individual chemical above	See individual chemical above
Clopyralid + Triclopyr	Toxicity Category I Highly Toxic	Toxicity Category IV Practically Non-toxic	Rat >1500	Toxicity Category III Slightly Toxic	Rabbit >2000	Toxicity Category III Slightly Toxic	Rat (4-hour) >2.6	Toxicity Category III Slightly Toxic	See individual chemical above	See individual chemical above	See individual chemical above	See individual chemical above
Chlorsulfuron + Metsulfuron Methyl	Toxicity Category II Moderately Toxic	Toxicity Category III Slightly Toxic	Rat >5000	Toxicity Category IV Practically Non-toxic	Rabbit >2000	Toxicity Category III Slightly Toxic	Rat (4-hour) >5.3	Toxicity Category III Slightly Toxic	See individual chemical above	See individual chemical above	See individual chemical above	See individual chemical above

Notes:
Unless otherwise noted, toxicity data are for technical forms of the herbicide (that is, the grade used for toxicology studies), not formulated (brand-name) products; data for specific formulated products might be different than that shown. **LC50** = lethal concentration 50; the concentration of a material in air that on the basis of laboratory tests (respiratory route) is expected to kill 50% of a group of test animals when administered as a single exposure (1 hour or 4 hours as indicated in the table). **LD50** = lethal dose 50; the dose of a substance that causes the death of 50% of an animal population from exposure to the substance by any route (other than inhalation) when given all in one dose. (Source: MSDS Pocket Dictionary, Genium Publishing Corporation 1988) **Toxicity Categories**: Category I indicates the highest degree of acute toxicity, Category IV the lowest.

- *If using herbicides*, ensure that treated areas are posted and re-entry intervals are specified and enforced in accordance with label instructions.
- Ensure that all herbicide applicators have received training and are licensed in appropriate application categories.
- Follow all herbicide label and MSDS instructions regarding mixing and application standards to reduce potential exposure to the public through drift and misapplication.
- Ensure the use of EPA-approved herbicides that have been reviewed by Bonneville for effectiveness and environmental considerations.
- *If using herbicides near crops for consumption*, comply with herbicide-free buffer zones, if any, as per label instructions.
- Never leave herbicides or equipment unattended in unrestricted access areas.
- Closely follow all equipment cleaning standards required by the herbicide label.
- In the event of a spill, immediately notify potentially affected parties.

Visual Resources

The following section discusses general impacts of vegetation management on visual resources.

General Impacts

Vegetation management activities can change the appearance of the landscape and introduce visual contrasts, such as contrasts in color and/or vegetation height.

Several factors influence the effect of vegetation management on visual resources, including the setting (e.g., rural, urban, agricultural, mountainous), season, type of vegetation present, landscape color (e.g., soils, vegetation, surface geology), and type and amount of public use. In addition, the technique employed and scope of the project greatly determine the level of potential impact.

The setting can include land use patterns, as well as vegetation structure present (e.g., forested or not). In some urban settings, rights-of-way provide green belts appreciated by residents of the area. Visual impacts can be great in forestlands that are within view of major highways or residential areas.

A loss of tall vegetation can have a sudden temporary visual impact on people who see the view often. Long-term impacts can occur if the vegetation formerly screened either aesthetic or unpleasant views. For example, danger trees cut along a road might reveal a view of a mountain or valley not seen before. Alternatively, the tree cutting might reveal large lattice-steel transmission structures. (What people find aesthetically pleasing is also a matter of taste. Many of our electrical engineers think transmission towers are an aesthetically pleasing sight.)

The scope of the clearing necessary also affects the visual impact. If a right-of-way has not been cleared for some time, and a number of small trees and brush needs cutting, the change—and therefore the visual impact and contrast—would be great.

The season, or time of year, that vegetation management activities take place can also determine potential impact on visual resources. During late-fall and winter, brown colors of treated vegetation might blend naturally with the surrounding colors, while in spring or summer, the same colors might contrast.

Potential impacts on visual resources also depend on the colors of the existing landscape, where areas dominated by green vegetation might show signs of vegetation management more than those areas where browns, grays, and other earth tones dominate.

Managing vegetation at non-electric facilities, landscaping, and parking lots, by keeping weeds removed, mowing lawns and keeping shrubbery healthy, is intended make these facilities look better. There would be no difference in visual quality associated with choice in management method.

The following sections discuss method-specific impacts of vegetation management on visual resources.

Manual Impacts

Manual techniques do not create any visual impacts particularly unique to the method. However, the control allowed by manual methods can serve to minimize incidental disturbances to non-target vegetation and associated impacts on visual quality.

Mechanical Impacts

Some mechanical methods such as tilling and mowing have the potential to scarify the landscape, leaving swaths of bare soil or dead vegetation that contrast with surrounding colors. (Use of walking brush-cutters can reduce this soils impact.) Mowing can also create an uneven, ragged appearance along roadsides. Because of these effects, some mechanical techniques might be considered inappropriate for some sensitive visual quality areas (David Evans and Associates,

1996). These impacts would be temporary (one or two years) until vegetation is re-established.

Biological Impacts

Insects or pathogens do not greatly affect visual quality of the landscape. These techniques are used in large areas or noxious weed areas. The weeds tend to die slowly, so the plant might look ill for some time before other plants could take over and gain dominance. The potential for contrast between the vegetation surrounding the treatment areas and the post-treatment vegetation would exist, though the transition would be less noticeable than with other management techniques.

Herbicide Impacts

The use of chemical techniques to control vegetation can create visually unappealing brownout areas immediately following herbicide applications. This impact can be heightened if applications prevent seasonal vegetation changes (e.g., spring flowers or fall colors). These impacts on visual quality would be temporary. Vegetation would reestablish itself, and thus lessen the color contrast between treated areas and the adjacent landscape.

Debris Disposal Impacts

Scattering cut branches tends to look unkempt and disturbed.

The burning of slash piles would generate relatively minor amounts of smoke and would leave a residual blackened area of soil. The minor generation of smoke would temporarily affect visual quality. Most pile-burning occurs during fall, when winds can quickly disperse smoke.

Spread-out wood chips can create a visually appealing park-like look.

Mitigation Measures

The following mitigation measures would apply in visually sensitive areas:

- Limit use of broadcast foliar application of herbicide to reduce the creation of large areas of browned vegetation.
- *At road crossings, highways or visual overlooks*, leave sufficient vegetation, where possible, to screen view of right-of-way.
- *If the area is a very sensitive visual resource,* consider (1) planting low-growing tree seedlings adjacent to the right-of-way (or providing low-growing seedlings to landowner for planting); (2) softening the straight line of corridor edge by cutting some additional trees outside the right-of-way; or (3) if possible, leaving some low-growing trees within the right-of-way.

Air Quality

The following section discusses general impacts of vegetation management on air quality.

General Impacts

The primary potential impact on air quality, regardless of the method for clearing, would be a less-than-significant impact on Global Warming. In general, clearing results in the release of carbon dioxide from cleared vegetation into the atmosphere. Additionally, clearing reduces the carbon storage capacity of the affected land because large trees, which store carbon, are not allowed to reach maturity.

The following sections discuss method-specific impacts of vegetation management on air quality.

Manual Impacts

Dust and chainsaw exhaust generated during manual clearing activities would be localized and short-term in nature.

Mechanical Impacts

Dust and offroad-vehicle exhaust generated during mechanical cutting would be localized and short-term in nature. Emissions are expected to be slightly higher than those from manual clearing; however, the impacts on air quality due to mechanical emissions remain less-than-significant.

Biological Impacts

There would be no effect on air quality from biological methods.

Herbicide Impacts

Herbicide use does not affect overall air quality. Please see **Worker Health and Safety** for potential impacts of herbicide vapors on workers located in the immediate area. The use of mechanical means to apply herbicide would have the same impacts on air quality as mechanical methods discussed above.

Debris Disposal Impacts

Woody debris from lop-and-scatter would be left onsite to degrade gradually. Carbon contained in the debris would either be reabsorbed by new growth (approximately 50% - USEPA, 1994) or gradually released to the atmosphere as carbon dioxide. Carbon dioxide is one of the most common greenhouse gasses and is linked to global warming.

Carbon dioxide emissions from line maintenance activities would be partially offset by the regrowth of low-growing vegetation and, if

some larger trees were marketed as lumber, the permanent storage of carbon in that lumber.

Burning debris would emit particulate matter, carbon monoxide, carbon dioxide, semi-volatile and volatile organic compounds. The exact amount emitted depends on the quantity and the moisture content of the debris being burned. It is important to note that only *unmarketable* debris is considered for burning (typically, 40% of the mass of a tree is marketable).

Generally, Bonneville avoids burning because soot from fires can cause flashovers from one transmission line to another, resulting in outages. Burning would not be conducted in nonattainment or maintenance areas or in areas that could affect visibility in national parks, wilderness areas, or monuments. In the unlikely event that burning is used, Bonneville will obtain burning permits from the appropriate authorities and, in Montana, join the Smoke Management Plan. If implemented, burning could have a short-term marginal impact on air quality.

Chipping would produce the same air emissions as lop-and-scatter, except that the carbon contained in chips would be released over a shorter period of time than that contained in unchipped debris.

Off-site disposal includes recycling, landfilling, and combustion in a biomass burning facility. In all three cases, carbon would be released to the atmosphere in the form of carbon dioxide. The recycling and landfilling options would release carbon slowly and would have the same impact as lop-and-scatter and chipping. The biomass burning scenario would have the same impact as on-site burning.

Mitigation Measures

The following mitigation measures would apply for air quality :

- Avoid removing vegetation where it will not grow up into the safety zones for the transmission line.
- *For all methods using machinery or vehicles (i.e. chainsaws, trucks, graders)* keep the equipment in good operating condition to eliminate excess exhaust.
- *Before pile burning is attempted off the right-of-way,* secure from the applicable fire control agency any required permits for burning.
- *If burning*, do not use oil, diesel, or rubber to start pile burn fires.

Social and Economic Resources

The following section discusses general impacts of vegetation management on social and economic resources.

General Impacts

The maintenance of vegetation near Bonneville facilities provides a major benefit to society and the economy by ensuring safe and reliable power. Bonneville facilities provide much of the electricity within the service area, and the maintenance of vegetation within these facilities allows for their safe and reliable operation, which in turn provides a critical resource to the economic functioning of the region. As stated in Purpose and Need (**Chapter I**), a major electric power outage occurred on August 10, 1996, caused in part by trees that had grown too close to transmission lines. The effects of this outage were widespread and illustrated the importance of reliable electricity for the everyday functioning of the region.

Other than the overall benefit of safe and reliable power, none of the alternatives is expected to significantly influence social and/or economic factors because the facilities and associated vegetation management are ongoing. In the numerous environmental studies reviewed as part of this EIS project, very few impacts on social or economic values were identified. Nevertheless, vegetation management can influence social and economic factors to some degree. For example, Bonneville's vegetation management often involves contract workers. The Program therefore provides a moderate level of employment, although (in relation to the overall economic base of Bonneville's service area) the amount of employment provided is negligible.

Impacts on socioeconomics are tied to impacts on agriculture and timber production (see **Agriculture** and **Timber Production** sections). In some cases, Bonneville vegetation management can affect adjacent commercial production of crop or forestlands. As stated elsewhere, many types of crop production are very compatible with Bonneville rights-of-way, so that those crops can be grown within the maintained corridor with little or no effect on their value or production costs. Occasionally, crops might be damaged during certain management activities. For example, fruit trees might require removal. In such cases, Bonneville compensates the landowners for the lost value. Vegetation management might also increase forage production in forested regions or, conversely, can reduce forage where non-target vegetation is removed incidentally.

Vegetation management can provide some opportunities for minor social and economic benefits associated with vegetation removal. Firewood can be made available where trees have been removed. Other forest products, including landscaping trees, can be made available to commercial and/or private collectors within maintained rights-of-way. In addition, as mentioned under **Recreation/Visual**, rights-of-way are often used by people for recreation. In urban areas, rights-of-way can provide open space and green-belt vegetation.

Noxious weeds affect economics by competing with agriculture. As stated in the **Vegetation** section, Bonneville works with local and state agencies on programs to control noxious weeds.

The following sections discuss method-specific impacts of vegetation management on social and economic resources.

Manual Impacts

As the most selective of the techniques, manual methods tend to have little effect on people, although use of chainsaws and other hand tools can temporarily disturb people.

Mechanical Impacts

One of the most common mechanical treatments, mowing of roadsides, has little or no social or economic effect. However, this and other mechanical techniques can be quite noisy, and, as discussed under **Land Use**, can temporarily disturb people in their homes, work places, or while recreating.

Biological Impacts

Because of required precautions associated with biological techniques, and because of the species-specific nature of this technique, little or no adverse effect on social or economic values is anticipated, other than the potential beneficial effect of controlling noxious weeds.

Herbicide Impacts

Impacts from chemical techniques would occur if there were a spill or if spray were to drift and affect crops, grazing grasses, timber production, landscaping, or water resources. The economic impacts would be the loss of production. For example, if herbicide spray on the right-of-way drifted to adjacent timber production land and timber trees were accidentally killed before growing large enough for harvest, money would be lost from the potential sale.

Bonneville once misapplied herbicide on a maintenance site. The herbicide ran off to a nearby stream, traveled downstream and killed many trees in its path, including some in people's yards. The economic impacts of tree replacement fell on Bonneville. The social impact of this incident on the people in the neighborhood was the anger and fear that the mistake of one person could affect them and their surroundings.

Debris Disposal Impacts

Debris disposal would have little potential social or economic impact. Some revenues and public opportunities might be foregone should wood suitable for commercial or firewood use be burned or chipped.

Consequences of Right-of-way Management Approach Alternatives

This section discusses the impacts specific to the implementation of the management approach alternatives.

Alternative MA1: Time-driven

If rights-of way were managed on a time-driven basis, vegetation would be cut or controlled on a cyclical schedule based on when the tallest trees were a near threat to a line. The maintenance activities would involve the removal of relatively tall trees (about 14 ft.).

With this alternative, there is no attempt to change the vegetation structure of the right-of-way. Trees would sprout on the corridor through blown seed or root suckers. If deciduous trees dominated, cutting of those trees without herbicide treatment to stop root growth would create more densely sprouting trees. Sapling-filled corridors could develop, requiring the same or increasingly intensive maintenance with each maintenance cycle. With each cycle, there would be repeated disturbance of the right-of-way.

The environmental impacts of this repeated disturbance include potentially affecting the following: non-target vegetation (crushing, accidental treatment or removal); soils (disturbance and erosion through vegetation removal, maintenance traffic and clearing activities); water (sedimentation through erosion, increased surface runoff until revegetation); fish (temporary sedimentation reduces feeding success in the short-term); wildlife (disturbance or removal of habitats).

Impacts on land uses and land owners/managers (Agriculture, Timber, Recreation, Residential, Commercial, Industrial, FS- and BLM-managed lands, Tribal, City, County, and State) specific to this management approach would come from the repetitive and intensive maintenance disturbance on the rights-of-way (noise, dust, debris disposal, access, coordination efforts). Cultural and Historical Resources would not be specifically affected through this management approach.

Impacts on worker health and safety specific to this approach would be the potential for accidents related to working with dense, tall vegetation. Public health and safety impacts would be the slight potential for accidents to the public (such as being hit by flying vegetative debris, hurt by felling of trees, exposed to herbicide applications) during maintenance of dense tall vegetation.

Impacts of visual resources by this approach would be the drastic visual difference of clearing tall vegetation from a site and the disturbance of the right-of-way until revegetation occurs.

Impacts on air quality would be due to the repetitive maintenance activities (exhaust, dust) and the debris left to decompose, releasing carbon dioxide into the atmosphere.

This approach is not specific to the method(s) that would need to be used. Impacts associated with methods would depend on which methods were used.

Alternative MA2: Promotion of Low-growing Plant Communities

This management approach would promote the establishment of low-growing plant communities within the right-of-way. Maintenance would be conducted in a manner conducive to that establishment, including removing or treating tall-growing vegetation before it is tall enough to shade or out-compete low-growing vegetation, and being careful not to disturb low-growing vegetation during maintenance activities.

The impacts associated with this approach would be similar to those of MA1 during the first few years of implementation: the impacts of removing dense, tall vegetation. During early implementation there would also be more potential maintenance impacts and human presence on the rights-of-way to treat small trees. Once low-growing plants began to establish themselves on the rights-of-way, impacts associated with tree removal would lessen because there would be fewer trees.

The impacts of this approach would be more noticeable in forest areas. In these areas the impacts would be associated with changing the vegetation structure from one that constantly reverts back to a forest, to a structure of low-growing plants—shrubs, grasslands. This change could affect the following: vegetation (vegetation structure is changed by reducing the natural rate of tree regeneration; the area becomes a shrub- or grassland); soils (potential for soil erosion would decrease by decreasing soil exposure and creating root mats that hold soil and water); water (less erosion lessens potential sedimentation and turbidity); fish (decreased erosion-related impacts would decrease

impacts on fish); and wildlife (habitat is changed to low-growing and is not in constant disturbance via cutting cycles).

Impacts on land uses and land owners/managers (Agriculture, Timber, Recreation, Residential, Commercial, Industrial, FS- and BLM-managed lands, Tribal, City, County, and State) specific to this management approach would include those associated with MA1 (noise, dust, debris disposal, access, coordination efforts). However, these impacts would decrease over time, as rights-of-way needed less intensive maintenance.

As low-growing plant communities became established, potential impacts on worker and public health and safety would decrease (less maintenance necessary means less potential for impacts).

Impacts on visual resources would be most noticeable in forested areas. The rights-of-way would be changed to low-growing vegetation cover, which might/might not be more appealing-looking than a right-of-way with a large number of saplings growing. With fewer maintenance activities needed, the right-of-way would look less disturbed.

Air quality impacts would decrease over time with the fewer maintenance activities (exhaust, dust) and relatively little debris to decompose and contribute to carbon dioxide release into the atmosphere.

The impacts of this approach associated with methods would depend on the methods used, and would categorically include impacts of herbicide methods. This approach would require, at a minimum, herbicide applications for deciduous species. Without herbicide treatment of these fast-growing species, the roots would resprout creating more dense growth with each cutting (see the **Vegetation** section, **Manual Methods,** in this chapter for details) and the establishment of low-growing plant communities would be very difficult.

As with all the methods, the use of herbicides would decrease over time as low-growing plant communities establish.

Consequences of Right-of-way Methods Package Alternatives

This section discusses the impacts specific to the implementation of the right-of-way methods package alternatives.

Alternative R1: Manual, Mechanical, Biological

Alternative R1 relies heavily on manually controlling tall-growing vegetation, with some use of mechanical methods. Noxious weed control would be done with manual and mechanical methods, and biological agents. No herbicides or growth regulators would be used.

Short-term Impacts

Short-term environmental impacts of this alternative would result from the use of manual (chainsaws) or mechanical (heavy equipment) methods to remove tall-growing vegetation.

Non-target vegetation could be crushed through tree felling, use of mechanical clearing, and debris disposal. Soils are usually disturbed only slightly by manual methods (the top duff layer can be rearranged), while soil-scraping mechanical methods can cause erosion. Erosion is also possible through vegetation removal, maintenance traffic, and debris disposal. If erosion occurs, then potential sedimentation could occur if there are water bodies nearby. Surface runoff could increase until revegetation. Oils or fuel from equipment could also potentially enter waterbodies.

Temporary sedimentation could reduce fish feeding success in the short-term. Wildlife would be disturbed through chainsaw and mechanical equipment noise. Maintenance activities could also potentially remove habitats, and soil-scraping mechanical equipment could affect soil-dwelling species.

Impacts on land uses and land owners/managers (Agriculture, Timber, Recreation, Residential, Commercial, Industrial, FS- and BLM-managed lands, Tribal, City, County, and State) would include noise, dust, debris disposal, access, and coordination efforts.

If soil were disturbed, then subsurface cultural resources might be exposed or damaged (more likely with mechanical methods than manual methods).

Worker health and safety impacts would include those for manual (chainsaw accidents, felling of trees) and mechanical (heavy equipment accidents) methods, and with working in dense vegetation. It is potentially more dangerous to cut trees on steep terrain, compared to spraying a tree with herbicide and leaving it standing. Public health and safety impacts would be the slight potential for accidents to the public (such as being hit by flying vegetative debris, hurt by felling of trees).

Vegetation disturbance (stumps and branch debris) could cause impacts on visual resources until revegetation occurs. Impacts on air

quality would include exhaust, dust, and slight carbon dioxide release into the atmosphere due to debris left to decompose.

Since herbicides would not be used, there would not be the potential impacts of herbicide use, such as potential contamination.

Long-term Impacts

The indirect or long-term environmental impacts would occur in areas of deciduous vegetation, similar to the impacts of management approach MA1. When cut, deciduous vegetation would resprout with an increased number of stems, creating more thickly vegetated rights-of-way that would need to be managed even more intensively. The right-of-way would then need more extensive clearing (more vegetation per acre to be cut and removed) each maintenance cycle. When densely vegetated areas were cleared, environmental impacts would be more drastic compared to the selective removal of trees or brush. More habitat would be affected and more soil disturbed; non-target plants that have grown in shade-tolerant situations would suddenly be exposed; maintenance worker presence on the right-of-way would increase; and visual impacts would be more dramatic. Increased deciduous brush densities could also decrease vegetation diversity, and in turn decrease wildlife use of the right-of-way.

Noxious Weeds

Without the use of herbicides with this alternative, noxious weed control would be difficult, especially for weeds that do not have an approved biological control. If such weeds cannot be controlled, and therefore spread, impacts would occur for vegetation (loss of diversity), agriculture (competition with crops), and wildlife (loss of habitat and food sources). Because such weeds are very resilient and capable of resprouting through roots, as well as from seed, mechanical or manual techniques are not very effective.

The use of biological methods (where applicable) tends not to have any adverse environmental impacts. There could be some noise disturbance if helicopters apply biological agents. Insect agents might be a food source for birds or fish. There would be no soil or water disturbance.

Mitigation Measures

With this alternative, all the mitigation measures listed in **Chapter III** would apply, with the exception of the measures for herbicide use (since this alternative does not include herbicide use).

Alternative R2:
Manual, Mechanical, Biological **+ Herbicide – *spot and localized* application**
(Environmentally preferred alternative)

Alternative R2 would use all methods (manual, mechanical, biological, and herbicide), but would use only spot and localized herbicide applications. Most tall-growing vegetation would be manually removed (cut with chainsaws). Spot and localized herbicide applications would be the next most used method. Mechanical methods would be used very rarely. Noxious weeds would be managed primarily with localized herbicide treatments and some biological treatments.

Short-term Impacts

The short-term manual and mechanical impacts would be similar to those of Alternative R1. However, because those methods would be used less, the impacts associated with those methods would be less.

The difference between R1's and R2's short-term impacts spring from the use of spot and localized herbicide applications. These application treatments can be very selective, so that non-target vegetation is not harmed. The slight potential for an herbicide spill would cause the biggest impact on non-target plants as well as water bodies. Applicators must take care not to allow the herbicide to get on non-target vegetation, in order to maintain selectivity. Herbicides have a slight potential to affect soil productivity by reducing soil microbes in small areas, but the local and spot treatments would allow the microbes to quickly recolonize from adjacent, unaffected areas. There is the potential for herbicides to wash off sprayed plants through heavy rains or over-applications and reach water bodies and fish. Herbicide movement through water runoff could kill crop plants, expose range animals, or affect timber production. Mitigation measures that include no-spray buffers around water bodies and careful consideration of weather before applying should eliminate this risk. Herbicide use could have a slight potential for wildlife poisoning.

Spot treatments of stumps have no particular visual impacts. Spot injection treatments of large trees and localized applications (e.g., backpack spraying) on clumps of vegetation can leave standing dead plants that are not visually appealing.

Worker impacts include potential repeated exposure to herbicides, especially if appropriate precautions are not taken. Exposure to herbicides could cause short-term nausea, dizziness, or reversible abnormalities of the nervous system. Prolonged, repeated, and excessive exposure can cause organ damage, immune system damage, permanent nervous system damage, production of inheritable mutations, damage to developing offspring, and reduction of reproductive success. The option to use spot or localized herbicide

applications in areas of steep terrain or where it may be dangerous to fell a tree near an energized line may lessen potential physical injuries.

The potential for the public to be exposed to herbicide applications on the right-of-way is small. Exposure to herbicides could cause short-term nausea, dizziness, or reversible abnormalities of the nervous system. Herbicide applications on the right-of-way would not cause prolonged or repeated exposure to the public because of the time span between treatment cycles (every 2 – 10 years).

Long-term Impacts

Spot and localized herbicide applications could be used to treat deciduous plant species, depending on the Management Approach Alternative and Vegetation Selection Alternative paired with this alternative. If herbicide applications were used to treat deciduous species, then the long-term impacts would be similar to those of the management approach MA1 (Promotion of Low-growing Plant Communities). As the regrowth of multiple stemmed sprouts is controlled and the right-of-way is converted to a shrub- or grassland, maintenance activities would become less intense and the resulting impacts would lessen over time. Wildlife habitat would also change, as the right-of-way vegetation was converted to shrub- or grassland type habitats.

Noxious Weeds

The amount of use and the impacts of biological methods would be the same with this alternative as with Alternative R1. This alternative would mainly treat noxious weeds with localized herbicide treatments. The ability to control noxious weeds is much greater with herbicides than with manual or mechanical methods; therefore, there would be much less impact due to unchecked growth of noxious weeds

Mitigation Measures

With this alternative, all the mitigation measures listed in **Chapter III** would apply, except those for broadcast and aerial herbicide applications (since these applications are not used in this alternative).

Alternative R3:

Manual, Mechanical, Biological, Herbicide – *spot, localized* **+ *broadcast application***
(current practice)

Alternative R3 would use all methods (manual, mechanical, biological, and herbicide), with spot, localized, and broadcast herbicide applications. Most tall-growing vegetation would still be manually removed (cut with chainsaws). Spot and localized herbicide applications would be the next most used method. Broadcast herbicide applications would be used very rarely, as would mechanical methods. Noxious weeds would be managed primarily with localized herbicide treatments and some biological treatments.

Short-term Impacts

The short-term manual and mechanical impacts would be similar to those of Alternative R1. However, those methods would be used less with this alternative; therefore the impacts associated with those methods would also be less. Impacts of spot and localized herbicide applications would be the same as under R2.

The impacts specific to this alternative would be due to the additional option to use broadcast herbicide application. The applicability of broadcast is very limited on rights-of-way (the vegetation needing treatment must be close to good truck access), so its use would be small.

Impacts specific to broadcast applications include greater potential to accidentally treat non-targeted plants, because the nature of broadcast is to treat everything in an area. Broadcast applications are usually sprayed from a truck. This application has a greater potential for drift (fine clouds blowing or vaporizing to untargeted areas) than with spot or localized applications. This potential also slightly increases the potential for water contamination, fish mortality, and wildlife poisoning. Mitigation measures that include no-spray buffers around water bodies and careful consideration of weather before applying should eliminate this risk.

Potential worker exposure to herbicides would increase with this alternative because slightly more herbicide would probably be used. However, because broadcast herbicide application is done via a truck (rather than by backpack or hand application), there is actually less potential for worker contact or exposure with the chemical.

There would be a slight increase in possible public exposure, because there is more potential for drift with broadcast herbicide use and a slightly greater potential for accidentally spraying persons on the right-of-way with broadcast (compared to spot or localized herbicide applications). Broadcast treatments can leave large areas of dead standing vegetation that are not visually appealing.

Long-term Impacts

As with R2, the herbicide applications in this alternative could be used to treat deciduous plant species, depending on the Management Approach Alternative and Vegetation Selection Alternative paired with this alternative. The long-term impact of treating deciduous species would be similar to the impacts of R2 and of management approach MA2, Promotion of Low-growing Plant Communities (deciduous species controlled, low-growing plant communities developed, and maintenance activity impacts becoming less intense).

Broadcast applications would be more likely used for corrective action treatments where large, dense stands of deciduous vegetation need removal.

Noxious Weeds

The use of biological agents and localized herbicide applications would be the same as with Alternative R2. This alternative would make greater use of broadcast treatments for noxious weeds than for tall-growing vegetation, allowing somewhat more flexibility in controlling noxious weeds. The impacts of the herbicide application itself would be as discussed above; however, because noxious weeds tend to be so invasive, there is little chance of accidentally treating non-target vegetation.

Mitigation Measures

With this alternative, all the mitigation measures listed in **Chapter III** would apply, except those for aerial herbicide application (since aerial would not be used in this alternative).

Alternative R4:

Manual, Mechanical, Biological, Herbicide – *spot, localized, broadcast* ***+ aerial application*** *(Bonneville Preferred alternative)*

Alternative R4 would use would use all methods (manual, mechanical, biological, and herbicide), and all herbicide application techniques (spot, localized, broadcast, and aerial). Most tall-growing vegetation would still be manually removed (cut with chainsaws). Spot and localized herbicide applications would be the most used herbicide application techniques. Aerial herbicide applications would be the next used option. Broadcast herbicide applications would be used very rarely, as would mechanical methods. Noxious weeds would be managed primarily with localized herbicide treatments, with some broadcast, aerial, and biological agent treatments.

Short-term Impacts

The short-term manual and mechanical impacts would be similar to those of Alternative R1. However, because those methods would be used less with this alternative, the associated impacts would also be less. Impacts of spot and localized herbicide applications would be the same as under R2 (except that this alternative would use localized applications somewhat less, so associated impacts would also be less). Impacts of broadcast applications would be the same as those under Alternative R3.

The impacts specific to this alternative would spring from the additional option to use aerial herbicide application. Because aerial applications are relatively non-selective, there is greater potential to treat non-target vegetation and soils. This application also has a greater potential for drift (fine clouds blowing or vaporizing to

untargeted areas) than with spot or localized applications. Potential drift slightly increases the potential for water contamination, fish mortality, and wildlife poisoning. Mitigation measures that include no-spray buffers around water bodies and careful consideration of weather before applying should eliminate this risk. Additional impacts would include short-term helicopter or plane noise disturbance of wildlife and residential areas.

Where aerial spraying is used, ground-base vegetation removal is not needed, reducing physical damage to non-target vegetation and soils. Less erosion would occur, as well as associated impacts such as sedimentation to water bodies and wetland or habitat degradation.

Worker exposure to herbicides is actually slightly decreased with this alternative. In the areas treated aerially, fewer workers would be involved and there would be little contact with the herbicides. There would also be some risk of aircraft accidents when flying over or under transmission lines.

The areas that would be treated aerially would not be heavily populated, so potential for public exposure shouldn't increase. However, there is a slight possibility of direct sprays if persons are on remote rights-of-way and cannot be seen by helicopter pilots. Aerial herbicide applications can leave large areas of dead standing vegetation that are not visually appealing.

Long-term Impacts

As with the other herbicide alternatives, the herbicide applications in this alternative could be used to treat deciduous plant species, depending on the Management Approach Alternative and Vegetation Selection Alternative paired with this alternative. The long-term impact of treating deciduous species would be similar to the impacts of R2, R3 and of the management approach MA2 (Promotion of Low-growing Plant Communities). Aerial applications would be more likely used for corrective action treatments where large, dense stands of deciduous vegetation need removal.

Noxious Weeds

The use of biological agents and localized herbicide applications would be the same as with Alternative R2. Broadcast treatments would be the same as with Alternative R3. The addition of aerial applications would allow the greatest number of noxious weeds to be treated.

Mitigation Measures

With this alternative, all the mitigation measures listed in **Chapter III** would apply.

Consequences of Right-of-way Vegetation Selection Alternatives

This section discusses the impacts specific to the implementation of the Vegetation Selection Alternatives. These alternatives would be paired with any of the right-of-way methods package alternatives that include herbicide use.

Alternative VS1: Noxious Weeds

With Alternative VS1, herbicides would be used only to treat noxious weeds. The impacts associated with this alternative would be the beneficial impacts of being able to treat noxious weeds, reducing potential infestation impacts on vegetation, agriculture, and wildlife.

Potential impacts of herbicide use would be limited to only those areas of noxious weed treatment. Because herbicides would not be used on deciduous species, there would be environmental impacts associated with the increased maintenance needed to clear densely vegetated areas.

Alternative VS2: Noxious Weeds & Deciduous

The environmental impacts associated with Alternative VS2 include those associated with the use of herbicides in areas with noxious weeds and deciduous species. Impacts would be due to herbicide use, reducing potential noxious weed infestations, and being able to lessen maintenance activities through deciduous species control.

Alternative VS3: Any Vegetation

Alternative VS3 allows herbicide use to be an option to treat any vegetation. This alternative would include the beneficial impacts of reducing potential noxious weed infestations and being able to lessen maintenance activities through deciduous species control. Impacts associated with herbicide use would be greatest with this alternative because herbicides would probably be used more. Worker safety impacts from physical injury could be lessened with this alternative; herbicide treatment could be used where manual cutting might be dangerous (e.g., steep terrain).

Consequences of Electric-yard Alternatives

This section discusses the impacts specific to the implementation of the Electric Yard Program Alternative.

Alternative E1: Herbicide Treatment

Under this alternative, pre-emergent herbicides would be used most frequently, with some infrequent use of post-emergent herbicides, weed burners, steamers, and selective hand-pulling.

The main environmental impacts from this alternative would occur if herbicides were to migrate off-site and into surrounding areas or water bodies. Pre-emergents tend to be persistent (remain active for a long time).

If herbicides were to move out of the application area (slight potential for runoff or leaching), non-target vegetation could be affected, water bodies or groundwater could be contaminated, and fish and wildlife could be affected. Mitigation measures, such as following weather restrictions, label instructions and buffer requirements would limit potential off site movement.

Worker exposure during application of herbicides could cause health impacts.

Mitigation Measures

With this alternative, all the mitigation measures for herbicide use listed in **Chapter III** would apply.

Consequences of Non-electric Program Alternatives

This section discusses the impacts specific to the implementation of the Non-electric Program Alternatives. The difference between the alternatives is whether herbicides are used to manage vegetation.

Alternative NE1: Mixed Methods with Herbicides

Under this alternative Bonneville would continue to contract landscaping services, maintain landscaping manually, use herbicides to suppress weeds, and apply fertilizers.

No environmental impacts would occur from hand hoeing, clipping, or weed pulling. If herbicides were to move off-site, through runoff, leaching or drift, vegetation and water resources could be affected. Noise and air pollution could occur from lawn mowers, weed whackers, and leaf blowers. Workers would be exposed to health and safety risks when applying herbicides and operating tools and equipment.

Alternative NE2: Non-herbicide Methods

No herbicides would be used under this alternative. Vegetation would be controlled using only manual methods, mechanical methods where needed, and fertilizer.

No environmental impacts would occur from hand hoeing, clipping, or weed pulling. Because noxious weeds are difficult to control without the use of herbicides, the potential for noxious weeds to spread would increase under this alternative. Vegetation would have to be managed more frequently under this alternative, and visual quality could be degraded if the management cycle is too long. Noise and pollution could occur from lawn mowers, weed whackers, and leaf blowers. Workers would have some potential to be hurt with sharp objects such as clippers, and to experience back injuries from hoeing or weed pulling.

Cumulative Impacts

Cumulative impacts are defined as the effects on the environment that result from the incremental impact of the proposed action, when added to other past, present, and reasonably foreseeable future actions, regardless of what agency (Federal or non-Federal) or person undertakes such other actions (40 CFR § 1508.7).

Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time. In this EIS, the cumulative impacts are the impacts of a Bonneville vegetation management program, together with impacts of other actions taking place throughout the Northwest.

Forest management, construction, and agricultural activities can cause impacts similar to those of the alternatives in this EIS. Because rights-of-way are linear in nature and spread out over a large geographical area, a vegetation management program would contribute relatively minor impacts when considered together with other actions in the region. For example, soil compaction that may occur where heavy equipment is used may increase erosion and diminish soil productivity.

However, compared to erosion and diminished soil productivity caused from construction, farming, or logging activities, impacts caused by the vegetation management would be negligible.

The following is a description of the potential cumulative impacts that could occur from the vegetation management program when added to past, future, and reasonably foreseeable actions.

Cumulative impacts on **vegetation** include decreased plant diversity, colonization of noxious weeds in disturbed sites, the increase of trees prone to windfall along forest edges, and potential herbicide damage on non-targeted plants. **Soils** impacts include increased erosion, increased landslide potential, and reduced soil productivity.

Water bodies could be affected cumulatively through increased surface water runoff and water temperatures, reduced nutrients in water, potential groundwater and surface water contamination, and potential wetland degradation. **Fish and other aquatic species** could be affected through cumulative habitat degradation from decreased water quality (usually less than 300 m [985 ft.] of any stream is typically affected).

Cumulative impacts on **wildlife** include harassment, degraded or modified habitat (most affected in forested areas where habitat can be fragmented and thermal cover lost), and potential wildlife poisoning.

Agriculture could be affected by noxious weed and nuisance plant invasion, and crops could be damaged by potential herbicide movement off target areas. There could be additional impacts on **timber** production from potential herbicide damage on timber trees. **Recreationists** can be temporarily disturbed and displaced, diminishing recreational experiences.

Residential, Commercial, and Industrial resources can be further affected with temporary noise disturbances, conflicts with adjacent property owners' landscaping needs or desires, and increased potential for local herbicide contamination.

Additional impacts on **FS- and BLM-managed lands** involve including various management needs and conflicts, and making appropriate amendments or changes to existing FS and BLM resource management plans in order to gain consistency.

Cumulative impacts on **Tribal lands** include encroachment on Tribal rights to traditional-use activities on ceded lands and usual and accustomed areas, and potential inconsistency with Tribal land use plans. Impacts on **City, County, and State lands** involve potential conflicts with land use plans.

Cumulative impacts on **cultural and historic resources** include potential damage to or exposure of archeological sites, harm to plants with traditional cultural value, visual intrusions on places of traditional cultural value, and temporary noise impacts in areas of traditional cultural value.

Additional **health and safety impacts** would be due to potential physical injury, and health risks from exposure to exhaust, gases, herbicides, and smoke. **Visual resources** impacts would arise from additional changes in visual contrasts and landscape appearance (most notable in forested areas). Short-term and localized dust and exhaust emissions would temporary increase in particulate emissions, reducing **air quality**.

Social and economic resources are further affected through contribution to employment (benefit), minor impacts on commercial production of crops or forestlands, and contributions to open space and green-belt vegetation in urban areas.

Table VI-10, following page, shows the relative cumulative impacts of the alternatives.

Table VI-10: Relative Cumulative Impacts of the Alternatives

Alternative	Relative Cumulative Impact
Right-of way Program Alternatives	
Management Approaches	
MA1	More likely to contribute to overall physical land and noise disturbances than MA2.
MA2	More likely to contribute to potential herbicide contamination than MA1.
Method Packages	
R1	More likely to contribute to overall physical land and noise disturbances than R2, R3, or R4.
R2	More likely to contribute to overall physical land and noise disturbances than R3, or R4. More likely to contribute potential herbicide contamination than R1, less likely than R3 or R4.
R3	More likely to contribute potential herbicide contamination than R1 or R2, less likely than R4. Less likely to contribute to overall physical land and noise disturbances than R1 or R2.
R4	Most likely to contribute potential herbicide contamination. Least likely to contribute to overall physical land disturbances.
Vegetation Selection	
VS1	More likely to contribute to overall physical land and noise disturbances than VS2 or VS3. Less potential contribution to herbicide contamination than VS2 or VS3
VS2	Less likely to contribute to overall physical land and noise disturbances than VS1. More potential contribution to herbicide contamination than VS1, less than VS3.
VS3	Most likely to contribute potential herbicide contamination. Least likely to contribute to overall physical land and noise disturbances.
Electric Yard Alternative	
E1	Potentially contribute to herbicide contamination of resources if movement off-site.
Non-electric Yard Alternatives	
NE1	Most likely to contribute to overall physical land and noise disturbances. (Would not contribute to potential herbicide contamination.)
NE2	Less likely to contribute to overall physical land and noise disturbances than NE1. Would potentially contribute to herbicide contamination.

Effects of Short-term Uses of the Environment on Long-term Productivity

NEPA requires that EISs consider the effects of short-term uses on long-term productivity. Short-term uses of the environment are those that occur as discrete events or that can occur on a year-to-year basis. Bonneville's vegetation management program is an assortment of short-term uses: cutting vegetation or treating it to control its growth around facilities.

Long-term productivity refers to the capability of the land to provide resources for future generations. The very existence of the power facilities excludes some land from being used for any other production (in the case of substations or maintenance sites) or certain agricultural production such as timber (on transmission-line rights-of-way). The short-term use of vegetation management on these facilities tends to exclude other uses on the land. Long-term productivity has already been affected with the existing facilities, and the use of the vegetation management program does not enlarge the amount of affected land.

Irreversible and Irretrievable Commitment of Resources

Irreversible commitment of resources refers to the use of non-renewable resources such as minerals and petroleum-based fuels. Bonneville's vegetation management program would use some petroleum-based fuels for vehicles and equipment.

Irretrievable commitment of resources is that commitment that results in the lost production or use of renewable resources, such as timber or rangeland. The vegetation management program would not increase any such commitment beyond what has already occurred through the building of the facilities.

Adverse Effects that Cannot Be Avoided

Alternatives presented in this FEIS for the vegetation management program would have few unavoidable adverse effects. This FEIS has included recommended mitigation measures (see earlier discussions in

this Chapter and in **Chapter III**) to avoid or reduce adverse environmental effects. The primary effect that could be considered adverse—limiting the growth of plants within and around the facilities—is intrinsic to the vegetation management program. This is not a choice in this FEIS: it was set forth when the facilities were built. Hand-in-hand with the construction of the facilities came the responsibility that they would have to be maintained, with vegetation kept a certain distance away, with diversity and successional changes affected, and the height of the vegetation controlled.

An adverse effect related to any of the alternatives would be the temporary disturbances of wildlife and their habitat in localized areas from increased human activity during vegetation maintenance activities. The presence of humans in an area is enough to disturb many wildlife species. Any of the methods that would be available for use could potentially disturb wildlife and their habitat in localized areas.

Other possible adverse effects depend on the method used to control the vegetation. With this dependence there is a question of whether or not the effects would be avoidable. For instance, vehicle traffic and some types of mechanical clearing can cause adverse soil compaction in certain soil types. It is possible that the soil compaction could be avoided by using other methods in the areas susceptible to soil compaction or by using equipment such as walking brush-cutters that disturb soils minimally.

This page intentionally left blank.

Chapter VII
Public Comments and Responses

In this chapter:

- **Public Involvement Draft EIS Comment Period**
- **Comments on the DEIS and Responses**
- **Copies of All Letters, E-mails, and Comments Received**

Public Involvement Draft EIS Comment Period

Opportunities

In early August 1999, we made three separate mailings regarding the Draft EIS to about 1500 interested or affected governments, agencies, organizations, and individuals.

- One mailing included the Draft EIS, a cover letter, and comment form.
- Another went to people who had requested the Draft EIS Summary.
- A third mailing told people the Draft EIS was available and how to receive a copy.

Bonneville, the BLM, and a Forest Service Region posted the Draft EIS and comment links on their respective Web sites.

A news release was sent to media throughout the Northwest announcing availability of the Draft EIS and telling how to request a copy.

Notice was also published in the monthly *BPA Journal* that is mailed to customers and others interested in the agency's work.

An open-house style public meeting was held Wednesday, September 15, 1999, in the State Office Building in Portland, Oregon.

Bonneville's Constituent Account Executives contacted governmental agencies and public interest groups to invite them to the public meeting and to offer opportunities for one-on-one discussions on the Draft EIS.

A "Crossing Paths" publication was developed specifically for the Tribes of the Northwest to encourage discussion and comment. Tribes with Bonneville facilities on their lands and/or those who expressed interest or comments during scoping were contacted and offered opportunities for one-on-one meetings to provide comments on the Draft EIS. Bonneville staff also attended the Affiliated Tribes' September 27 meeting in Pocatello, Idaho, to tell people about the Draft EIS and to solicit comment.

The comment period officially closed October 9, 1999, but we continued to accept comments (through early January 2000) from Tribes and persons informing us that their comment would be late.

Comment Summary

We catalogued a total of 271comments. Most were submitted in writing, by letter, e-mail, or on the comment solicitation form that was mailed with the Draft EIS. The meetings generated few comments, as did the phone calls.

Every part of the Draft EIS attracted comment, but three chapters (III, IV, and VI) drew 75 percent of the comments. Those commenting on Chapter III, Site-specific Planning Steps, most often focused on noxious weeds and land use and landowner issues. Comments on Chapter IV, Program Alternatives, targeted right-of-way management and right-of-way methods. Chapter VI, Environmental Consequences, most often attracted comments about potential herbicide impacts on water, fish and aquatic species, and wildlife.

Who commented? Just over half of the 39 people submitting comments in writing (only written comments can be accurately traced) were affiliated with governmental agencies: Federal (35 percent); local, mainly weed control boards (11 percent), and state (5 percent). Individuals submitted 16 percent of the written comments and Tribal agencies submitted 14 percent. The remainder were submitted by interest groups, utilities, and academic institutions.

How to Use This Chapter

Comments are organized by chapter. At the end of each comment is an identifying number that refers to the number of the response (in the order in which the letter, email, phone message, or meeting comments were received). The letters, e-mails, phone call logs, or meeting summaries that contain comments are copied in whole at the end of this chapter.

Comments and Responses to *Purpose & Need* (Chapter I)

General

Comment: *. . . the draft EIS on vegetation management . . . incorporates the concepts of integrated vegetation management, making use of a variety of approaches to achieve the vegetation management goals of your program. In my opinion, it takes a balanced and scientifically sound approach to the issues involved. [#19]*

Response: Thank you for your review and comment.

Purposes

Comment: *Noxious weed management ought to have been promoted as a "purpose" (page S-1) given the impact (existing and potential) that transmission system vegetation management has on plant communities and adjacent lands, as regards noxious weeds. Perhaps earnest noxious weed management is implied in the third purpose: "comply with laws and regulations"? [#7]*

Response: Noxious weed management should have been part of our "need" for vegetation control. We have added it. Thank you.

Reasons for EIS

Comment: *Chapter I - PURPOSE AND NEED Page 3: Reasons for the EIS: Your document states that: "Preparation of this document is intended to fulfill the requirements of the National*

Environmental Policy Act (NEPA) for Bonneville". What does this mean? What specific NEPA requirements is this EIS intending to fulfill (if any)? The Forest Service does not believe that this programmatic analysis is adequate to account for the environmental effects of site specific vegetative management activities along every mile of Bonneville's transmission facilities on National Forest System lands. Statements like that quoted above have the potential of implying otherwise. This statement should be clarified to more appropriately state something to the effect that: "This document discloses the estimated environmental effects of a variety of vegetative management methods that may be considered and applied at Bonneville facilities. Decisions for treatment methods will be made in accordance with existing and/or future site-specific vegetative management plans". [#39]

Response: We have clarified the statement to indicate that this EIS is fulfilling the requirements of the National Environmental Policy Act (NEPA) *for the decisions that are being made through this process.* Through this process, Bonneville is making decisions *regarding what methods should be in our toolbox* for managing vegetation throughout our system. We are also proposing *planning steps and mitigation commitments* for site-specific actions. These are federal decisions that could potentially affect the environment and, as such, require us to fulfill the requirements of NEPA and its implementing regulations, as well as other federal laws. This NEPA process is intended to help our agency make decisions on our program that are based on an understanding of the environmental consequences.

We agree that these decisions are *not* site-specific. The planning steps lay out the process for completing site-specific NEPA compliance tiered to this EIS.

Comment: *Page 4: Efficiency and Consistency; Your document states: "Site-specific analysis would be in the form of a Supplemental Analysis". Recommend you add to this statement the following: "Supplemental, site-specific analyses will be documented, and appropriate decision documents written, in accordance with the policies and procedures for the implementation of NEPA of the agency having land management jurisdiction on the affected area, and in accordance with all other applicable State and federal laws and regulations". [#39]*

Response: We have revised the statement to reveal that at times other federal agencies would also have to make decisions regarding Bonneville's site-specific project proposals, and that in those circumstances those agencies' NEPA policies and procedures would also apply. Thank you for bringing this to our attention.

Comment: *. . . the DEIS does not provide sufficient implementation detail, mitigation commitments, or alternative analysis to determine site specific impacts. . . . We would like to be involved in the future review of this program if BPA decides to significantly change the described preferred alternatives or follows through on our recommendation to produce site specific plans for the program in our region. [#40]*

Response: We agree that this document is not an analysis of site-specific impacts. The planning steps are developed to ensure that the appropriate resources are considered at the site-specific level for NEPA compliance and appropriate decisions. The analysis will tier to the EIS for environmental effects of the various methods so that the need to repeatedly (and potentially, inconsistently) cite those effects in individual site-specific plans will be precluded. The site-specific analysis can be consistent, focused, and pertinent to the decisions to be made. (Please note that analysis would be needed for all facilities, as appropriate.)

Comment: *As you have disclosed in this document, the programmatic approach that you are undertaking will serve to identify the environmental effects of various treatment methods. Its primary benefit will be its availability as a source of reference in the development of site specific management plans. In tiering to the environmental effects of various treatment methods, as disclosed and documented in this analysis, the need to repeatedly (and potentially, inconsistently) cite those effects in individual site-specific plans will be precluded. [#39]*

Response: Yes, this EIS is being prepared not only to facilitate good program-wide decisions, but also to provide analysis of vegetation control methods that will be tiered to for site-specific analysis. Also, with planning steps in place, good decisions can be made regarding appropriate methods to be used and NEPA compliance can be consistent, focused, and pertinent to the decisions to be made.

Public Involvement

Comment: *Formal tribal consultation on a government-to-government basis with potentially affected tribes is required for the federal lands under the administration of the Modoc National Forest. This consultation requires a one on one meeting between the tribes and a decision maker for [Bonneville] in addition to providing opportunities for written comments. The Modoc NF has provided the list of tribal representatives. Please let us know if this consultation has already taken place and the results. [#32]*

Response: Bonneville contacted Northwest Tribes to gain input into our program. Bonneville met with several Tribes for one-on-one meetings as requested, and had phone conversations regarding issues or concerns. None of the Tribes stated a need for formal consultation on this EIS (though some thought there might be a need during the development of site-specific right-of-way management plans or if their issues were not addressed to their expectations). The Tribal representatives listed by the Modoc National Forest were contacted personally by phone. No meetings were requested as a result.

Comment: *I am a Hoh Tribal member from the State of Washington and I am also a cultural teacher. I teach the traditional weaving of the coastal Indian throughout the Pacific Northwest. [At a conference attended by basketweavers and representatives of the BLM, Dept. of Fisheries and Forestry] the weavers were presented with draft administrative rules concerning the gathering sites and permits to gather. I told the parties on the panel that I felt it was a violation of my treaty right to gather where we have always gathered as stated in the treaty. I also stated that I do not believe that tribal council can change my treaty right and any agreement that is signed should have be reviewed by the traditional Indian people. I have been on the tribal 21 years before I resigned to in 1996, so I know all of the administrative rules that the government can present only to the council and not the people. I have reviewed your draft and I was wondering if you have contacted the Tribes that are in the area for any review about the use of herbicides. I think that the statement on the draft is very important and BPA should really take into consideration the Indian people and use of the materials throughout the country. [#12]*

Response: Bonneville actively sought and received Tribal comments on the program. We contacted the Tribes in the Northwest. We

greatly appreciate the time it takes to review and comment on the Draft document and have worked to make changes based on much of the input we received.

Comment: *Thank you for giving us the opportunity to comment. [#22]*

Comment: *Thank you for putting such a nice informational packet together. [#27]*

Comment: *Thank you for letting me comment. [#25]*

Comment: *Thank you for the opportunity to comment . . . [#29]*

Comment: *Really like your meeting layout and graphics. [#30]*

Comment: *Thank you for the chance to review the Transmission System Vegetation Management Program DEIS. [#33]*

Response: You are welcome. Thank you for taking the time to comment.

Comment: *The State Clearinghouse submitted the above named environmental document to selected state agencies for review…and no state agencies submitted comments. . . . This letter acknowledges that you have complied with the State Clearinghouse review requirements. [#37]*

Response: Thank you for acknowledging compliance.

Cooperating Agencies

Comment: *The Forest Service sincerely appreciates the BPA's efforts to reach out, solicit the concerns of the Forest Service, and to address those concerns in this programmatic analysis. We believe that most of the Forest Service's concerns, previously provided to the BPA in the course of this analysis, have been adequately disclosed and addressed in this DEIS. [#39]*

Response: Thank you. Bonneville appreciates the work that the Forest Service has put into this effort as a cooperating agency. We hope these efforts will help our agencies work smoothly and effectively together at the site-specific level.

Comment: *… the Forest Service has consistently represented to the BPA that a product of this programmatic analysis, and its Final EIS/Record of Decision, will NOT be Forest Service approval for the BPA to begin the implementation of vegetative treatment methods along it rights-of-way on National Forest System lands. We believe that existing, revised, and/or new site-specific vegetative management plans are needed as the basis for vegetative treatment activities on any segment of BPA's authorized use and occupancy on NFS land. Such plans need to be developed and adopted for use in accordance with the provisions of NEPA, and pursuant to the provisions of the outcome of this EIS/ROD. [#39]*

Response: We completely understand that Forest Service cooperation on this EIS is not approval to implement vegetation control without further site-specific work. Your work on this document is to help set in place the planning steps, agreeable to both agencies, for site-specific NEPA compliance, and to help ensure that the environmental effects of various treatment methods have been analyzed adequately to be able to tier to this analysis/cite those effects in individual site-specific plans. We look forward to working with individual Forests on revising or developing site-specific vegetation management plans.

Comment: *. . . with your adoption of this programmatic plan, there will be a potential opportunity created to more fully realize its benefits with respect to vegetative management activities on NFS lands. That can happen if the BPA is willing to consider a comprehensive revision to the manner in which its facilities on NFS lands are now authorized. Currently, BPA's generation and transmission facilities are authorized on NFS lands under a wide variety of old, and in some cases, obsolete, forms of authorizations. They include unique Land Use Grant Instruments ("LUGI's") (that were created specifically for the BPA), Memorandums of Understanding, and various forms of our more standardized special use permits. There is little to no consistency in the terms and conditions between these different types of authorizations. Some include requirements which suggest that the Forest Service is responsible for the development of vegetative management plans (for review and approval by the BPA); a concept that is totally contrary to our management of special uses. Others have little to no reference to vegetative management activities whatsoever. In such cases, BPA has suggested that vegetative management is part of the all-inclusive concept of authorized*

"maintenance" of the facilities, as provided in the authorization. We recommend that upon the adoption of this programmatic plan, the BPA enter into discussions with the Forest Service to consider the potential of replacing all of these existing Forest Service authorizations with current special use authorizations for its facilities on NFS lands. [Specific topics for discussion are detailed.] . . . We [FS] believe that this approach . . . has the potential to benefit both of our agencies, and provides the opportunity for your agency to realize a significant increase in the value of the programmatic vegetative management plan you are now working towards adopting. [#39]

Response: Bonneville welcomes the opportunity to bring greater uniformity to Bonneville's occupancy agreements covering facilities on National Forest. Bonneville and the Forest Service have been in on-going discussions regarding revising our Agencies' Memorandum of Understanding (MOU) to be workable for all parties involved. Although these discussions are outside the scope of this EIS, when a revised MOU is adopted, we look forward to tiering to this EIS for a more streamlined process that will increase the value of this EIS.

Other Related Documents, Projects

Comment: *Please add to the listing of documents provided the following: Forest Land and Resource Management Plans - [which] provide for the allocation of National Forest System (NFS) lands and resources for a variety of management purposes. . . . Other Forest Service Land or Resource Management Plans [which have] [m]anagement direction, prescriptions, and guidelines . . . such as Wild and Scenic River Management Plan.. . . . Although this document lists Forest Land and Resource Management Plans as Guidance Documents in Appendix F, we believe that such Plans are of such importance in guiding management activities on NFS lands, that they should also be listed in this part of the document. [#39]*

Response: Thank you for the suggestions. These documents have been added.

Comments and Responses to *Methods* (Chapter II)

General

Comment: *I have reviewed the August, 1999 draft. There seems to be adequate unit costs for the various process that tend to lead toward the more cost effective and easier to administer processes. However I*

feel efficiency which I define as cost divided by time should be the economic evaluation basis. Therefore I suggest the economic evaluation be based on cost per unit per year instead of just cost per unit. Also one should look at the cost to maintain the entire system per year instead of cost per unit. Although this may seem to be similar to cost per unit per year, there are differences. [# 5]

Response: Thank you for your suggestion. The EIS describes the costs of the methods per acre in Chapter II Methods. We agree that these costs alone do not give a picture of efficiency or costs over time, but are baseline information. We did not further break down costs over time for specific methods, because for actual vegetation control we want to use a combination of methods, and pure method costs overtime would not be relevant to the decisions to be made.

In Chapter IV Alternatives, the EIS gives *comparative* costs of implementing an alternative (such as which methods package would cost more or less if implemented) both in the short-term and long-term, in our program. We did not give dollar figures because they would depend on too many factors (how many rights-of-way were treated in a given year, at what stage of low-growing plant communities they were in, and so on).

Manual/ Mechanical

Comment: *When controlling noxious weeds many mechanical and manual methods can be very successful. We support utilizing these methods for primary control and the use of pesticides only in extreme circumstances. [#14]*

Response: Mechanical and manual methods *can* be a tool for noxious weed control in some cases, but in general, when used on their own, they are often ineffective in providing long-term control of noxious weeds.

For example, some mechanical methods (mowing) can be used, when critically timed, in infested grass stands to preclude noxious weed seed maturation and allow the grass to compete and establish. Manual methods have also been effective in areas where only a few weeds are established and hand weeding prevents any further need for treatment, or to prevent the plant from forming a flower and making seed.

However, the reliance on manual and mowing methods can also lead to the *increase* of noxious weed populations, since many of the weeds are perennial and have growth forms that actually increase when manual or mowing methods are used. Some examples include the following:

- When mowed, Diffuse and Spotted knapweed re-grow flowers and seedheads lower to the ground (out of reach of mower blades).
- Rush Skeleton weed and other types of noxious weeds have rhizominous roots that develop new plants where broken roots have been left by hand pulling.
- Canada thistle has large root systems that allow the plant to re-grow after mowing.
- Noxious weeds that have a high potential for seed production (scotch broom, knapweed, gorse) can have seed dispersed and spread by mowing after seed-set.
- After ten years of hand-pulling knapweed on Bonneville rights-of-way on the Mt. Hood National Forest (at a cost of approximately $10,000 per year), the weed population and areas affected have increased.

In conclusion, manual and mechanical methods can be an effective part of an IVM program when used in combination with other methods. Exclusive use of these methods is usually ineffective in dealing with noxious weeds.

Comment: *Page 28, last paragraph: should troller read roller? [#22]*

Response: Yes. The correction has been made.

Biological

Comment: *The Tribe does not support the introduction of non-native biological control species. [#14]*

Response: Thank you for your perspective. Noxious weeds are introduced plant species from other countries or areas. These plants can invade and flourish because they have no natural enemies. Biological control agents (insects, fungi) are often also non-native (if there were native predators for the noxious weed, that weed wouldn't be a problem). These agents are heavily tested to see what their impact may be on native plant species if released. The agents are not authorized for use unless they pass rigorous tests, including a test to ensure that they will feed only on the target plant species. Many people feel that biological controls are a more natural, holistic way of controlling noxious weeds than the use of herbicides.

Comment: *An individual from the Colville Tribe commented that bio-control agents for noxious weeds are not very effective. [#31]*

Response: In some areas, and with some weed species, biological controls have not been very effective. In other areas and weed species, they have been found to successfully control, reduce, and control the spread, but not completely eliminate noxious weed species.

Herbicides

Comment: *Page 35. It may be helpful to add a sentence to the 4th paragraph that explains perhaps only a subset of these herbicides may be available to use on certain lands. The Willamette EA only provides for the use of 2 of these herbicides, glyphosate and/or triclopyr. [#33]*

Comment: *. . . several of the land owners involved in the program, including the US Forest Service, restrict the types of chemical agents that are allowed to be used on their lands. Typically only five herbicides are approved for use on Washington State USFS land. These compounds are 2,4-D, dicamba, glyphosate, picloram, and triclopyr. Coordination between landowners and BPA should take place during the planning steps and prior to herbicide application to ensure the interests of all parties are addressed. [#40]*

Response: Thank you for your comment. Bonneville recognizes that the Forest Service and BLM have certain herbicide compounds approved for use on their lands. The list of herbicides in this EIS would be in our overall program toolbox. During planning for site-specific vegetation control (the planning steps), Bonneville will coordinate with these agencies to determine appropriate herbicides for use. (The compounds you have mentioned—2,4-D, dicamba, glyphosate, picloram, and triclopyr — are all on our approved list also.) This need to coordinate at the site-specific level is in the EIS; however, given your comment, we have reiterated the need to consider the planning steps for appropriate herbicides in Chapter II when the herbicide list is first introduced.

Reseeding/ Replanting

Comment: *Section on Replanting: has replanting been done on the Hanford site? [#22]*

Response: Rights-of-way crossing Hanford require vegetation control only for noxious weeds (there are no tall-growing plants to

interfere with the lines or brush to inhibit access). Bonneville has not done any replanting on the Hanford site.

Debris Disposal

Comment: *What do you do with the trees you cut? [#30]*

Response: Larger trees that are cut are often kept by the landowner for firewood or timber. If Bonneville owns the land, we may sell the trees for timber. Other times the trees are chipped, lopped and scattered, mulched, or (rarely) piled and burned. We have clarified what is done with cut trees in Debris Disposal, Chapter II.

Comment: *Debris should be composted. [#15]*

Response: Usually the debris from right-of-way vegetation control is chopped up and left to decompose naturally on-site.

Approving New Techniques

Comment: *The program allows for the approval of new techniques and new herbicides that are not presently listed by name in the document. We have reservations about the approval process, which allows BPA to determine the environmental impacts of newly registered compounds using EPA risk assessment data without contacting the [USFWS]. . . . new techniques may result in new effects to listed species not previously considered in consultation and therefore may trigger re-initiation of consultation. . . . Threatened and endangered species may have different considerations than risk assessment models assume and may be more sensitive to particular compounds than the organisms tested during the registration process. . . . In our opinion the use of a newly registered herbicide would require BPA to consult with the Service regarding effects to threatened and endangered species. [#40]*

Response: We will contact the US Fish & Wildlife Service (USFWS) through our Supplement Analysis process to ensure that potential impacts of the herbicide are considered in determining whether it is appropriate for use. We have clarified the language for the approval process to include appropriate contacts to be made. We acknowledge that approval may require re-initiation of consultation, depending on the potential impacts on species. Thank you for bringing this to our attention.

Methods Eliminated from Consideration

Comment: *Biological Control Agents (S-9) - the usefulness of sheep were discounted due primarily to logistics. However, Bonneville could utilize the services of a 3rd party to provide sheep, thereby eliminating logistical problems. The use of sheep should be revisited. [#26]*

Response: The logistics of sheep grazing was only part of the reason that this alternative was eliminated from further consideration. The primary reason is because sheep are not very effective in controlling tall-growing species in the rights-of-way. They tend not to eat readily the plant species we need controlled, especially when the plants are out of reach.

Comments and Responses to *Site-specific Planning Steps* (Chapter III)

General

Comment: *Bonneville should develop guidance for field staff responsible for implementing the program on use of low-impact approaches. [#34]*

Response: The planning steps are the guidance for our vegetation control project managers for lessening impacts. The impact of an approach or method is very dependent on site circumstances. We developed the planning steps to help identify site-specific circumstances and determine appropriate methods and mitigation measures to lessen impacts.

Comment: *Overall we feel the document does a good job of . . . providing a process to accomplish site specific plans that will meet a variety of resource needs on the ground. It appears that the planning steps outlined in the document will ensure that site specific concerns are addressed. [#33]*

Response: Thank you for your comments.

Identify Facility and Vegetation Management Need

Comment: *Under Planning Step 1 (Identify Facility and the Vegetation Management Needs), herbicide mitigation measures are specified only for electric yards. We recommend that the same*

mitigation measures also be specified in this planning step for rights-of-way, non-electric facilities, and noxious weed control throughout the BPA service territory. Specifically, these mitigation measures include rotating herbicide use to prevent resistance, avoiding spray drift, determining if water bodies require monitoring for herbicide contamination, and observing riparian buffer and herbicide-free zones defined on page 62 of the DEIS. [#40]

Response: The mitigation measures listed in this section were intended to reflect issues specific to these facilities, but do not exclude the need to apply all other appropriate measures listed in the remaining six steps. Planning step 4, Determine Vegetation Control Methods, has a comprehensive listing of herbicide mitigation measures to be used, as appropriate. We have made some text changes to help clarify this. Thank you for noting this potential confusion.

Comment: *. . . several of the herbicides selected for the program are very persistent in soil. An example of this is isoxaben, which has a soil half life of 5 to 6 months. Since the document states that herbicide application in electric fields may occur as often as once a year, the Department [of Interior] would advise BPA to assess if chemical control is needed every year, and if so, to select compounds that are less persistent reducing the potential for accumulation and residual levels of these chemicals in the soil. [#40]*

Response: The most persistent herbicides are used in the substation environment, where pre-emergent herbicidal activity is required to keep weeds and grasses controlled at a maximum basis due to immediate human safety concerns (i.e., electrocution). These concerns require Bonneville to be proactive and use annual application techniques regardless of the presence of plants. To minimize impacts, Bonneville has dropped three herbicides (benefin, pendimethalin, and trifluralin) from further consideration. We are also evaluating geology, water, and soil in determining the best combination of herbicides to be used while protecting offsite resources.

Comment: *The Blue River District is currently looking at options to restrict access along the road beneath the powerline with a gate. BPA access would still be provided. [#33]*

Response: Thank you for the information; it has been forwarded to the Natural Resource Specialist in charge of Bonneville vegetation management in your area.

Comment: *Regarding washing vehicles to prevent spread of weeds/seeds. If there is a concern with washing vehicles with power washers (oils, metals) use an air gun to blow off noxious weeds. [#13]*

Comment: *I think consideration should be given to pressure washing all vehicles and equipment that enter your right-of-way especially from other weed infested sites. This should be done with the view of washing radiator and under carriages where weeds and plant fragments hide. [#8]*

Comment: *Page 55. Mitigation measures for noxious weeds. Bullet #5: Washing vehicle clause. How about adding wording about developing sites to wash vehicles in association with land owners/managers as part of site-specific management plans. [#33]*

Response: We plan to wash vehicles, when possible, that have been in weed-infested areas before entering areas of no known infestation. When vehicles are washed, they are taken to an approved wash rack or commercial car wash facility. These facilities have oil-water separator systems so as not to contaminate soils or water bodies. We will also consider implementing the last suggestion on a site-specific basis with large landowners or managers (such as the Forest Service.

Comment: *Concerns with **weeds along all access roads** - they need to be treated. Sometimes access roads are owned by the county or others, and used by Bonneville and no one takes responsibility for treating weeds. [#13]*

Comment: *BPA has several transmission lines that cross the Colville National Forest. Many of these rights-of-way contain noxious weeds, and we are very concerned that if these infestations are not treated, they will remain a perennial source of reinfestation of adjoining National Forest System lands. [#24]*

Comment: *An individual from the Colville Tribe was concerned that noxious weeds were appearing everywhere on tribal lands. [#31]*

Comment: *Our greatest concern with the powerline corridors at this time is centered on noxious weeds. A sizeable population of spotted knapweed has been located within the corridor near Blue River along*

the McKenzie River. This species is considered a new invader and as such has the highest priority for treatment on this forest [Willamette National Forest]. . . . Each of the three corridors [in the Forest] also has large amounts of scotch broom, blackberry and other noxious weeds. We would like to work with the BPA to develop an active management strategy to address this concern. [#33]

Comment: *It seems to me [supervisor, noxious weeds program, FS] that there should be some shared responsibility for noxious weeds control in not only the right of way, but also the roads that access the towers. Portions of roads within the forest service road system, I am sure, are maintained and left open and maintained solely because of the need for access to the towers. [#38]*

Response: Thank you for forwarding your concerns. Where appropriate, your comment has been forwarded to the Natural Resource Specialist in charge of Bonneville's vegetation management in your area. Bonneville works with county weed boards and landowners or managers who have active noxious weed control programs. We often contract with county weed boards to treat rights-of-way in conjunction with larger scale treatments they may be doing in an area. Weed control is a larger picture than a narrow strip of land; weeds must be treated in an entire area or the control effort would be lost to surrounding infestations. Bonneville also has a program to give herbicides to landowners who are actively controlling weeds on their lands for right-of-way infested areas. On Forest Service lands, Bonneville will work with your overall programs to ensure that the rights-of-way and access roads are also treated.

Comment: *Page 56. Mitigation measures for noxious weeds. Bullet #6: Reseeding should follow all ground-disturbing activities to help compete with weed seed in the soil. All seed should be state-certified weed-free. . . . it would be more appropriate to use "when appropriate" not "when practical". [#33]*

Response: Thank you, the change has been made.

Comment: *Page 31, 4th par. Does this statement mean BPA has also worked with Hanford [for noxious weed control]? [#22]*

Response: Bonneville has worked with Hanford's noxious weed group in the past. Bonneville also works with the Benton County

Weed Board that monitors and treats noxious weeds on transmission line rights-of-way that cross Hanford.

Comment: *I do not like current noxious weed control or lack of noxious weed control as currently practiced in Skamania County (west end) by . . . your Olympia Office. [#28]*

Response: Thank you for your perspective. Your comment will be forwarded to the Natural Resource Specialist in charge of Bonneville's vegetation control in Skamania County. It is Bonneville's intention to work with county weed boards and landowners with active noxious weed control programs for noxious weed control.

Comment: *I am also pleased to see your proposal to use bio-control and herbicides for these noxious weeds. [#10]*

Response: Thank you for your comment. Please note that Bonneville also supports research for noxious weed control. Bonneville has an annual $25,000 contract with the Oregon Department of Agriculture that helps to support their biological control program with ongoing research to develop new insect methods to control noxious weeds. Current research projects focus on Gorse (Southern Oregon Coast), Scotch and French Broom (Willamette Valley), Leafy Spurge (Klamath Falls), and Spotted Knapweed (Central Oregon). In addition, Bonneville's helicopters are used to help map these infestations using global positioning system (GPS) and geographic information systems (GIS) technology.

Comment: *I am glad to see your continued hard-line approach to controlling noxious weeds. . . . I am most happy to see your continued supply of herbicides and biocontrol to landowners who have land where power lines travel through. [#10]*

Response: Thank you for your comment. We have had success with our limited program to provide herbicides to agricultural landowners for noxious weed control along the rights-of-way, and we plan to continue this practice. In the Eugene area, this program involves about 40 landowners at an annual Bonneville cost of $10,000.

Comment: *Thank you again for the opportunity to comment. Please let us [Panhandle Weed Management Area Steering Committee] know if we can be of assistance. Partnering to control these invaders [noxious weeds] is the best way to ensure success. [#20]*

Response: Thank you for taking to the time to review our program and submit comments. We look forward to working with you.

Comment: *At first blush, it appears BPA is hoping to decrease man-hours and costs in annual treatments after the initial emphasis period. While such a goal can be realized, the fact is that noxious weeds can move in quickly without constant watchfulness to ensure they don't. In other words, don't turn your back after 5 years, hoping the good control you've achieved is all that needs to be done. . . . The Panhandle Weed Management members urge you to consider scheduled visits to the sites to ensure undesirable vegetation, and particularly noxious weeds, are controlled after your emphasis period is completed. Noxious weeds because of the longevity of viable seed, can quickly take over these sites even though you may have actively controlled the area for 5 years. Long-term monitoring will be required. [#20]*

Response: We agree. The decreasing need for right-of-way maintenance with our proposed alternatives is more targeted toward the tall-growing vegetation. Noxious weed monitoring is often on a different schedule than monitoring for tall-growing or access-blocking vegetation. The schedule is often dictated by the particular weed board in the area. Also, although the need to conduct maintenance may decrease, our right-of-way inspections will remain consistent, looking for both noxious weed invasions and tall-growing species that will still be able to establish (although less often).

Identify Surrounding Land Use and Landowners

Comment: *[I] like idea of vegetation management alternatives and discussing them with landowners. [#30]*

Response: The planning steps include notifying landowners (if they are potentially affected by our actions) to find out any issues that need to be considered when determining the appropriate methods to be used.

Comment: *[Pacific Power and Light forester]. . . [would you please] start notifying property owners when your crews are coming*

through a right-of-way performing vegetation management work. We receive many irate calls every year from customers who think that work that was done by your crews was done by us. We hav[e] to go out and investigate each of these calls which costs us a good bit of time. Your Vegetation Management Department could certainly improve your communications with your "neighbors" so that these folks know who to contact with their questions and/or concerns. [#11]

Response: Thank you for your comments. As part of our planning steps for site-specific vegetation control (Chapter III Site-specific Planning Steps) we will try to contact landowners over whose land out rights-of-way cross, during the planning for vegetation control. Public contact may take place in a number of ways: notice in a local newspaper, phone calls, meetings, letters, door-hangers. This commitment to landowner contact will provide more consistency in our notification.

Comment: *Will areas be surveyed in advance to ascertain the presence of organic farming operations (S-7)? [#26]*

Response: Sometimes organic farm operations are easily determined through right-of-way reviews (e.g., if they have signs) but we also depend on responses to our public notification of site-specific vegetation control to inform us of organic farming operations. We keep historical information of organic farming sites (as well as other resources or issues to consider) on our photomaps.

Comment: *I would like to see prior notification of exactly when our area will be aerial sprayed. This could be done through newspapers giving us a approximate date of application, and then you supplying us with a hot-line number to call to get a specific date and time (subject to change because of weather). We may have to call more than once as the hot line is updated. This would be so beneficial because we could keep our children in on that particular day and not allow them to play outside (especially beneficial for those of use who live very near power lines). We could also move livestock, change out water supplies, etc. just for safety measures. Also, I know you need to be in the growing season for aerial spray, but if there is any way you could spray before apples and berries have been set on (in other words, spray during the bloom stage - preferably before - (the earlier the better) this would greatly reduce any chance of ingesting contaminated*

fruit by our children. We do have orchards from old homesteads close to powerlines where drift could be questionable in my opinion. . . . . All that I personally can ask is that you please keep us informed so that we have the opportunity to use as many safety measures on our behalf as we see fit to protect our families. [#27]

Response: Thank you for your recommendations and letting us know your needs and concerns. As part of our planning steps for site-specific vegetation control (Chapter III Site-specific Planning Steps) we will contact landowners over whose land our rights-of-way cross, prior to vegetation control. This notification will give approximate dates, methods being considered for use, and points of contact to call for additional information. We hope notification will give you ample time to contact us regarding any issues or scheduling that we need to consider as well as allow you to take measures you deem appropriate. In addition, aerial spraying will not be carried out in areas that are densely to moderately populated, and access points into the right-of-way will be posted with signs regarding aerial herbicide applications. Thank you for your suggestion of a Hot Line; we will consider it on site-specific projects.

Comment: *When you plan a specific project on the Colville Forest, we are more than willing to coordinate with you and help insure that the terms of the Mediated Agreement, as well as other applicable laws and regulations regarding vegetative treatment on National Forest System lands are followed. [#24]*

Response: Thank you. Your offer to help and coordinate has been forwarded to the Natural Resource Specialist in charge of Bonneville vegetation management in your area.

Comment: *Project Proposal Notification: Another bullet on page 58 under USFS managed lands needs to be added which includes BPA Project Managers notifying the FS in advance of any proposed projects (non-emergency) involving NF lands. This is needed in order that FS NEPA procedures are complied with. This requirement is already contained in the Right of Way Management Plan for BPA facilities on the Plains/Thompson Falls Ranger District, but I'm not sure of other Districts and Forests. [#36]*

Response: Thank you for the suggestion. There is a bullet in that section that requires managers to contact the local Forest Supervisor's

or District Ranger's office before implementing vegetation management activities on National Forest Service lands. The bullet has been revised as suggested

---

Comment: *We look forward to working with you on site specific management plan updates for each of the three corridors that are located on the Willamette National Forest as a follow up to this EIS. [#33]*

Response: Thank you. We also look forward to updating plans. Please be aware that Bonneville will need to do so over the next few years. We expect that we will work on plans, as upcoming vegetation control is needed in that area.

Comment: *Detroit Ranger District personnel will be writing a comprehensive management plan for the Pacific Gas and Electric (PGE) powerline corridor, which parallels the Detroit BPA corridor for approximately 18 miles, in the next year, as a part of the relicensing process for the PGE corridor. It would be beneficial for BPA to be involved with this site-specific management because working together could potentially lower costs for both PGE and BPA for management activities, surveys, etc. It would be beneficial for the Willamette NF to have a single set of guidelines for managing both corridors. [#33]*

Response: Thank you for the information; it has been forwarded to the Natural Resource Specialist in charge of Bonneville vegetation management in your area. We agree that a combination effort in developing a plan could be beneficial to all parties and look forward to discussions with you.

Comment: *Page 58: Recommend that BPA also consider including, either in the selected alternative itself, or in the Record of Decision, specific direction that will require BPA's Project Managers to review all EXISTING site-specific vegetative management plans [on National Forest lands], for consistency with the selected alternative of this programmatic analysis, and to revise or amend those existing plans as necessary to make them consistent with the finding, standards, guides, management direction, etc. in the selected alternative/ Record of Decision of this EIS. [#39]*

Response: We agree that existing site-specific vegetative management plans need to be reviewed for consistency with decisions made through this EIS process. (A mitigation measure in the planning steps—FS-managed lands—addresses this need.)

However, we have also heard concern from specific Forests that the EIS should not supercede or revoke existing plans. The concern is that some might think that past agreements no longer apply. As we review and revise plans in cooperation with the appropriate Forest, both agencies will need to consider past agreements and right-of-way management plans and together decide whether they are still appropriate.

Comment: *CHAPTER III - SITE-SPECIFIC PLANNING STEPS Page 58: USFS-Managed Lands: Recommend revising the fifth bullet statement under this heading to read as follows: "If expecting the USFS to require environmental data collection for evaluation, allow more than one year for completion, and be prepared to reimburse the USFS for its cost to collect and analyze data, conduct the environmental analysis, document that analysis, and/or the cost to contract for such activities". [#39]*

Response: Revisions to this effect have been made. Thank you.

Comment: *Page 58: USFS-Managed Lands: Recommend revising the seventh bullet statement under this heading to read as follows: "Comment and engage in all Forest Service proposals to revise or amend Forest Land and Resource Management Plans, to assure that the designation and management of utility corridors are adequately addressed wherever appropriate." [#39]*

Response: The revision has been made. Thank you.

Comment: *When planning ROW treatments on the Colville Forest, as well as other National Forest lands in Region 6, I want to remind you that BPA must also comply with the terms of the Mediated Agreement to the EIS Managing Competing Unwanted Vegetation. This document emphasizes prevention activities, but it also restricts the types of chemicals that can be used on National Forest System lands. [#24]*

Response: Yes, we understand the need of certain Forest Service regions to comply with the mediated agreement. See Appendix F, FS Mitigation Measures and Background.

Bonneville understands that a mutually approved site-specific vegetation management plan with the Forest Service must be consistent with the appropriate Forest Plan. The Region 6 Forest Plans incorporate the Mediated Agreement. As a practical matter, Bonneville's vegetation management plans must comply with the Mediated Agreement before the Forest Service can approve them. Appendix F gives examples of special mitigation measures Bonneville will apply on Forest Service lands in addition to those discussed in Chapter III.

Comment: *Page 56, provides for the use of "public contact to help find out about any special uses of the land, or other issues or concerns that might need consideration when determining or scheduling vegetation control" on an only if needed basis. We suggest always use public contact and involvement within Modoc County. The Modoc County Board of Supervisors has established a land use committee to consider and comment on Federal Agency actions that may occur within the county. [#32]*

Response: Thank you for noting the need for clarification. The public would be notified of vegetation control projects that would potentially affect them (for example, notification would probably not be needed for weeding landscapes around a substation control house, but would be done for landowners that have easements crossing there land). The appropriate level of notification, involvement, or coordination would be determined at the site-specific level. Please note that public contact is used for a couple of reasons: to keep our neighbors informed of vegetation control activities on their land, and to help us determine uses of the land or issues that are not otherwise evident. We hope that the changes made in Chapter III, Step 2: *Identify surrounding land use and landowners/ managers* clarifies this.

Comment: *In the Siuslaw Forest, Waldport Ranger District, a major north-south BPA transmission line cuts a swath about 300 yards wide through areas of timber that will never be cut again under the National Forest Plan. These areas used to be sprayed with herbicides, creating a grassy meadow area miles long. As we understand the*

BPA-USFS agreement, these transmission right-of-way areas were supposed to be managed for "wildlife". Keeping the areas in a brush cycle now does not accomplish this earlier objective. We would like the BPA and USFS to honor their past agreement by keeping the areas in a grassy meadow condition. This would provide an alternative for wildlife such as deer and elk, etc. to the older forests surrounding these transmission lines. Could the BPA and USFS return to controlling brush (by mechanical or manual means) for grassy growth? [#18]

Response: Your comment has been given to the Natural Resource Specialist in charge of Bonneville vegetation management in your area. Please note that it is difficult to keep an area within a forest in grassy growth without some use of herbicides to control deciduous regrowth. The right-of-way is probably in a brush cycle now because herbicides are not being used. (We are assuming "brush" means thick medium-height vegetation, such as young deciduous trees with multiple stems). Manual or mechanical means of keeping this area in grass would require yearly mowings, which is a more time-consuming and expensive method than Bonneville can commit to. Please note that the right-of-way across the Waldport and Mapleton Ranger District is 50 miles long and 125 feet wide. Working with people from the Waldport and Mapleton districts, the right-of-way was recently cut by manual chainsaws and mowed by machines where terrain has allowed (October 1999 -January 2000). Vegetation was left in place at stream crossings for fish and water quality protection. Bonneville continues to coordinate with Forest Service staff on the feasibility of following-up with herbicide treatments to control deciduous species, primarily Red Alder. (We are in the process of completing a site-specific environmental analysis.) The overall goal for the right-of-way is to establish a quasi-stable native low-growing plant community. The low-growing plant communities have been found to be beneficial to a number of wildlife, not just big game. We hope that, through this coordination, Bonneville's Natural Resource Specialist and the Forest Service district can enhance wildlife while providing a relatively low-maintenance right-of-way.

Comment: *For any actions that may take place on the Hanford Site, BPA must consult with the US Fish and Wildlife Service which manages these lands for DOE-RL [and] . . . BPA must consult the document Biological Resources Management Plan.*

Page 164, Herbicide Impacts: The Hanford site has a Weed Control Plan. A copy will be provided to BPA.

Page 165, Mitigation Measures: at Hanford a Cultural Resource Survey is needed before any ground disturbance is done. [#22]

Response: Thank you for the information. This information has been given to the Natural Resource Specialist in charge of Bonneville vegetation management in your area for use when working with you for vegetation management activities on the rights-of-way crossing the Hanford Reservation.

Comment: *Page 59, last bullet: add "and the U.S. Department of Energy." . . .*

Page 131, Land Use Section: Add a Section for the Hanford Site. Indicate that "Coordination must be done with DOE, Richland Operations Office and the U.S. Fish and Wildlife Service for actions that take place on the Hanford Site". . . .

Page 132, Under Washington add a discussion on Federal Lands in Eastern Washington, such as DOE. . . .

Page 135, 5th paragraph: U.S. DOE also complies with NEPA. . . .

Pages 184 and 185: Need to include discussion of other federal managed lands (DOE, etc.) [#22]

Response: Thank you for your comments regarding coordination needs with DOE on the Hanford reservation. We have added information to address federal lands (including Hanford) more completely in chapters III, V, and VI.

Identify Natural Resources

Comment: *However, since there are differences in environmental fate among herbicides, the use of generic riparian buffer and herbicide-free zones for all herbicide applications is not justified. [#40]*

Response: Thank you for your input. We have added the consideration of aquatic toxicity ratings to the process for determining buffer widths. At the site-specific level, Bonneville will consider all aspects of the herbicide formulation in determining appropriate herbicides and buffers widths for use.

Comment: *An analysis of the new (just now being drafted) Washington State Department of Ecology's Storm Water Manual - Vols 1-5. How will that document fit in? [#6]*

Response: Bonneville has reviewed the draft Manual; we would be in compliance with the Manual as written.

Comment: *What methodology is used to detect these [streams and wetlands] areas? During Rashin's pesticide study it was noted that not all stream channels were identified prior to pesticide application. Methods to identify flowing water included aerial viewing and road crossings. We suggest that all streams and wetlands be field verified and their buffers flagged prior to any maintenance activity. [#14]*

Response: Streams and wetlands would be identified with a combination of plan and profile maps, aerial photos of our system, USGS or other maps, and some field verification. Depending on the site-specific circumstances, buffers would be flagged. Applicators would have tools such as aerial maps of the right-of-way with buffer areas and other sensitive area information marked.

Comment: *Riparian Protection: 2) Table III-2 Herbicide Free Zones (page 62) should be expanded to describe how close to natural streams the various proposed herbicides can be used. [#36]*

Comment: *The management proposal does not address buffers on streams and wetlands. We have concerns about the protection of these critical areas and recommend the following: pesticides should not be used in areas associated with water or riparian/wetland vegetation. [#14]*

Response: Buffer zones for riparian areas are addressed in the EIS (Tables III-1, III-2, VI-2, and VI-3). These buffers consider herbicide application techniques; we have added the consideration of herbicide aquatic toxicity ratings in defining appropriate buffer widths. Buffer widths may be more strict than those proposed in the EIS, depending on site-specific requirements or circumstance.

Comment: *Due to the fact that there are a number of domestic water systems, particularly within the first four towers south of the Alsee River, I don't want to see any herbicide application in those areas.*

They have a number of surface systems in the area and some wells south of the first four towers. [#25]

Response: Thank you for informing us of these water systems. Your comment has been given to the Natural Resource Specialist in charge of vegetation management in your area. With this information, the Specialist will know to provide adequate no-spray buffer zones around these sites. If you receive notification (through our planning steps) about upcoming vegetation management of lines in this area, it would be helpful to remind us of this information.

Comment: *[C]larify the language on page 61 under the Section 404 discussion. The sentence in parentheses should be revised as follows: (In certain circumstances vegetation debris left in a stream or wetland could be considered fill material for purposes of Section 404 of the Clean Water Act. Questions concerning the regulation of particular activities under Section 404 should be directed to the Regulatory Branch of the local U.S. Army Corps of Engineers District Office.) [#34]*

Response: Thank you. A change to this effect has been made.

Comment: *The Service agrees that the procedures outlined under Planning Step 3 will permit project managers to comply with the provisions of the Endangered Species Act, as amended. However, we recommend that BPA consider, for the sake of efficiency, a programmatic consultation at the appropriate level (e.g., state, watershed, or species). We also recommend that any such programmatic consultation address potential project impacts to all species proposed for listing, regardless of whether BPA reaches the statutory conference threshold of being likely to jeopardize such proposed species. [#40]*

Response: Thank you for noting that the procedures would allow for compliance with the Endangered Species Act. Bonneville has in the past entered into programmatic consultations for efficiency, and we will continue to do so where appropriate. For example, we are currently consulting with the National Marine Fisheries Service (NMFS) and USFWS on transmission facility maintenance activity effects on listed fish species throughout our service territory. As recommended, our normal practice is to consult on both proposed

species and listed species, whether our actions are likely to jeopardize the species or not.

Comment: *Canada Lynx - Due to the recent proposal to list the Canada lynx (Lynx canadensis) as threatened and potential impacts to lynx from the proposed vegetation management program, it is appropriate to provide comments specific to this species. . . . the Canada lynx is a USFS sensitive species, a Northwest Forest Plan "survey and manage" species (in Oregon and Washington), and is listed as a threatened species by the State of Washington. The proposed BPA vegetation management activities would potentially impact Canada lynx throughout their range. The abundance of snowshoe hares significantly influences lynx populations. Prime snowshoe hare habitat includes . . . conditions often found beneath BPA transmission lines at higher elevations. To be available for snowshoe hare during the winter months, forage cover must be 6 to 8 feet tall where average snow depth does not exceed 3 to 4 feet). Some hardwoods, particularly willow, are also used by snowshoe hares during the winter months). Providing adequate winter forage for snowshoe hares is a key component of maintaining or expanding snowshoe hare and Canada lynx populations. The habitat beneath transmission lines provides lynx forage cover if it consists of at least 4,700 stems or boughs per acre (1,210 trees per acre, 8 feet tall, with 6-foot spacing). This height and spacing provides adequate snowshoe hare forage and cover during average winter snow depths. The BPA management approach of promoting "low-growing plant communities" in rights-of-way using herbicides or other vegetation control methods is incompatible with management for hare and lynx. Impacts to lynx would be minimized by maintaining dense thickets of coniferous/deciduous vegetation of adequate height. [#40]*

Response: Bonneville does have some rights-of-way through Canada lynx habitat. Since your comment, the lynx has been listed as threatened. Bonneville will enter into consultation with USFWS as appropriate at the site-specific or programmatic level, and will need to follow specifications resulting from that process. This information has been forwarded to the Natural Resource Specialists in charge of vegetation management in areas with potential lynx habitat. (Please note that the existing rights-of-way have been in place for many years. Operation of these facilities requires vegetation control. Tall trees cannot be allowed to grow over a certain height in the right-of-way because of electrical safety and reliability reasons. Bonneville can not

allow trees to grow more than 14 feet tall under most rights-of-way. Keeping trees 8 feet tall may not be feasible because of the constant cutting that would be required to keep them both tall enough for the hare and short enough for the lines. Remaining with a cyclical management approach, allowing trees to grow to the maximum allowable height, then cutting, would provide some snowshoe hare habitat for a short period of time before being cut. Converting the right-of-way to low-growing species may allow for naturally low deciduous thickets, but not conifers.) We hope that, through consultation, we can work through these issues for appropriate action. Thank you for reminding us of this issue.

Comment: *We recommend that you conduct detailed ground surveys for listed plant species, particularly Spiranthes diluvialis (Ute ladies'-tresses) along the South Fork of the Snake River in eastern Idaho, prior to implementing any form of vegetation management in areas where this species is known to occur or areas that support potential habitat for this species. If this species is found in the project area, efforts to avoid impacts to S. diluvialis should be pursued. [#16]*

Response: Thank you for your recommendation. The planning steps require that the presence of T&E species be determined. For site-specific projects in areas that could support this species, ground surveys will be conducted and mitigation measures implemented, as appropriate.

Comment: *Finally, the document states that formal consultation is not needed for species previously consulted on, such as the marbled murrelet. . . . this program constitutes a new action and as such, if effects are likely to be expected from this new action, consultation on all currently listed species must be conducted. [#40]*

Response: The former consultations for marbled murrelet and spotted owl appear still to be valid for the timing restrictions and actions of manual and mechanical means of vegetation control and tree removal. For these actions, there is no new proposed action that has not been previously consulted. However, we realize that herbicide use (other than the physical presence of workers and noise disturbance) was not included in these prior consultations; therefore, new consultations would need to be done for these species for any herbicide

use. Thank you for bringing this to our attention. Changes in the text (Planning Steps) reflect this need for additional consultation.

Comment: *The corridor near Lowell was mentioned extensively in the watershed analysis for Lookout Point. The BPA corridor is located in and around western pond turtle (a Forest Service Region 6 sensitive species requiring special management) habitat. Specifically, timing of vegetation management needs to take into account the migration of pond turtle mothers through the corridor for nesting. [#33]*

Response: This is a good example of the type of information that needs to be used in developing site-specific right-of-way management plans with the Forest Service for corridors crossing Forest Service-managed lands. As you mentioned, in this circumstance an appropriate mitigation measure would be to time vegetation management activities so that they would not interfere with the migration of mother pond turtles. Your comment will be forwarded to the Natural Resource Specialist in charge of Bonneville vegetation management activities in your area.

Comment: *Page 174, Mitigation Measures: Hanford shrub-steppe has not been designated as Critical Habitat, but the State of Washington has classified it as "priority habitat." [#22]*

Response: Thank you. We have added a mitigation measure to contact state agencies to determine potential impacts (and ways to avoid impacts) on state-listed species and habitats.

Comment: *We applaud BPA's effort to integrate environmentally preferred alternatives into the program and encourage the implementation of any habitat enhancing measures for fish and wildlife that can be undertaken as part of the program (i.e., allow for the growth and establishment of low growing vegetation, leave debris and brush piles in place to provide habitat, and top trees while leaving the stumps in place). [#40]*

Response: Thank you for your comments. We hope to promote low-growing vegetation along the right-of-way where possible. The other type of measures (leaving brush piles and topping trees) that 3you have mentioned can be carried out at many sites, depending on the

landowners and other particularities of the site (fire potential, visual sensitivities). We have added these measure to the planning steps for consideration when possible.

Comment: *Prior to the site specific use of chemical control methods via spot, localized, broadcast and especially aerial applications, we urge BPA to work closely with the [USFWS's] field offices to minimize effects to non-target species. [#40]*

Response: We agree. Bonneville plans to work with the USFWS prior to site-specific actions as outline in our planning steps.

Comment: *Fourth, the mitigation measures for soils state BPA will "consider reseeding or replanting seedlings on slopes with potential erosion problems." (emphasis added) The Department requests that BPA actually reseed or replant seedlings on slopes with potential erosion problem (rather than just considering doing so), for slopes with 10 percent of soils exposed. [#21]*

Response: Thank you; we have changed the mitigation measures to read "Reseed or replant on slopes with potential erosion problem, and/ or take other erosion control measures as necessary."

Comment: *This letter is to reiterate and clarify previously communicated concerns and recommendations of the Klamath Tribes on the Draft EIS for the BPA Transmission System Vegetation Management Plan. The Klamath Tribes' Natural Resource Department has reviewed the DEIS. The DEIS was also discussed with the Klamath Tribes' Culture and Heritage Department Director. Following are comments and recommendations.*

It is important to ensure that proper consultation occurs with potentially affected tribes during NEPA planning of site-specific vegetation management projects. Though chapter three includes text pertaining to tribal consultation, this section [should] be revised to more clearly describe the need for tribal consultation.

Maps of the general area of concern to the Klamath Tribes are enclosed for reference and, if appropriate, inclusion into the Final EIS. Additional pertinent information on the history of the Klamath Tribes is also included.

The enclosed maps depict the area recognized by the U.S. Government as the homeland of the Klamath, Modoc, and Yahooskin Band of Snake Indians during negotiation of the Treaty of 1864 (CEDED LANDS). [Now jointly referenced as the "Klamath Tribes."] In terms of cultural resource protection and management, the homeland of the three tribes is often referred to as "The Klamath Tribes' Area of Cultural Influence." Because artifacts attributable to the Klamath Tribes have also been discovered outside the area depicted on the maps, it is recognized that the maps describe only the Tribes' general area of concern.

[N]ote that this area was not used exclusively by the Klamath, Modoc, and Yahooskin Band of Snake Indians, and that historical use by other tribes and bands overlap in some areas.

Though the Klamath Tribes were "terminated" from federal recognition as an Indian tribe in 1954, the Tribes' rights to hunt, fish, trap and gather, free of state and federal regulation, survived "termination." The Tribes currently exercise these rights within the former reservation boundary. In addition, there are locations outside of the 1954 Treaty Boundary within the Tribes' area of concern where tribal members continue to gather traditional plants, roots, berries, etc., and where other cultural, religious, and spiritual activities are practiced.

Because of potential impacts to fish, wildlife, and their habitats, plants and other resources pertinent to the exercise of treaty rights, it is imperative that the Tribes be consulted during consideration and planning of site-specific vegetation management projects within and adjacent to the former reservation boundary area. It is important to note that because of the migratory nature of fish and wildlife species relied upon by the Tribe's management concerns often extend beyond the former reservation boundary.

Because of potential impacts to cultural resources, and cultural, religious, hunting, fishing, gathering and other Treaty uses, the Klamath Tribes request to be informed of all site-specific projects that will be considered or planned within The Klamath Tribes' Area of Cultural Influence.

Where appropriate, the Tribes may wish to participate in development of site-specific mitigation measures to ensure protection of cultural resources and cultural/religious uses and values important to the Tribes. [#42]

Response: We appreciate the Klamath Tribes' time taken to review and comment on Bonneville's EIS. We acknowledge that the Klamath Tribes has membership of three distinct Tribes that exercise hunting, fishing and gathering rights within former Reservation boundaries and areas of concern. As suggested, we have revised Planning Step 3, Identify natural resources, cultural resources, to clarify the need to coordinate and consult at the site-specific level to determine potential impact son cultural resources. It is at the site-specific level that we can determine together the appropriate mitigation measure, if needed. We have forwarded the maps you have provided to the Natural Resource Specialist in charge of Bonneville's vegetation control in your area, so the Specialist will know where to engage the Tribe in consultation on projects. We look forward to your participation at the site-specific level. Thank you again for your comments.

Comment: *An individual from the Confederated Tribes of the Warm Springs Indian Reservation that worked in cultural resource section commented that Bonneville needs to consider the value of the Tribe's cultural site when planning vegetation control activities. [#31]*

Response: Bonneville will look to the Confederated Tribes of the Warm Springs Reservation to provide information regarding the value of the Tribes' cultural sites when planning vegetation control actions on rights-of-way over the Reservation and ceded areas. In this way, the Tribes can make sure there is appropriate consideration of their Tribe's cultural sites when Bonneville makes decisions about control methods.

Comment: *Tribal fishing, hunting and plant gathering areas extend much farther than reservation boundaries, and include the traditional use areas of the twelve tribes comprising the Colville Confederated Tribes. Because the Tribes retain rights in ceded and traditional use areas, Tribal representation on ROW management plans developed for off-reservation areas used by the Tribes (in addition to management plans for the reservation) are necessary.*

Snoqualmie Pass, Moses Lake, Stevens Pass are some examples of Colville Confederated Tribes gathering areas. Some of the plants that are gathered annually by Tribal members include huckleberry, elder berry, mushrooms, willows, a variety of celery's, potatoes, carrots, camas root, bitter root etc. We should have the opportunity to

represent our interests in areas that are traditional [Colvilles did not sign any document abdicating their rights.] [They will send Bonneville a map of Colville's traditional use areas.] Spiritual values of burial sites must be considered as well as managing ancestral remains. Although you may not disturb the ground, herbicide spraying above the ground may impact spiritual value. If lines cross burial sites, some tribal members would not like herbicide used on those sites - others might want herbicide use if it controls knapweed.

This is an opportunity for weeds to be managed together with cultural resource and traditional use area management. [#13

Response: Thank you for reminding us of the need for your input in areas outside of Reservation boundaries, and in traditional use areas. Bonneville has included in the final EIS, as part of our planning steps, a need to notify interested Tribes of up-coming site-specific vegetation management activities in areas of interest to them. This contact would be done to determine the presence of traditional gathering plants or other cultural resources and to determine the desired level of involvement of the tribe. We look forward to the opportunity to manage weeds together with cultural resources and traditional use area management. Please see additions in Chapter III, and Chapter VI cultural resource sections.

Comment: *It is a federal responsibility to identify and avoid burial sites if present. Even if identified, burial sites are not always managed respectfully. To better ensure burial sites aren't impacted during vegetation control activities, burial site locations should be recorded in a database so information is retrievable and accessible to managers prior to issuing work contracts. [#13]*

Response: As a federal agency, Bonneville must determine whether its actions could potentially affect historic and cultural resources (i.e., whether actions could cause impact and whether the resources are present). If Bonneville's actions could affect burial sites, then we must determine whether sites are present. By engaging Tribes on site-specific projects in their interested areas, we hope that the Tribes will be able to help determine potential for impacts.

Regarding databases of burial site locations, this undertaking would need to be considered area by area, with consideration of the area Tribes' sensitivity to recorded locations that are easily accessible.

Comment: *Thank you for the chance to comment on the Bonneville Power Administration's Transmission System Vegetative Management Program DEIS. Our meeting with Stacy Mason of the BPA was very informative and we consider this meeting the beginning of a cooperative effort to protect cultural resources on BPA managed transmission rights-of-way. [#41]*

Response: We thank you for taking the time to review the EIS, meet with us, and submit comments on our program. Your comments are essential to ensure that site-specific work is done in consultation with the Confederated Salish and Kootenai Tribes.

Comment: *. . . we wish to address the apparent lack of an intensive cultural resource survey within the BPA transmission line corridors and at electrical facilities on and adjacent to the Flathead Indian Reservation. We are unable to locate any record concerning prior cultural resource survey or National Historic Preservation Act consultation with the Confederated Salish and Kootenai Tribes on BPA transmission lines on or off the reservation in northwestern Montana. Lacking specific cultural resource data, it is simply impossible to assess proposed vegetation control impacts on cultural resources, or ongoing impacts to cultural sites from other transmission line management activities. [#41]*

Response: We recognize that many of the lines were built before the Section 106 of the National Historic Preservation Act regulations that are now in place; as such, cultural resource surveys may not have been conducted. In the past we have assumed that, if there were no ground-disturbing actions taking place within the right-of-way, surveys were not needed. However, we acknowledge that your views may differ in this respect. We will work with you to address these concerns as we develop a right-of-way management plan together.

Comment: *. . . for the Confederated Salish and Kootenai Tribes, cultural resources include traditionally used cultural plant communities and plant harvest and processing areas as well as archaeological properties. Tribal elders have expressed their concerns in the past that chemical agents may pollute the native cultural plants they use for food, medicine and ceremony. Therefore, we believe that certain manual, biological and chemical vegetation control measures can adversely impact traditional cultural use*

properties and archaeological sites, and that these impacts should be taken into account under Section 106 of the National Historic Preservation Act. [#41]

Response: We are confident that, by working together and developing courses of action (such as identification of cultural plants, timing restrictions, posting of treated areas, or a need to only perform spot treatments of herbicides on targeted plants), we can alleviate concerns of potential polluting of native cultural plants.

Comment: *The Confederated Salish and Kootenai Tribal Preservation Office is responsible for protection of historic and prehistoric cultural resources on the Flathead Indian Reservation and also has an obligation to protect cultural resources off the reservation within our ceded or aboriginal territories. These rights and responsibilities are clearly delineated within the 1999 revised regulation for implementing Section 106 of the NHPA. Therefore we provide the following recommendations.*

- *Implement a cultural resources inventory including a traditional cultural plant survey within the transmission line corridors and electrical facility sites on and adjacent to the Flathead Indian Reservation to identify cultural plant communities and other cultural resources.*
- *Develop a right-of-way management plan in consultation with the Confederated Salish and Kootenai Tribes for power system corridors on and adjacent to the Flathead Indian Reservation.*
- *Employ tribal members to perform management tasks on and adjacent to the reservation.*
- *Use Confederated Salish and Kootenai Tribes vegetative guidelines on and adjacent to the Flathead Indian Reservation.*
- *Define a consultation protocol with the Confederated Salish and Kootenai Tribes Preservation Office for potential impacts to cultural resources on and off reservation.*

We look forward to an opportunity to meet with you or your staff soon to discuss these recommendations. We believe that it is critical to continue consultation with Joanne Bigcrane, Confederated Salish and Kootenai Tribal Ethnobotanist, concerning native plant revegetation and the posting of chemically treated plants in plant harvesting areas.

Our staff is also prepared to undertake the cultural resource studies recommended above in conjunction with the Salish and Kootenai Culture Committees and the Elders Advisory boards. [#41]

Response: Thank you for letting us know your interests, responsibilities, and recommendations regarding our vegetation management activities and cultural resources in your area of interest. We recognize the Confederated Salish and Kootenai Tribes' rights and responsibilities for protection of historic and prehistoric cultural resources. We look forward to developing a right-of-way management plan in consultation with your Tribe in order to address the recommendations you offered here. As we have discussed with you, a qualified person on our staff has been assigned to work with your staff on these recommendations.

Determine Vegetation Control Methods

Comment: *Mechanical methods should be used sparingly, and only where soil conditions and wildlife can readily tolerate such invasive procedures. [#26]*

Response: We agree. Soil-disturbing mechanical methods would be used only in certain situations, such as where total vegetation management is needed (because of the non-selective nature of this type of mechanical clearing), where slopes are less than 20%, and when the ground is sufficiently dry to sustain heavy equipment.

Comment: *…consider applying the herbicide at less than the maximum label rate where the lower level is efficacious. [#34]*

Response: Thank you for your comment. Manufacturers and EPA have attempted, as best as possible, to minimize herbicide use by very carefully outlining application rates that are most effective for the type of target plant and application method. To use *less* than the amount indicated on the label for a particular plant or application method runs a real risk of under-application. The target plants would then require a second application at the recommended rate. This would not only increase the amount of applied herbicide, but would also double all of the risks associated with applying the herbicide in the first place.

Comment: *As part of Planning Step 4 (Determine Vegetation Control Methods), specific weather restrictions are presented as one mitigation measure to reduce herbicide drift and leaching. However, as*

described in Chapter IV, geology and soil types also are important in determining if herbicides will migrate to water resources. We recommend that climate, geology, and soil types be included in Planning Step 4 as factors to consider in selecting vegetation control methods. [#40]

Response: Thank you; we have added consideration of climate, geology and soil types in the selection of the herbicide active ingredient and formulation (granular versus liquid).

Comment: *Vegetation management projects should select herbicides, application rates, and methodologies that are the least disruptive for adequately controlling the weed situation. [#34]*

Response: We feel that the planning steps will provide good guidance for an integrated management approach to choosing methods that are the least disruptive.

Comment: *We also suggest the use of secondary containment of chemicals during transportation and storage to reduce the risk of a spill. Due to the potential for additive and synergistic interactions between chemical compounds, the use of two chemicals as a mixture should be used sparingly and with great caution in order to minimize environmental repercussions. It is imperative when formulating your tiered project specific planning steps to take into consideration the comments listed above. [#40]*

Response: Bonneville stores herbicides in specially designed "herbicide storage buildings" that have secondary containment as well as other unique features. The transport of herbicide requires special licensing by each state within Bonneville's operating area. In addition, the herbicides must be properly loaded, placarded, etc. Not all of the chemicals listed by Bonneville can legally be mixed. Those that can be mixed have been considered; they are identified and listed on the toxicological tables (Tables VI-6 and VI-7).

Comment: *An individual from the Confederated Tribes of the Warm Springs Indian Reservation commented that extreme care should be taken to ensure that herbicides are correctly applied. [#31]*

Response: We agree. Bonneville intends to fully carry out all application instructions, as provided by the label of the registered product, particularly with respect to human health standards and environmental hazards. In many cases Bonneville will exceed the label instructions by applying its own best management practices (BMPs), i.e., use of riparian buffer zones and pesticide-free zones.

Comment: *Will Bonneville map all rights-of-way to determine soil conditions, slope, etc. in order to determine whether or not granular herbicides should be prohibited (S-7)? [#26]*

Response: Mapping of general soil types both along rights-of-way and at substations will be available for use when determining which herbicide active ingredient and formulation (granular versus liquid) to use.

Determine Debris Disposal and Revegetation Methods

Comment: *Will BPA allow removal of vegetation along the right-of-way by the general public? [#30]*

Response: Bonneville's rights-of-way are easements across private, public, or other landowners' land. Those landowners may control the vegetation under the line on their land. However, if tree heights come within a certain distance of the line (the *minimum approach distance* – please see Appendix E for more information on Clearance Criteria), the vegetation must be removed by an electrically qualified person for safety reasons. Since Bonneville does not own the land under most of our rights-of-way, we can not give permission for the general public to clear vegetation along the right-of-way.

Comment: *Reseeding (S-9). When reseeding is undertaken, will native species be used? Will the Administration select plants that will provide food, hiding cover, thermal cover, nest sites, etc. for grizzly bear, elk, migratory birds and other wildlife? [#26]*

Comment: *We recommend seeding only native and preferably indigenous plant and grass species. Using native/indigenous species which are climatically adapted to geographic areas raises the survivability rate and helps control the introduction of non-native/noxious weed species. Studies have also shown that native, indigenous plant species provide higher food values to animal species adapted to these regions. [#14]*

Response: Thank you for your questions/suggestions regarding native seed species. Bonneville uses native seed to the extent practicable. When considering the appropriate seed, we consider 1) the need for reseeding (whether to control erosion, help establish low-growing plant communities, or to replace a noxious weed community), 2) the ability of the seed to establish, 3) other site circumstances (such as wildlife or forage enhancement), and 4) the costs.

Bonneville often defers to the state fish and wildlife department for recommendations of species helpful to wildlife. Non-native species that will take hold and compete against noxious weeds are sometimes a better option than native species. However, our seed mixtures generally do carry a high percentage of native seeds that would also provide wildlife benefits. Also note that the seed mixtures Bonneville uses are certified as free from noxious weeds.

We try to use native seed where possible, but such use is not always feasible or suitable. Often we use a mix of native and desirable non-native species. In all cases, more than one goal or purpose can be met by species selection, or by developing mixtures of species that address the many site variables on each treatment project. Bonneville uses expertise from many sources to help select and establish vegetation on projects, including Cooperative Extension, Washington State Department of Fish and Wildlife; agricultural colleges and universities; and the Natural Resource and Conservation Service.

Note that native seed is not always part of recommendations for wildlife values. For example, to benefit big game and wild turkeys, the Washington State Fish and Wildlife Department often recommends seed species that includes a variety of desirable non-natives such as white, red, Dutch, and ladino clover; birdfoot trefoil; and ranger alfalfa.

The costs and availability of native seed can make it unfeasible for exclusive use. In some places the costs can be as much as ten times the cost of desirable non-native seeds.

Some recent Bonneville reseeding projects used mixtures with 25-45% native seeds by weight. The mixtures included big bluegrass, sheep fescue, slender wheatgrass, thickspike wheatgrass, Basin wildrye, small burnet, and western wheatgrass, which are all classified as native species for the area in which they were used. These species have been readily available and are easy to establish on right-of-way sites. They have other values as well: slender wheatgrass, western wheatgrass, and thickspike wheatgrass are sod-forming grasses that are considered

to be competitive with tall-growing species; sheep fescue is showing an ability to be competitive against some noxious weeds such as yellow star thistle, and big bluegrass has a high value in wildlife plantings.

Prepare Appropriate Environmental Documentation

Comment: *BPA can greatly assist Forest Service decision makers by documenting environmental effects and considerations in a more complete statement than a checklist [#32]*

Response: The Bonneville environmental documentation will be in the form of a Supplemental Analysis tiered to the EIS, as appropriate. Some clarification has been made in the Planning Steps, Prepare Appropriate Environmental Documentation section.

Other Requirements

Comment: *Page 195, last paragraph: is "nearby residents" an Environmental Justice concern? Are there lower income people that live closer to the corridors than others? [#22]*

Response: There are residents of varying income levels and races who live along our lines. Program-wide, there is no clear income level or race that is more or less likely to live along the line (many of our lines originally crossed farmland or forest land that has since been developed into suburban housing). When new lines are located, environmental justice issues are considered when determining appropriate routing alternatives.

Comments and Responses to *Program Alternatives* (Chapter IV)

General

Comment: *I do not like: the policy that "no action" could be considered a management action. [#2]*

Response: Federal agencies are required to consider the "no-action" alternative when making decisions that could affect the environment. The no-action alternative in the context of this EIS means "keep doing what we are doing now," or current practice.

Comment: *I do not like the use of "Environmentally Preferred Alternative". This reference is not in the best interests of long term*

vegetation management. Invasive weed species without their natural parasites or pathogens from their original homeland love to flourish in these areas. Uncontrolled rapid growth of exotic weeds is not in the best interests of the environment. A do nothing approach as suggested by anti-herbicide groups is definitely anti-environmental. [#8]

Response: NEPA requires Bonneville to identify the alternative we have found to be the most *environmentally* preferred (this doesn't include cost or reliability factors). We think that the environmentally preferred alternatives are MA2, R2 (mixed methods with spot and localized herbicide applications), and VS2 (herbicide applications for noxious weed and deciduous species only). We assume by your comment that you feel noxious weeds can't be controlled effectively by limiting noxious weed treatments to spot or localized herbicide treatments. We agree that noxious weed control would be difficult with backpack sprayers alone. Bonneville relies heavily on working with county weed boards that treat our corridors as they treat much larger areas of infestations. Given that, the environmentally preferred alternatives for the methods package would actually be a combination of R2 (for tall-growing species) and R4 (for noxious weed control).

Comment: *You can improve the choices by being scientific and not giving in to public action groups that claim to be "environmental." [#8]*

Response: Our goal is to objectively analyze the need and the potential impacts, develop mitigation measures to reduce impacts, and hear all public comment. Public comment helps us make sure we have considered all aspects of the program needed to make good decisions.

Comment: *Overall we feel the document does a good job of providing alternatives for management of vegetation . . . [#33]*

Response: Thank you for your comments.

Comment: *EPA has rated this DEIS EC-1. The rating of "EC" indicates that EPA has environmental concerns with the preferred alternatives. We suggest measures to reduce the environmental impacts of these alternatives. The rating of "1" indicates that the analytical information presented is adequate, although we suggest some clarifying language. [#34]*

Response: Thank you for taking the time to review and offer measures to further enhance the program. Please see your other comments through out this chapter for responses.

Comment: *The [Panhandle Weed Management Area Steering Committee] voted unanimously to support BPA's preferred alternative for vegetation control. [#20]*

Response: Thank you for your comment and support.

Right-of-way Management Approach

Comment: *I prefer: . . . MA2. You can improve the choices by: eliminating all but . . . MA2. Do not weaken your position or stance by accepting any choice but . . . MA2. [#2]*

Comment: *I prefer MA2 on right-of-way. Your idea of controlling all vegetation as necessary while establishing ground cover will prove to be the best economically and environmentally. [#28]*

Comment: *Of the choices offered in the Draft EIS, I prefer any methods that give the biggest amount of tools in the tool box. This appears to be . . . MA2 . . . Anytime we can save money on high cost items - especially labor - and still reduce weeds and propagate a plant community of desirable vegetation that will reduce weeds and tall plants, I'm all in favor of it. [#8]*

Comment: *Approach: We support the overall approach described in Alternative MA2 using Integrated Vegetation Management. We feel as if the overall management strategy, to focus on creating low-growing (preferably native) plant communities under powerline corridors, is a sound one. [#33]*

Comment: *EPA agrees with Bonneville's preferred management approach (alternative MA2) that allows use of herbicides in combination with other methods to promote low-growing plant communities at rights-of-way. This approach should minimize impacts on non-target species. [#34]*

Response: Thank you for your comments and support.

Comment: *I would vastly prefer a hedgerow approach where low growth vegetation is promoted to limit destruction of fish and wildlife habitat. . . . . We need to keep as much green stuff as we can in a number of species, not just grass. [#15]*

Response: We agree; thank you.

Comment: *What low growing species do you plan to use that will out-compete noxious weeds? [Are any low growing species] suitable for roadside use? [#28]*

Response: It is difficult to out-compete noxious weeds; that is why they are a problem. Reseeding disturbed areas with desirable grasses and shrubs will help. Below is a list of low-growing species that are desirable in the rights-of-way or along our access roads.

grasses	ninebark	rabbitbrush
sedges	vine maple <14 ft. tall	vaccinium
forbs	manzanitas	bitterbrush
legumes	rhododendron	snowberry
bracken fern	current	rosa
salal	sagebrush	ceanothus
bearberry		Oregon grape.

For desirable plants along county or city roads, we would refer your question to a local road department.

Comment: *Alternative MA2 (S-11) [Alliance for the Wild Rockies (AWR)] supports this alternative assuming that native plants will be used and habitat improvements will be incorporated into this program. The reliance on spot-herbicide treatments should be minimized or eliminated. . . . AWR supports the MA2 alternative, with a focus on manual and biological control agents. [#26]*

Response: Overall, Bonneville would rely on promoting low-growing plant growth on rights-of-way. Actual plantings or reseeding would only be done in specific circumstances (e.g., potential erosion areas, places where natural revegetation is not likely). Low-growing plant growth can be promoted by eliminating tall-growing vegetation before it is tall enough to shade or compete with other desirable species, treating deciduous tall-growing species with herbicide to ensure there will be no resprouting, and performing maintenance using selective methods that will not disturb existing low-growing plants. Plants to revegetate the space will be those that can be seeded from surrounding plants or that are in the soil and will sprout with favorable

conditions. Whether native plants or seeds are used for plantings or reseeding would depend on many factors.

Comment: *In your Right-of-way Program, we support Alternative MA2 (promotion of low-growing plant communities). [#29]*

Response: Thank you for your input. We note that you support MA2 if herbicides are used for noxious weeds only (your support for VS1 is expressed in a subsequent comment). Based on our analysis and observations of the success of other utilities, we think that promoting low-growing plant communities would lessen both environmental impacts and maintenance costs in the long run. Though you support Alternative MA2, you also support Vegetation Selection VS1. Please note that it is not feasible to "arrive at" low-growing plant communities without some herbicide use to control deciduous tall-growing species. When cut, deciduous species resprout rapidly and grow back more densely than before they were cut. We have found that if we do not treat the plant so that it stops growing, we can not get to a community of low-growing plants that requires little vegetation maintenance.

Comment: *I would like to see consideration given to native vegetation to propagate your plant community, not just low growing grasses and forbs from where-ever. [#8]*

Response: Most of the low-growing vegetation will not be from seeding or plantings, but will occur as the natural vegetation encroaches from the adjacent landscape. (For example, in some places where we have promoted low-growing plants, grasses, rhododendrons, hazelbrush and snowberries have established on site.) If noxious weed encroachment is a potential, then reseeding with a mix adaptable to the site would be used.

Comment: *The [Squaxin Island] Tribe advocates the use of manual and mechanical methods as well as the planting of low growing native plant species. . . . The Tribe supports the use of low growing vegetation to out-compete other plant communities as a way of controlling undesirable plant species. [#14*

Response: Thank you for your perspective.

Comment: *Low-growing is better than herbicides. [#30]*

Response: We agree that the ultimate way to control tall-growing vegetation on the rights-of-way is to have low-growing plants that keep the tall-growing plants from sprouting in the first place. Getting to low-growing plant communities will take several cycles of maintenance that, in many cases, will require the use of some herbicides. Once low-growing plants are established, there will still need to be a mix of methods to treat/cut the tree saplings that are able to sprout through the ground cover of low-growing plants.

Comment: *You may wish to consider cycle length and type of cycle in your evaluation. Frequently vegetation on an entire rights-of-way does not develop at the same rate. However, a utility frequently treats everything as the slower growing vegetation will not wait until the next cycle. We utilize a "just in time" cycle. In this cycle, a vegetative cover type or tree is not worked until actually needed. THIS REDUCES THE COST PER YEAR TO MAINTAIN THE ENTIRE SYSTEM. Cycles within cycles require more intense planning and are trickier to manage but can reduce the frequency of impact for many sites and save money. A "just in time" cycle also reduces the visual impact to a right-of-way. [#5]*

Response: Thank you for offering this consideration. We believe this approach falls within Alternative MA1, Time-driven, because it calls for a cyclical vegetation management, with more frequent cycles. We didn't break this multi-cyclic process out of Alternative MA1 because, although specific vegetation may not be affected as often with this approach, overall impacts could be greater because of increased number of site visits and the cutting of larger trees. It would also seem that costs could go up for the same reasons. Reliability could be a problem when waiting to cut trees just before they become a threat to the lines, because there is a greater potential for some trees to grow more quickly than expected and actually grow too close to the lines.

Right-of-way Methods Package Alternatives

Comment: *Based on my personal scientific and technical knowledge, I believe the use of a combination of the chemical, mechanical and manual methods outlined in the EIS will be effective and can be carried out with little or no adverse environmental impact or impacts on the health of humans. [#19]*

Comment: *In general the [USFWS] supports the integrated approach which uses manual, mechanical, biological, and chemical methods to control vegetation on Bonneville Power Administration's (BPA) electric facilities, namely rights-of-way, electric yards, and non-electric facilities. [#40]*

Response: Thank you for your scientific review and comment. We think that this integrated approach is a good combination of providing effective vegetation control and environmental stewardship.

Comment: *I prefer: R2. [#7]*

Comment: *Alternatives R2 or R3 are both consistent with the methods outlined in our new EA. The Willamette EA addresses manual, mechanical, biological and herbicide control methods in powerline corridors. Treatment methods will be dominantly spot and localized, although some boom spraying from ATV's or trucks could be done. [33]*

Response: Thank you for your comment.

Comment: *We support Method package R3 (herbicides permitted with spot, localized, and broadcast application). [#29]*

Response: Thank you for stating your preference. We note that you would prefer that herbicide applications be used for noxious weed control only (your support for VS1 in a subsequent comment). As part of our program to help control noxious weeds throughout our system, we work with county weed boards. Some of the county weed boards and private landowners use aerial applications for treatment of weed infestations in their areas. We team with some of these parties to monitor and treat our rights-of-way as part of their area-wide treatments. Method package R3 would eliminate this possibility.

Comment: *I prefer: R4 . . . . You can improve the choices by: eliminating all but . . . R4 . . . Do not weaken your position or stance by accepting any choice but R4. [#2]*

Comment: *Of the choices offered in the Draft EIS, I prefer any methods that give the biggest amount of tools in the tool-box. This appears to be R4 . . . . [#8]*

Comment: *[Because of concerns for noxious weed control] we are supportive of your preferred alternative R4, which approves all methods of control. [#24]*

Comment: *R4, best alternative. [#28]*

Response: We also like this alternative because it gives us the most flexibility for the many different site-specific situations. We would combine this alternative with the planning steps to help determine the appropriate tools for the given environment.

Comment: *BPA needs to keep all possible methods of "management" available to maintain safe and effective power production and transport. [#2]*

Response: Thank you for your comment. Having all possible tools in the tool box allows us the most flexibility in determining the best way to control vegetation on a particular site.

Comment: *I believe we can use herbicides to establish this desirable plant community, then, over time reduce the use of herbicides down to as necessary to combat invasive weeds that have no pathogens or parasites to keep them from spreading rapidly. If the above [R4, VS3] alternatives are not followed, I think this would open up enforcement actions by both State and County Noxious Weed Authorities. This would result in fines and the work being done on large scale treatment and large amounts of herbicides which may or may not be on your approved list. [#8]*

Response: We agree. However, please note that we would not use herbicides that had not been through our process for approval.

Comment: *I am against any use of herbicides. [#9]*

Comment: *. . . we feel that the proposal is biased towards the use of herbicides rather than manual or mechanical forms of vegetation control. . . . While the [Squaxin Island] Tribe does not oppose the use of pesticides, we recommend that pesticides only be used as a last resort when other strategies have failed or are impractical. . . . For vegetation control we support the use of mechanical and manual methods. Soil disturbance can be kept at a minimum by raising mower heights as well as using vegetation species which do not require*

maintenance. . . . We support utilizing these methods for primary control and the use of pesticides only in extreme circumstances. [#14]

Comment: *AWR appreciates the Administration's need to control vegetation. However, based upon [discussion of concerns] the use of chemical control agents should be revisited. [#26]*

Response: Thank you for your comments regarding herbicide use; we appreciate your perspective. Please note that, for all of the proposed right-of-way alternatives, Bonneville would still rely heavily on manual methods of vegetation control (Figures IV-3,- 4, -5, and -6).

Unfortunately, using herbicides only in extreme circumstances will not get us to a long-range goal of low-growing plant communities. Through past practices and experience of other utilities, we have found it difficult to keep up with vegetation growth without using herbicides for at least noxious weed control and deciduous species.

If we are able to use herbicides, together with other methods, to promote low-growing plants, we will be able to lessen the need for *all* maintenance activities, including herbicide use. We think that, in the long run, low-growing plants on the right-of-way by means of the integrated, judicious use of herbicides (not just as a last resort) will be the best for Bonneville and the environment.

Comment: *In particular, herbicide applications do nothing to change the conditions which allowed the noxious weeds or other vegetation to establish in the first place, and such applications may leave the soil bare, a condition that favors re-establishment. Therefore, the dependency on toxic chemicals to manage vegetation is difficult to overcome unless it is part of an explicit program to prevent the re-establishment of such vegetation and to eliminate the need to use herbicides in the future. [#26]*

Response: We agree that if herbicide applications resulted in bare-ground rights-of-way, then noxious weeds could reestablish. We are proposing an integrated approach of control that considers ways to prevent reestablishment of undesirable species, including promoting low-growing plant communities, reseeding where necessary, and timing of removal or treatment. (Note that herbicide treatments can often be less likely to leave bare soil than manual or mechanical means, because the herbicide kills roots without disturbing the soil.)

The use of some herbicide is an explicit part of the management goal of promoting low-growing plants along the rights-of-way. With this management goal, we hope to change the plant community on the right-of-way to be compatible with our needs, rather than keep fighting the battle with tall-growing plants. With this change there would be much less need for herbicide use in the long run, because there would be less need for maintenance in general.

Comment: *If you decide you must use herbicides (which I strongly protest), aerial and broadcast spraying should absolutely be banned from the program. [#9]*

Comment: *I do not like any kind of broadcast or aerial application of poisons of any kind. [#15]*

Comment: *EPA would prefer a management plan that avoids the use of aerial or broadcast methods for applying herbicides. However, we understand that there are terrain or weed conditions where aerial or broadcast spraying of powerful herbicides according to the label is the only feasible approach. Accordingly, EPA agrees with alternative R4, but urges Bonneville Power to restrict the use of aerial and broadcast methods in upcoming projects as much as possible so as to avoid deleterious effects on non-target plants and wildlife. [#34]*

Response: Thank you for your comment. Please note that, under Alternative R4, aerial and broadcast herbicide applications would be sparingly used for tall-growing vegetation on the rights-of-way, and somewhat more for noxious weed control. Please see Figure IV-6. Also note that, in the overall management goal of promoting low-growing plant communities, we state that one must be careful not to disturb existing low-growing or non-target plants. Using selective herbicide application techniques or selective herbicide products would be necessary to avoid harm to non-target vegetation.

Comment: *Don’t spray any poisons. [#30]*

Response: We assume that by "poison" you mean "Herbicides." Please note that the EPA-approved herbicides we are proposing to use would be applied using protective measures (in planning steps), including requirements listed on the herbicide labels. These measures are important in keeping herbicides where they are needed for treatment and not affecting non-targeted areas (such as water bodies).

Comment: *While I personally am not too comfortable with aerial spraying, I understand it is least cost, and most effective for you. [#27]*

Comment: *The [Alliance for the Wild Rockies (AWR)], appreciates the opportunity to participate in this planning process and we support the Administration's effort to control vegetation using means which minimize adverse environmental impacts. However, AWR is concerned [with] several of the preferred alternatives, especially the R4/VS3 alternative, would permit Bonneville to utilize broadcast and aerial herbicide treatments, impacting both target and non-target vegetation. … if (herbicides) are used, under no circumstances should broadcast and aerial methods be employed. [#26]*

Response: Thank you for conveying your concerns. Bonneville would like to have aerial and broadcast herbicide application methods in our vegetation management tool-box. However, we estimate that the number of rights-of-way that would be appropriate for the use of these methods would be limited (please see Figure IV-6.) Also, please note that the planning steps would help determine where these methods might or might not be appropriate for use (e.g., restrictions due to land use or natural resources present). The steps also provide a number of mitigation measures to lessen potential impacts, including ways to limit impacts on non-target species via selective versus non-selective herbicides, wind drift restrictions, observation of no-spray buffer zones, and complying with all label instructions.

One commenter mentioned that aerial application is the least cost method; this would probably be true for densely vegetated rights-of-way, but not be for many other right-of-way circumstances.

Comment: *Also, if wildlife is allowed in the right-of-way, they will help inhibit plant growth to some degree. [#15]*

Response: Yes, studies of rights-of-way on the East Coast have shown that wildlife plays a role in inhibiting tree growth by eating seeds and leaves of young saplings. On some Bonneville right-of-ways, browsing by deer and elk has been noted. However, the browsing is very species-selective, and controls the height of plants only to a limited extent.

Whether wildlife is allowed in the right-of-way depends on the underlying land use and on the presence of barriers associated with that use. Many rights-of-way are open space, and wildlife may come and go independently.

Comment: *If you don't kill the plants but cut and prune you won't have a revegetation question. [#15]*

Response: Pruning tall-growing trees along 15,000 miles of right-of-way is extremely expensive. Repeated pruning would have to be done very frequently. On the west side of the Cascades, some trees can grow 3 to 7 feet in one season (see below for examples of tree growth rates west of the Cascades). Bonneville is proposing that most vegetation in the right-of-way should be low-growing plants that do not threaten electric reliability. Also note that pruning often causes multiple stems to sprout, increasing the amount of vegetation control needed.

Species	**Growth rate**	
	(feet/year)	**(feet/5 years)**
Douglas-fir	3 - 6	15 - 30
Western redcedar	1 - 4	4 - 16
Bigleaf maple	5 - 8	20 - 44
Red Alder	3 - 8	12 - 32
Western hemlock	1 - 3	4 - 12

Comment: *Plant trees under the lines that don't grow high. [#30]*

Response: Because, in general, we can't have trees taller than 10 feet high under the line, we want to promote low-growing plants. Those plants can include trees, if they stay short. Unfortunately, there are not many "low-growing" tree species. Private landowners along our lines may obtain special permits from Bonneville to plant trees that are maintained at short heights (Christmas trees, orchards) as long as the trees don't block access to the towers or the roads. For Bonneville to plant low-growing trees, and nurture them until they hold their own would be very expensive. We will and do plant trees in special circumstances.

Comment: *An individual from the Quinalt Tribe had a comment regarding herbicides as they relate to labor; that local labor should be used to control vegetation in lieu of herbicides. Un- or under-employment was unacceptably high on tribal lands. [#31]*

Comment: *You can improve the choices by employing full-time staff to do vegetation maintenance along rights-of-way. Employ people rather than poison to control plants. [#15]*

Response: Contracts for vegetation removal are often bid on by local people. On Tribal Reservations, Bonneville has often offered contracts to do this work to qualified Tribal members. Regarding using labor instead of herbicides, we've found that the amount of work to control the vegetation in the right-of-way would increase without the use of herbicides (we have seen that through recent years). In the long run, the impacts on the environment also increase because of continual and increased maintenance activities as resprouts grow thicker and thicker.

Please note that Bonneville has 10 full-time staff and many hours of contract staff employed in controlling vegetation.

Right-of-way Vegetation Selection Alternatives

Comment: *I prefer: . . . VS3. . . . You can improve the choices by: eliminating all but . . . VS3. . .. Do not weaken your position or stance by accepting any choice but . . . VS. [#2]*

Comment: *VS3, any vegetation. [#28]*

Comment: *Of the choices offered in the Draft EIS, I prefer any methods that give the biggest amount of tools in the tool box. This appears to be . . . VS3. [#8]*

Response: Thank you for your comments and support.

Comment: *I do not like: Language written under "Alternative VS1-noxious weeds" (p. S-15) that reads "This alternative would allow us to keep in compliance with controlling noxious weed" when the BPA is not currently in compliance with controlling noxious weeds (e.g., on the Kootenai National Forest) (for noxious weeds currently designated by the State of Montana). [#7]*

Response: We've changed the text to more accurately portray the *ability* to be in compliance. Thanks.

Comment: *I prefer: VS1. [#7]*

Comment: *We support Vegetation Selection VS-1 (herbicides will only be used on noxious weeds). We support the use of alternative methods to control other non-desirable vegetation (other than noxious weeds). [#29]*

Comment: *Of the choices offered in the Draft EIS, I prefer herbicide - spot and localized for noxious weeds only. [#15]*

Response: This alternative would be good for ensuring that Bonneville has feasible tools for helping control noxious weed infestations. However, by limiting herbicide use to noxious weeds and not allowing the treatment of deciduous species, the probability of arriving at low-growing plant communities along the rights-of-way is low. Just as it is difficult to control noxious weeds without the use of herbicides, we have found that it is extremely difficult to control tall-growing species without at least some herbicide use. We are proposing to use an integrated approach—a mix of methods to control tall-growing species that includes the judicious use of herbicides.

Comment: *If herbicides are used, only noxious weeds and deciduous plants that compete with the low growing plants should be targeted. [#26]*

Response: As we're noted in the document, noxious weeds and deciduous plants are both very difficult to control without using herbicides. We are proposing to use herbicides in an integrated approach, for any vegetation depending on the site-specific resources present.

Comment: *Using herbicides on any type of vegetation would likely have adverse environmental impacts and should not be undertaken. In particular, the Administration should not use herbicides on plant species consumed by wildlife. [#26]*

Response: Thank you for conveying your concern. We are proposing to use herbicides on plants that we cannot have growing under our lines, while trying to promote low-growing plants. Please note that most of the herbicides proposed for use on rights-of-way rate *practically non-toxic* to *slightly toxic* to mammals.

Comment: *EPA can also support alternative VS3 which would allow herbicide use on any vegetation, but urges Bonneville Power to limit application whenever feasible to noxious weeds and deciduous plants and trees capable of re-sprouting. [#34]*

Response: Thank you for your comment.

Electric Yard Alternatives

Comment: *Of the choices offered in the Draft EIS, I prefer any methods that give the biggest amount of tools in the tool box. This appears to be . . . E1. [#8]*

Comment: *E1, selective herbicide. [#28]*

Comment: *In your Electric Yard Program, we support Alternative E1, because it appears that other alternatives (besides E1) pose a direct threat of electrocution to your maintenance workers. [#29]*

Response: Thank you for your comments. Yes, allowing vegetation to sprout within an electric yard poses a threat to those working in the yard. We have not found other feasible ways to keep plants from sprouting within the yard.

Comment: *Electric Yard Program: If ground cloths that help prohibit plant growth can be utilized in these areas it would reduce the need for maintenance as well as the use of pesticides. [#14]*

Response: Ground cloths are not feasible in these areas because of the work and safety issues with replacing them (digging up the gravel in an electrically charged environment). We have removed the mention of this method in Table II-1. We have also added more discussion of this method under our non-electric facility alternatives in Chapter IV. Thank you for bringing this to our attention.

Comment: *Finally, EPA agrees with Bonneville's proposed approaches to managing vegetation at electric yards and non-electric facilities, although Bonneville should attempt to minimize the use of herbicides when implementing these approaches. [#34]*

Response: Thank you for your comments.

Non-electric Alternatives

Comment: *Of the choices offered in the Draft EIS, I prefer any methods that give the biggest amount of tools in the tool box. This appears to be . . . NE1. [#8]*

Response: Thank you for your comments.

Comment: *Non Electric Program: It is preferable that landscaping utilize native plants to reduce the use of pesticides, fertilizers and water resources. Landscaping with native plants is aesthetically pleasing, virtually maintenance free, and requires no fertilizers and less irrigation. [#14]*

Response: Thank you for your comment. Most of Bonneville's landscape vegetation is established. When new plants are needed, we consider native plants and plants that require little maintenance.

Comment: *In your non-electric Program we support Alternative NE1 if the herbicides will only be used on noxious weeds and not to control other undesirable vegetation. It is unclear from the description if this was your intent since it just mentions "weeds" and not "noxious weeds." If the intent is to use herbicides to control any undesirable vegetation, then we support Alternative NE2. [#29]*

Response: Thank you for pointing out the need for clarification. Alternative NE1 would have herbicides available for use for control of any vegetation necessary, not just for noxious weed control. We have clarified this in the text. Given this, we note your support for alternative NE2.

Comment: *Alternative NE2 (S-17) the argument for using herbicides is often related to access and cost effectiveness. Therefore, landscaping at non-electric facilities should be readily able to utilize non-herbicide methods to manage noxious weeds. [#26]*

Response: There are advantages and disadvantages to all the methods. To control noxious weeds, herbicides have advantages of killing roots and being able to treat large infestations. Other "weeds" in landscaping could be treated with herbicides or other methods. We recognize your preference for the use of non-herbicide methods.

Alternatives Not Considered

Comment: *BPA failed to review the alternative method of running transmission lines underground through specially constructed cooling system thus eliminating the extensive need for vegetation management. [#22]*

Response: Thank you for suggesting other alternatives. However, reconstructing the transmission system is outside the scope of this EIS. Bonneville reviewed reasonable alternatives for vegetation management of our system. We did not review alternative methods of reconstructing the transmission system to avoid the need for vegetation management. Such alternatives do not meet Bonneville's need for "keeping vegetation a safe distance from existing facilities." This alternative is also not reasonable from an economic standpoint because of the billions of dollars it would cost to implement. There would also be great technological hurdles to clear in order to underground Bonneville's transmission system and still meet the needs of our customers. Therefore, we do not deem this a reasonable alternative that this FEIS needs to consider.

Comment: *No discussion about partnerships with public and private industries to utilize transmission rights-of-way for compatible uses that would maintain vegetation at optimum heights. Such actions as the berry industry, pulp and paper industry or Christmas tree farming were not reviewed. [#22]*

Response: Compatible uses under the rights-of-way are part of all the alternatives. About 1,440 miles of our corridors cross agricultural lands. These uses are addressed in the EIS in Chapter V (Affected Environments, Land Uses) and Environmental Consequences (Agriculture). Since Bonneville usually doesn't own the land under the transmission lines, we do not have complete control over the compatible uses. We have a permit process for compatible uses that include orchards and Christmas tree farms. These uses are compatible unless the vegetation is not maintained by the landowner (if trees grow too high or interfere with access to the facilities).

Comment: *Other Alternatives: The DEIS only addresses alternatives that manage vegetation in order to maintain safe operating clearances. The EIS does not address any alternative which manages the transmission facilities in order to maintain safe operating clearances. . . . I think that in some specific instances in which*

raising tower structures, adding new towers, minor route realignments, possibly even managing current loads during periods of high temperature to prevent unsafe line sags could be implemented as a way to allow vegetation to develop naturally and provide critical resource benefits while continuing to transmit electricity safely. This EIS process could address the specific planning steps which would identify specific conditions/locations where managing the transmission facilities rather than the vegetation would be appropriate. Further, site specific analysis would be needed to determine exact locations of new towers, right-of-way clearing, etc. [#36]

Response: Thank you for your thoughtful comment. Bonneville has in the past taken some of the actions you describe, and will probably continue to do so as part of its transmission system maintenance, development, and management activities. However, here we are examining alternatives that meet our need for keeping vegetation a safe distance from existing facilities. Our need is not to re-construct the transmission system to avoid interference from vegetation. Our facilities have already been constructed in a manner that takes into account the geographic features of each right-of-way. The alternatives for our vegetation management program need to be reasonable and effective for all the conditions covered by our 15,000-mile transmission system. As the comment notes, some of the suggested actions—such as raising tower structures, adding new towers, or route realignments—would apply only in some specific instances.

Comments and Responses to *Affected Environment* (Chapter V)

Vegetation

Comment: *Page 119, T& E species are listed by both USFWS and NMFS. [#1]*

Response: True, but plant species are listed only by the USFWS. To avoid this confusion, and for consistency with other sections, we have eliminated the sentence you refer to.

Comment: *Page 118, table V-1 shows white fir in mid elevations of the Blues and North Idaho. This is wrong. White fir occurs in southwestern Oregon. [#1]*

Response: Thank you for pointing this out. Reviewing *Abies concolor* (white fir) we found that it occurs in the Blues, but not in Northern Idaho. It also occurs in the Cascade range of Southern Oregon, as you stated, and Northern California, with some in Southern Idaho along the Utah border. We have updated the table.

Comment: *The reader is supplied with reasonable maps within the document which show the location of transmission lines, but unless I missed it, there was no text on the mileage of the transmission lines in each of the major ecosystems -- grasslands, shrub, and forest. [#22]*

Response: Thank you. We have added this information in the vegetation section, Chapter V, Affected Environment.

Comment: *Vegetation maps - do they show the vegetation types under all the lines? Portland shows-up as agriculture. [#30]*

Comment: *Figure V-2 Vegetation Type, you are showing light green (majority deciduous) in many places in Eastern Washington and North Idaho. Most are wrong. The major river bottoms are deciduous and the uplands are coniferous. [#1]*

Response: Please note that the vegetation map V-2 is gross in scale and is intended to give the readers a general idea of the distribution and range of vegetation types found throughout the system. At this scale, it is not possible to show deciduous plants in river bottoms in areas of mostly coniferous growth. The maps will not be used for site-specific vegetation identification. Given that, also note that we have made some changes to our maps to try to reflect vegetation types more accurately. Thank you for your observations.

Comment: *Vegetation types need to be revised and possibly expanded. Little mention is made of the shrub-steppe ecosystem although BPA on page 117 wants the reader to consider the shrubland ecosystem as containing the shrub-steppe ecosystem. Shrublands according to BPA can be located in high precipitation areas or low precipitation areas and is also Range Land. This classification is not practical and takes in too many independent ecosystems. I feel that the shrub-steppe ecosystem, a low precipitation ecosystem, warrants its own discussion since according to the maps provided, many miles of transmission lines cross this ecosystem type. Figure V-2, Vegetation*

Types, does not depict the shrubland ecosystem as stated on page 116 of the text. [#22]

Response: Thank you. We have added both discussion about this ecosystem and information to the map.

Comment: *Page 119, Table V-2, see Neitzell 1999. [#22]*

Response: Table V-2 addresses only Federally listed threatened and endangered plants. Thank you for the information on Washington State listed species in the Hanford Reach. We will pass the Neitzel report on to the Natural Resource Specialist who works in the Hanford Reach area.

Water

Comment: *Page 121, last paragraph, "…crosses 10 sole-source…" however there are only 9 listed. [#22]*

Response: The Eastern Snake River Plain aquifer has been added.

Comment: *Page 122, 3rd paragraph, sentence 3, clarify Snake River: "…and flows through Idaho and along the Oregon-Idaho border into Washington,…" [#20]*

Response: Thank you. The description has been clarified.

Comment: *Our Forest [Willamette National Forest] is in the process of completing a new Environmental Assessment for Integrated Weed Management. Many parts of the BPA preferred alternative will dovetail well with the Willamette EA. [#33]*

Response: Thank you for reviewing the EIS. We look forward to working with your Forest on a right-of-way management plan.

Land Ownership

Comment: *Page 138, 2nd bullet: add Confederated Tribes of the Umatilla Indian Reservation [#22]*

Response: Thank you, the change has been made.

Comment: *Page 136 identifies the current BPA facilities covered by direction in the Northwest Forest Plan on the Modoc National Forest.*

This is not currently the case. All current facilities operated by BPA under agreements with the Modoc National Forest are outside the area of the Northwest Forest Plan. [#32]

Response: Thank you for your observation. We have changed the document accordingly.

Cultural Resources

Comment: *Page 139; see Neitzel 1999 [#22]*

Response: See 22-14. Thank you for the information on the abundant cultural resources in Hanford Reach. We will forward this information to the Natural Resource Specialist who works on our facilities in your area.

Comments and responses to *Environmental Consequences* (Chapter VI)

General

Comment: *In addition to previously utilized chemical control agents for the program, the current document now proposes the use of a total of 24 herbicidal compounds singly and in combination. While we applaud the document for not suggesting solely the use of toxic herbicides, the Department has concerns over the effects that several of the herbicides may have on non-target species, particularly endangered, threatened, and proposed species. [#40]*

Response: Thank you for acknowledging that we are not proposing solely herbicides with high toxicity ratings. Please also note that, in response to comments we received on the draft EIS, we have dropped from our list some herbicides that had high toxicity ratings for aquatic species.

Vegetation

Comment: *We feel that the environmental risks of aerial application of herbicides to non-target species are unacceptable. [#29]*

Response: Thank you for your comment. Please note that, although the aerial spraying application *technique* is non-selective in the plant types treated, the herbicide *formulation (chemical make-up)* can be selective such that only the target vegetation will be controlled. For example, if a right-of-way is filled with conifer saplings, the herbicide

formulation could be one that primarily affects targeted conifers (not broadleaf) plant species.

Comment: *The BPA EIS did a fairly good job in presenting the case but . . . it appears that they have not given the shrub-steppe ecosystem much attention during their analysis but instead dwell mainly on forest system. . . . The reader is at a loss as to what BPA will do where transmission lines cross shrubland ecosystems. If no vegetation management will be done in these ecosystems it should be mentioned in the document. [#22]*

Response: The biggest potential for impact occurs when rights-of-way cross forests. Because the most intensive vegetation control needs to take place in those areas, much of the EIS is focused on determining the potential impacts and ways to avoid impacts in forest ecosystems. There is some vegetation control needed in shrublands (e.g., clearing sagebrush around poles for fire control, controlling tall junipers). Thank you for noting this lack. We have added discussion in the Chapter VI regarding potential impacts in shrubland.

Water

Comment: *Page 162, the buffer widths for NRCS code 391A are national standards used in a general scope. Most States have supplemented this standard to fit their conditions and situations. There can be many widths depending on the circumstances. You should contact each state to obtain the state supplement to the national standard. [#1]*

Comment: *Rashin's 1992 study on aerial application of pesticides showed that pesticides were detected in streams following application on all the study sites monitored, thus being out of compliance with label requirements. The study recommended that a 90-meter buffer be applied along flowing streams. Manual and mechanical applications typically are at higher concentrations and droplet size of drift is also larger. . . If pesticides are applied we recommend that a minimum 250 foot buffer be applied along all streams and wetlands and that drift into buffer areas be prohibited. [#14]*

Comment: *Page 62 and Page 161. It's somewhat unclear exactly what these riparian zones apply to. It appears to be a mix of different standards, some are BPA, some are BLM and others are NRCS. The Northwest Forest Plan buffers are only displayed in Appendix F. Perhaps it would be better to state that these are examples of potential*

riparian zones but that site specific locations and management plans will dictate the actual distances. Restrictions on buffer distances may also be applied as a result of consultation for listed fish species under the Endangered Species Act. [#33]

Comment: *Riparian Protection: 1) Table III-1 Riparian Buffer Zones (page 62) needs to be thoroughly reviewed by fisheries biologist to ensure INFISH standards are being met with the proposed buffer zones. [#36]*

Comment: *We recommend that site-specific planning include a detailed examination of the environmental fate and effects of proposed formulated herbicide products such that more restrictive riparian buffer and herbicide-free zones may be used when necessary to protect natural resources, particularly endangered and threatened species, other wildlife, fish and aquatic organisms, and water. [#40]*

Response: Thank you for your comments. When developing the appropriate buffers for our proposed methods (including herbicide use), Bonneville reviewed and considered numerous standards at the national, state, and local level. Rather than list all the local buffer requirements (which are subject to change) in this EIS, we have established buffers that are appropriate for our facilities and methods. Our proposed buffers—which have been revised from the draft EIS to include the aquatic toxicity rating for buffer width consideration—are in place for our managers to follow when there are no other buffer requirements in the area. If different requirements are in a given area (e.g., T&E fish species may require a different buffer), Bonneville will use the local buffer widths **if** they are more strict than Bonneville's. We will not use more lenient buffer widths.

Please note that the references in the table (e.g., NRCS code 391A) are given to show where our buffers are consistent with other established standards.

Comment: *These applications (aerial application of pesticides) need careful monitoring to ensure that herbicides are not entering buffer areas and water. [#14]*

Response: Monitoring would depend on a site-specific instance of aerial application. Bonneville may initiate monitoring to determine application effectiveness and/or resource protection purposes. Monitoring may also be required at the request of regulatory agencies such as NMFS.

Comment: *Stream and wetland buffers provide many functions and by allowing herbicides to enter these protected areas certain functions are lost. [#14]*

Comment: *The site-specific planning steps for water resources state that "if using herbicides, it may be necessary to leave untreated zones (filter strips) to preclude the possibility of herbicide movement from the application site to adjoining water bodies." The [Oregon Department of Fish and Wildlife] requests that BPA always apply this mitigation measure near adjoining water bodies. [#21]*

Response: Bonneville will always consider appropriate buffers for herbicide use near water bodies to ensure that herbicide doesn't get into the water body and to protect important riparian habitat. In many cases, that will mean untreated zones near water bodies. However, in some instances, either noxious weeds or fast growing deciduous trees may grow immediately adjacent to streams and other water bodies. It may be necessary to treat noxious weeds (in accordance with local noxious weed authorities) and/or treat fast growing deciduous trees where transmission lines are directly threatened in riparian zones. In these situations, we will use chemicals with low aquatic toxicity ratings and low persistence combined with the least invasive application methods, such as spot treatments (basal and stump and/or injections). Bonneville will coordinate such activities with regulating authorities, where applicable.

Comment: *. . . increases in water temperature as vegetation is removed, etc. [from herbicides] [#26]*

Response: If vegetation is removed from stream banks *by any means or methods*, there is a potential for increase in water temperature. We have a mitigation measure in place for water resources to "leave streamside vegetation intact where possible" to help mitigate potential streamside vegetation removal impacts.

Comment: *Riparian Protection: 3) The study cited on page 167 has been taken completely out of geographical context. The climate, soils, vegetation are all completely different between New York and the Pacific Northwest. Surely there is a study applicable to the Pacific*

and Inland Northwest that discusses the impacts of removing overstory along stream reaches. [#36]

Response: Extensive studies have been carried out on the East Coast on the impacts of utility rights-of-way across a variety of landscapes. We have not found any rights-of-way studies in the Northwest for stream crossings (most of the studies conducted in this area are of the impacts of clear-cuts on stream temperatures, not of small lengths of clearing). We acknowledge that there are definite differences between climate, vegetation, and soils from what we find here in the Pacific Northwest. However, there are still some things we can learn from these studies. Please note that we did not rely on this information to draw definite conclusions about impacts that would be observed here.

Comment: *All of the pesticides listed in the BPA proposal are restricted for use in or near water and/or wetlands. [#14]*

Response: The herbicides listed in the EIS are all registered for "terrestrial use only" with one exception: glyphosate. Glyphosate is registered for use on land or water. However, in most states a special permit is required in order to apply herbicides in water; such an herbicide is usually used for special lake plant infestations or ditch vegetation removal. Bonneville is not proposing use of any herbicides in water. Where Bonneville needs to use herbicides *near* water, all appropriate label instructions and restrictions will be applied in order to protect both surface and groundwater resources.

Comment: *Also, any application around water bodies should be done with the utmost care, especially when using products such as benefin, pendimethalin and trifluralin which are highly toxic to numerous aquatic species. We would advise the maximization of buffer and herbicide-free zones when applying all compounds but especially when highly toxic compounds would be applied around water. [#40]*

Response: We agree that water bodies need special consideration. Please note that Bonneville has dropped some herbicides (the three named above) with high toxicity ratings to aquatic species from the list proposed in the draft EIS. We have also added the consideration of toxicity to the buffer zones to maximize protection of these resources.

Fish and Other Aquatic Species

Comment: *The Draft EIS is lacking an analysis of the Threatened and Endangered Species. Particularly the effect of applying herbicides along stream banks where salmon spawn in cool water and are protected by riparian vegetation. [#6]*

Response: Bonneville will depend on outcomes of a biological assessment/consultation process with NMFS and USFWS for appropriate measures for T&E fish species protection. We are currently in the process of a program-wide consultation, the results of which will be incorporated into our vegetation management program.

Comment: *Riparian Protection: 4) Mitigation Measures, states "Apply all appropriate mitigation measures for water bodies". These "appropriate mitigation measures" should be referenced or stated as there is no way of knowing what these measures are. [#36]*

Response: Thank you for alerting us to this. The statement you are referring to was in the Fish section on mitigation measures. The measures referenced for water bodies are listed in the Water section of Chapter VI. Many mitigation measures apply to both resources. We have added a reference indicating where this information can be found.

Comment: *The Squaxin Island Tribe appreciates the opportunity to review and comment on BPA's Vegetation Management Program. As land and fisheries managers we are currently faced with many controversial issues. Several issues of concern include salmonid health, the preservation of fish habitat and water quantity and quality. . . . All pesticides toxic to aquatic life and subject to soil leaching should be prohibited from further use. These chemicals include but are not limited to: triclopyr, trifluralin, pendimethalin, dimethylamine (2,4D), benefin, bromacil, halosulfuron-methyl, hexazinone, and picloram. [#14]*

Comment: *When selecting a particular herbicide, consider using newer products, which often pose lower risks. [#34]*

Comment: *The [Oregon Department of Fish and Wildlife] appreciates the opportunity to comment on [the DEIS]. The Department's comments pertain to the vegetation management in right-of-way, rather than electric yards and non-electric facilities. The Department generally support's BPA's proposed mitigation measures to reduce the impacts on fish, wildlife and their habitat.*

However, the Department would request that BPA consider the following changes or additions to those mitigation measures. First, the Department strongly supports the use of riparian buffer zones and herbicide-free zones described in Tables VI-2 and VI-3. However, due to their high toxicity, the Department requests that BPA refrain from using the following herbicides within 30.5 m (100 ft) of waterways, regardless of the application method: 2, 4-D (highly toxic to aquatic organisms in some formulations); Benefin (highly toxic to aquatic organisms); Diuron (highly toxic to aquatic invertebrates); Pendimethalin (highly toxic to aquatic organisms); and Trifluralin (very highly toxic to aquatic organisms). [#21]

Response: Bonneville has looked carefully at the risks posed by using herbicides. Some of the herbicides that are included in our list are newer products that have lower risks (chorsulfuron, fosamine, metsulfuron, and sulfometuron). As part of this EIS, Bonneville has chosen to prohibit the use of certain herbicides having longstanding health or environmental issues. Prohibited herbicides include: atrazine, prometone, simazine. We have further dropped from our list and will prohibit the use of three herbicides that were in the draft EIS: pendimethalin, benefin, trifluralin. Herbicides selected for use within the programs covered in this EIS will be carefully used following the instructions and restrictions EPA has required the manufacturers to place on their labels.

In addition, Bonneville has many Best Management Practices in place, developed as a result of this EIS, to further reduce potential impacts that may be caused by the use of herbicides. These include our riparian zone buffers and pesticide-free zones. We have updated our herbicide buffer widths to include the consideration of aquatic toxicities and ground water or surface water advisories, as well as other mitigation measures resulting from consultations with Tribes and other state and federal agencies when vegetation management affects Tribal lands or other resource issues such as threatened or endangered species.

Comment: *In light of the Endangered Species Act and the numerous proposed listings for wildlife and salmonid species, it has become essential for managers to lessen the environmental impacts of their activities. [#14]*

Response: We agree and hope that the planning steps will ensure that the environmental resources are considered when making decisions for appropriate methods of vegetation control.

Comment: *Several of the pesticides are toxic to fish and have the potential to cause ground water contamination. [#14]*

Response: Bonneville is highly sensitive to the protection of all aquatic species. Generally, EPA requires manufacturers to place a warning on herbicide labels in cases where toxicity to fish is an issue. Based on your comment and others, Bonneville has taken steps to identify those herbicides having aquatic toxicity issues and has either prohibited or restricted their proposed use near water or riparian areas (please see updates to the herbicide buffer zones). EPA has also required manufacturers to place a warning on the label in cases where leaching or runoff may be an issue.

Comment: *Fish and animals need protection against herbicides. [#30]*

Response: Thank you for voicing your concerns. Mitigation measures are in place to keep herbicides from getting into water bodies. Please note that of the 23 herbicides we are considering for use 21 are rated either *practically non-toxic* to *slightly toxic* to mammals, with two rating *moderately toxic* to mammals. Buffer zones will be provided to protect fish and water resources.

Comment: *Use of Herbicides: 2) The BPA DEIS seems to have a fairly subjective tone making assertions that herbicides are not harmful, yet the DEIS does not cite references to fully support this position. For example, on page 168, the DEIS states "There is little potential for fish to be exposed to herbicides: mitigation measures . . . . .only a relatively small amount of area would be treated within a landscape." The DEIS does not state the effectiveness of the mitigation measures nor does it cite research work that confirms this assertion. [#36]*

Response: We realize that herbicides, if not used properly, can cause impacts. We have analyzed all the herbicides that we are proposing for use, and developed buffers and mitigation measures to be followed. With these measures in place, risks of impacts are greatly reduced. The citations for research for the effectiveness of the measures are footnoted in the buffer and toxicology tables. All herbicide references can be found in the **References** chapter.

Comment: *Use of Herbicides: The DEIS also makes some contradictory statements. For example, on page 168, the DEIS states that "many of the herbicides proposed by Bonneville are low in toxicity to fish", yet in Table VI-6 (page 175) 11 of the 24 herbicides are listed as moderately to highly toxic to aquatic resources. In addition, two of the herbicides listed in this table do not have any aquatic toxicity data. Eleven of 24, possibly 13 of 24 herbicides being moderately to highly toxic does not match the assertion on page 168 that many of the herbicides are low in toxicity. [#36]*

Response: Bonneville assumptions were based on the fact that some herbicides would only be used in substation environments, while others would be only used along rights-of-way. The final EIS clarifies which herbicides would be used for each facility type. Also, please note that we have dropped some herbicides from the list of herbicides proposed in the draft EIS —benifin, pendemethalin, and trifluralin (all had high aquatic toxicity ratings) and have completed all toxicity data in the tables.

Wildlife

Comment: *I did not find in the text of the document any discussions on State Sensitive Species, nor did I locate any information on the Migratory Bird Treaty Act. [#22]*

Response: Thank you for catching these omissions. We have incorporated state sensitive species into several chapters throughout the final EIS, and we have added a discussion of the Migratory Bird Treaty Act in "Other Requirements" at the end of Chapter III.

Comment: *Finally, the Department requests that BPA consider timing restrictions to reduce impacts on wildlife species in addition to federally listed threatened and endangered species. The state of Oregon has listed several species as threatened or endangered that have not been listed by the federal government. These species include the Arctic Peregrine Falcon (Falco peregrinus tundrius), the Kit Fox (Vulpes macrotis) and the Wolverine (Gulo gulo). The Department has also listed numerous species as "sensitive". Prior to significant vegetation management activities, BPA should contact local Department biologists to discuss timing such activities to avoid unnecessarily impacting these species. [#21]*

Response: Thank you. We have added a discussion of state-sensitive species to the text and a mitigation measure for site-specific vegetation management to contact the state fish and wildlife departments to determine whether there is a potential for impacts on state-listed species and, if so, measures to avoid impacts.

Comment: *Herbicide Use - the DEIS states that wildlife would not be impacted by herbicide use. Since the direct impacts associated with herbicides are at best uncertain, and will vary depending upon the chemical agent, this statement does not seem well founded. [#26]*

Response: The EIS states that the potential for wildlife to be affected by herbicides is based on whether an animal is exposed, whether the exposure amount is enough to cause effects, and what the toxicity of the herbicide is to the animal. All but two of the herbicides on our list are rated *practically non-toxic* to *slightly toxic* to mammals and avians. Of the two that are rated moderately toxic to mammals or avians, one would be used mostly in electrical yards and the other for landscaping and workyards where there is little wildlife. There is potential for impact on non-target resources with our program; we have worked to limit that potential.

Comment: *The vegetation management plan for rights-of-way should consider corridors and their impacts on particular wildlife species in more detail. [#26]*

Response: Detailed discussion of potential impacts on particular wildlife species is not relevant at this level of analysis. It would not be feasible to analyze all the impacts of such a large and diverse area in this document. The planning steps developed in this EIS are to ensure that site-specific impacts are considered when actual projects are to take place.

Comment: *Although the Administration wants the longest possible maintenance free period, shorter period should be considered if impacts to threatened and endangered species are possible. [#26]*

Response: We agree. Bonneville will take appropriate measures for T&E species, if they are present.

Comment: *Furthermore, herbicide use may include the removal of vegetation upon which wildlife species rely . . . [#26]*

Response: Bonneville needs to remove some vegetation in the right-of-way. We hope to promote low-growing plants, many of which wildlife species use. The use of any method of vegetation control that is non-selective can unnecessarily remove non-target vegetation. Some herbicides and herbicide application techniques can affect non-target species; many do not. The concept being proposed is to use methods that will support low-growing plant communities, which we believe will not only be more efficient for Bonneville, but will increase wildlife habitat along the right-of-way.

Comment: *Listed species: Washington Cascades Only: The western portion of the Cascade Mountains in the State of Washington are associated with federally listed and proposed threatened and endangered species under the Endangered Species Act (ESA). Of the species that may be impacted by the program, the bald eagle, the spotted owl, the marbled murrelet, and bull trout are of particular concern. Not only are direct, indirect, and cumulative effects of concern, but secondary poisoning is also an issue that will need to be addressed when considering the use of chemical control methods around habitats that contain higher trophic level organisms. . . .*

Due to the aforementioned concerns, information provided in the proposed integrated approach, especially the chemical control methods, may have adverse impacts and may have effects on listed species. [#40]

Response: Thank you for voicing your concerns. Secondary poisoning by herbicides is also called bioaccumulation. Bioaccumulation can occur when there is a potential for some animals, such as rodents, to accumulate chemicals in their system; predators who eat the rodent may then be poisoned. We have added information to the document on the potential of the various proposed herbicides to bioaccumulate. Consultation on these species regarding herbicide use will provide appropriate measures to address potential impacts.

Your comments, as well as others received on the draft EIS, have helped us further develop our program to lessen potential impacts (e.g., dropping some herbicides from our proposed list, including toxicity ratings for buffer zone considerations, ensuring the USFWS is in the loop for approving new techniques as appropriate). We are proposing

using the planning steps for site-specific projects so that good decisions can be made to control vegetation, with limited impacts.

Comment: *Temporal issues are also of concern. The time of year chemical control agents are used is critical and should not coincide with such activities as bald eagle and marbled murrelet nesting as well as bull trout spawning and incubation. [#40]*

Response: We agree that timing of vegetation management activities (by any means) can potentially affect some species. Site-specific or programmatic consultations will provide appropriate measures to ensure that timing is considered so that the activities will not coincide with critical T&E species activities.

Comment: *Also, low level aerial applications of herbicides may cause disturbances to threatened and endangered species. [#40]*

Response: We agree that noise of aerial applications could disturb threatened and endangered species. Site-specific analysis and consultations (if appropriate) should ensure that harmful noise disturbance of T&E species does not occur.

Comment: *The document refers to herbicides simply in terms of "active ingredient". Several of the compounds listed in the program have different formulations such as glyphosate and triclopyr. The different formulations contain different amounts of active ingredient, different inert compounds, and different adjuvants all of which determine the fate and effects in the environment, thus making it difficult to assess the potential toxicity to our trust resources. . . .*

Chapter IV [VI] also discusses toxicity as one factor that determines if an herbicide will cause adverse effects to fish or other aquatic resources. In addition, differential toxicity among herbicides is described and BPA states that using less toxic herbicides "in the vicinity of fish-bearing lakes or ponds would reduce the potential for adverse effects." The [USFWS] agrees with this assessment, however we recommend that evaluation of the toxicity of formulated herbicide products (not active ingredients) be included in site-specific planning, perhaps under Planning Step 4. . . .

. . . general riparian buffer and herbicide-free zones are presented as mitigation measures to reduce potential contamination of water resources. As discussed in Chapter VI of the DEIS, the physical properties of herbicides partly determine environmental fate. . . . The DEIS does not specify which formulated herbicide products will be used in vegetation management, so the [USFWS] cannot comment on potential adverse effects. [#40]

Response: Bonneville recognized early in the preparation of the EIS that different formulations of the same active ingredient might increase *or* decrease the actual toxicity of the product. We chose not to list all the toxicities for all the different formulations because the list would be large and cumbersome, and because we want our mitigation measures and guidance to be based on herbicide *characteristics* rather than on specific formulations. Instead, we chose to use a worst-case assessment in reporting the human and ecological toxicities. That is: when all of the toxicological values for a specific active ingredient were compared against the different formulations of that active ingredient, Bonneville always used the most toxic value. That way, Bonneville believes the relative toxicity may be less but never more than that listed in our tables.

We have also reviewed the toxicological data for inert ingredients and adjuvants. The inert ingredients of the herbicide formulations considered in this EIS are not classified by the USEPA as inert ingredients of toxicological concerns to humans or the environment. Information on inerts and adjuvants has been incorporated into Chapter VI of the final EIS.

Comment: *The [USFWS] requests that BPA limit use of the following herbicides due to the lack of data on the toxicity to fish and/or wildlife: Halosulfuron-Methyl; Imazapyr; and Sulfometuron-Methyl. [#21]*

Response: Those chemicals lacking toxicity data in the draft EIS have been researched; the information has been incorporated into this final EIS, please see Table VI-6.

Comment: *… the EIS discusses feathering. However, inadequate analysis is presented as to edge effects, how to minimize such effects, impacts on interior forest. [#26]*

Response: Chapter VI, Environmental Consequences, Wildlife section, discusses both the potential positive and negative edge effects. This impact is also discussed in NEPA documents when we are considering new transmission line routes. It is more of an impact resulting from constructing a new line across a forest, than of keeping an existing line maintained.

Comment: *Impacts from other [non-herbicide] methods can be mitigated in various ways (e.g., noise disturbance to T&E wildlife can be timed to avoid their nesting and denning periods). [#29]*

Response: We agree that many of the *short-term* impacts of manual and mechanical methods can be lessened or eliminated with appropriate mitigation measures. However, the greater impacts of using these methods alone are in the *long term* when vegetation resprouts. When cut, deciduous vegetation resprouts with an increased number of stems. This creates more thickly vegetated rights-of-way that need to be managed even more intensively. The rights-of-way then need more extensive clearing, and more vegetation per acre needs to be cut with each successive maintenance cycle. When densely vegetated areas are cleared, environmental impacts are more drastic compared to the selective removal of trees or brush. More habitat is affected, more soil is disturbed, non-target plants that have grown in shade-tolerant situations are suddenly exposed, human presence on the right-of-way is increased, and visual impacts are more sudden and dramatic.

FS- and BLM-Managed Lands

Comment: *It is our understanding that the current authorizations and agreements between Bonneville Power Administration and the Modoc National Forest continue to be in effect. The process outlined in the DEIS is not consistent with these agreements. Until such time as [Bonneville] completes the processes necessary to formally transfer land management responsibilities from the USDA Forest Service to the US Department of Energy for the right-of-way, the approving and deciding official for site-specific projects, which may affect the environment, remains the appropriate Forest Service line officer. [#30]*

Comment: *Vegetation Selection: As stated above, the Forest is very supportive of vegetation treatments with herbicides for noxious weeds (VS1). If deciduous species need to be treated on Willamette NF land*

(VS2 or VS3), additional NEPA analysis will need to occur because the 1999 forest-wide Integrated Weed Management EA covers herbicide use on only newly invading weed species. [# 33]

Comment: *NEPA Responsibility: On page 185, BPA makes the statement that "the decisions on vegetation management of rights-of-way across USFS and BLM managed lands are Bonneville's and therefore Bonneville is responsible for complying with NEPA." And goes on to state "The USFS and BLM usually would not have a decision to make (that would trigger their NEPA process) unless the proposed vegetation management were not consistent with their existing plans and regulations." The Memorandum of Understanding between BPA and USFS dated 1974 (FSM 1531.73a) provides for BPA's occupancy and use of National Forest lands consistent with laws applicable to the management of National Forest System in Item 1. Also, Item 6 provides for a subsidiary MOU to implement the master agreement. In the Subsidiary Memorandum of Understanding dated 1974 (FSM 1531.72a, FSM 8/83 R-1 Supp 41) Section 1B. Environmental Analyses and Environmental Impact Statements states that "Bonneville and the Forest Service will conduct environmental analyses and prepare environmental impact statements in accordance with their individual procedures". It also states that "When an environmental statement is to be prepared, the agency initiating the proposal will take the lead in statement preparation. The other agency will actively participate in development of the statement by (1) providing...existing information...and (2) review and comment on the draft and final environmental statement." Thus, the wording in the DEIS is not entirely correct and could mislead agency as well as public individuals as to whose responsibility the decision making really is. As I see it the FS has only granted BPA the occupancy and use of National Forest lands not the ownership nor management responsibility of these lands, in addition, the FS and BPA have agreed that environmental assessments will be conducted in accordance with their individual procedures. This section (page 185) should be rewritten in order to clarify BPA's role as they it crosses National Forest lands. The existing MOU's provide a lot of direction regarding roles of the various agencies. [#36]*

Response: Thank you for your comments and noting the need for clarity. We have updated the statement in the EIS as follows:

> "Bonneville, the FS, and the BLM all have decisions to make regarding vegetation management of rights of way across National Forest or Management Areas. Typically, as the owner

> and operator of the transmission facility, Bonneville will propose the vegetation management action. Under NEPA regulations and agreements between the agencies, this means Bonneville will usually have primary responsibility for completing the environmental impact analysis needed. Each agency will then use this analysis in its own NEPA compliance process and base its decisions upon it. Bonneville's decision will most often be on how to manage vegetation on a right-of-way. The Forest Service or BLM will decide whether Bonneville's proposed action triggers their need for NEPA, and if so, whether the action is consistent with their Forest or Management Area plans."

Bonneville recognizes that if we propose an action on Forest Service lands that is not consistent with the Forest plans and prior decisions, new Forest Service decisions may need to be made. These decisions would require NEPA analysis consistent with Forest Service regulations.

Please note that Bonneville is preparing this EIS to provide the NEPA coverage needed to control vegetation at its facilities across our service territory, including on National Forest and BLM lands. As a cooperating agency on the EIS, the Forest Service can adopt the EIS and issue its own Record of Decision to allow it to approve a Bonneville proposal to control vegetation. If Bonneville adopts one of the action alternatives, then the following process would apply to Bonneville rights-of-way and electrical facilities on National Forest lands. (As a cooperating agency, the BLM is proposing to adopt this EIS and issue a ROD.)

For site-specific vegetation management projects, we are proposing to prepare a Supplement Analysis. This is our equivalent to the Forest Service's Interdisciplinary Review. Bonneville would work with the checklist referenced in Chapter III of the EIS to study the site-specific impacts of the management regime proposed. This would include, for instance, consultation with the USFWS regarding T&E species, public comment, and consultation with the Forest Service. If the impacts of the site-specific action were no more than what Bonneville anticipated in the EIS, then Bonneville could conclude its NEPA compliance for the project with the Supplement Analysis. If the Supplement Analysis showed the impacts would be greater or other than those examined in the EIS, then Bonneville would supplement the EIS. Because the Forest Service is a cooperating agency on the EIS, it could adopt the EIS, issue a ROD after completing its public process, and approve

Bonneville's proposed action described in the Supplement Analysis/supplemental EIS.

Other Federal Agencies

Comment: *Page 187, 5th bullet: To what degree has the notification [of other Federal agencies] been done? It appears that it was not done for Hanford, unless receiving the draft was the extent of the notification. [#22]*

Response: The bullet referred to is when site-specific vegetation control is needed. However, notification and request for comments on this Program-wide EIS was done through letters requesting input for scoping the program, a follow-up Fact Sheet explaining what we heard during scoping, and the draft EIS for comment. Hanford has been on our mailing list to receive all mailings regarding this EIS process.

Tribal Lands

Comment: *Several commentors stated that trust needs to be built between Bonneville and the Tribes for planning and implementing programs. Firmly established mutual trust would provide long-term relations between the Tribes and Bonneville. [#31]*

Response: We agree, and hope that by including input from the Tribes in our overall program, and working together on individual projects, trust and long-term relationships can be built. Thank you for voicing this aspect of working together.

Cultural and Historic Resources

Comment: *As a traditional weaver and teacher I would oppose to the use of any herbicides because of not knowing the effect on plants, animals, water, roots, and materials used for weaving. [#12]*

Response: Thank you for your comment. We have added a measure to the planning steps in the Cultural Resources section to notify Tribes with traditional-use areas in the project area to help determine if there are any traditional-use plants that need to be considered when determining vegetation control.

Also, please note that Bonneville would apply herbicides to target plants and limit effects to non-target vegetation as much as possible. To protect human health, Bonneville would follow label instructions requiring an interval of time to go by before using the application area or vegetation within that area.

Public Health and Safety

Comment: *Page 195, 6th paragraph, 2nd sentence: at the end of the sentence add "or exposure to downwind draft". [#22]*

Response: The addition has been made; thank you.

Comment: *I was quite distressed upon reading your "transmission system vegetation management program." I am appalled that you are proposing (and probably already using) herbicides with a toxicity category II, III, and IV! [#9]*

Response: Thank you for conveying your concerns. Please note that toxicity categories are defined and used by EPA in describing the acute toxicities of herbicides relative to human receptors. These toxicity ratings are used by EPA to determine label requirements and warnings (such as establishing personal protective apparel for applicators, reentry intervals after application and other warnings) for the specific formulations. Categories range from Category I (Highly Toxic) to Category IV (Practically Non-Toxic). As listed on Table VI-7 of the EIS, most of the herbicides proposed for use by Bonneville fall in the Category III (slightly toxic) and Category IV (practically non-toxic) range. The Herbicide Fact Sheets, Appendix H of this document, contain the source material for the information presented in the tables.

Comment: *These same herbicides are carcinogenic, teratogenic, mutagenic, and effect reproduction. (2,4-D is notorious for causing problems.) [#9]*

Response: The effects you are describing are chronic toxicity effects. Chronic toxicity is the amount of a pesticide that will cause injury during repeated exposure over a period of time. Bonneville has listed chronic effects such as carcinogenicity, teratogenicity, etc., on Table VI-7 of the EIS. Most of the chemicals showed no adverse effects or some effects at doses higher than the "no observable effect level" (NOEL). In the event a chemical has such effect at or below the NOEL, EPA requires a chronic toxicity warning to be placed on the label along with appropriate precautions and mitigation measures. None of the herbicides being proposed for use in our program (including 2,4-D) have chronic toxicity concerns requiring such labeling.

Comment: *And you are actually proposing to use aerial spraying of some of these toxic chemicals? [#9]*

Response: Yes, we are proposing limited aerial spraying. Only some herbicides are registered for aerial applications. The herbicides on our list that could be used for aerial applications are imazapyr and metsulfuron, which have relatively low toxicity ratings. Also, the planning steps will insure that the land uses and the natural resources present are considered when determining whether aerial spraying is an appropriate method for use.

Comment: *Herbicide treatments have caused historic and repeated problems at numerous junctures, including manufacturing, transport, storage, application, dispersal, transformation into other toxic chemicals and disposal. [#26]*

Response: Thank you for voicing your concerns. The EIS addresses logistical, application, safety, and health risks of using herbicides. These issues have also been studied at length by the Environmental Protection Agency (EPA) and the Federal Occupational, Safety and Heath Administration (OSHA), resulting in label requirements, and Material Safety Data Sheets (MSDS) to reduce risks. Bonneville understands that such risks can never be completely eliminated, but knows that risks are minimized greatly by complying with federal requirements for herbicide use, providing Annual Herbicide Certification for employees, and providing additional mitigation measures for herbicide use. Please also see other responses to comments on herbicides.

Comment: *In addition, the direct effects of numerous herbicides are being found to affect the endocrine systems of both wildlife and humans. This can compromise development, reproduction, behavior, sexual integrity, and immune and nervous system functioning. [#26]*

Response: Thank you for your comments. We have reviewed all the herbicides we are proposing for use, and none of them are endocrine disruptors (they do not affect the endocrine system). One herbicide (triflurilin) that was in our draft EIS has potential effects on the endocrine system, but we have dropped that herbicide from our list.

Comment: *Projects should avoid to the extent feasible certain ingredients which are broad-spectrum and/or persistent and/or appear to affect non-target species. Of particular concern are bromacil, 2,4-D, dichlobenil, oryzalin, pendamethalin, triclopyr, and trifluralin. EPA is reassessing these ingredients for future use under the Food Quality Protection Act of 1996 which requires the Agency to consider all non-occupational avenues of exposure in its risk assessment. [#34]*

Response: Please note that our proposed use of broad-spectrum herbicides is limited to places where total vegetation control is necessary (electric yards, around wood-pole towers for fire protections, and in maintenance work yards). With respect to human health and environmental issues, Bonneville has assessed the available information for the herbicidal chemicals we intend to use as a result of this EIS. We believe that since we are prohibiting certain herbicides from use (e.g., pendimethalin and trifluralin), and restricting the use of other certain herbicides (using stricter buffer zones for herbicides with moderate and high toxicity ratings such as formulations of 2,4-D, dichlobenil, oryzalin, and formulations of trifluralin), Bonneville has reduced the risk of using herbicides as much as practical. We will keep current on studies of herbicides and include new information in our program as appropriate.

Comment: *"Integrated Vegetation Management is a strategy to cost-effective control vegetation with the most benign overall long-term EFFECT ON PUBLIC HEALTH AND SAFETY AND THE ECOSYSTEM. . . . I was told by my mother that it is important to protect everything in our circle of life because one thing depends upon the other, everything on this earth has a purpose. . . . I think that it is very important for the agencies to deal with the methods appropriately and with respect not only for Mother Earth but also the people. I would like to be informed of any hearings that will be held in the Aberdeen area so that I can attend. [#12]*

Response: Thank you for your perspective. We hope that with the planning steps in place for determining the specific circumstances at any given area needing vegetation control, Bonneville will be able to make wise decisions for the appropriate use of methods and mitigation measures in an integrated approach. As we indicated in an e-mail to you, we did not conduct any public meetings in the Aberdeen area, but would have been happy to schedule one with you if you have a group that would like to meet.

Cumulative Impacts

Comment: *As a government agency, you should be protecting us. Those of us who live in Skamania County are already bombarded by pesticides from the county, the state, Southwest Washington Health District, PUD, the railroad, gas lines, plus what private citizens spray. You are not the only ones using pesticides. Please keep that in mind. Of course I understand the need to keep down vegetation but you have better, safer means. . . . You must consider the health of the entire ecosystem, of which we are a part. . . . Finally, the cumulative effect of herbicide applications are difficult to quantify and are not adequately understood. [#9]*

Response: Thank you for voicing your concerns. Bonneville has considered the potential cumulative impacts of our vegetation management program when added to other past and present actions by other parties (see Chapter VI Cumulative Impacts). With this in mind, we have worked to develop a proposal to keep our system reliable while minimizing impacts. We think that promoting low-growing plants (with the integrated use of some herbicide) will lessen overall environmental impacts.

Comment: *An individual from the Confederated Tribes of the Warm Springs Indian Reservation had concerns that Bonneville had incessant intrusions upon the reservation lands; the cumulative effects of all activities was disruptive to their lifestyle and may negatively impact the cultural value of tribal lands. [#31]*

Response: Thank you for voicing your concerns. We hope that engaging the Tribes in the planning processes for managing our facilities that cross your Reservation will address Tribal concerns and issues and help alleviate overall negative impacts. Chapter III (Planning Steps, 2. Identify Surrounding Land Use and Landowners/Managers) has steps for working on Tribal Reservations.

Comments and Responses to *Agencies, Organizations, and Individuals to Whom the EIS is Sent*

Comment: *Page 235, Benewah County should receive a copy. (Idaho) [#1]*

Comment: *State Historic Preservation Offices [SHPOs] need to be on mailing lists. Tribal Historic Preservation Officers (THPOs) with facilities on their reservations, or off-reservation ceded and/or traditional use areas need to be on mail lists. [#13]*

Comment: *Page 232, under Department of Energy: Delete Battelle Labs, replace with Pacific Northwest National Laboratory. Delete Hanford, replace with: Richland Operations Office. Add Idaho Operations Office.*

Page 233: Add Wanapum People to list of Tribal Governments.

Page 234: Under Washington, add the Department of Fish & Wildlife

Page 237: Should the Benton County PUD be added to the list of Electric Utilities?

Page 240: Include Tri-City Herald and Spokane-Spokesman Review. [#22]

Response: The changes have been made; thank you.

Comments and Responses to *Glossary and Acronyms*

Comment: *Page 275, definition of T&E. Add NMFS after USFWS. [#1]*

Response: Thank you for bringing this omission to our attention. The definition has been corrected.

Comments and Responses to *References*

Comment: *Page 250: If information is used, add DOE 1999. Hanford Comprehensive Land-Use Plan Environmental Impact Statement, DOE/EIS-0222F. [#22]*

Response: Thank you. We feel that this plan will be very useful in site-specific analysis/planning for rights-of-way across Hanford. Because it will be used on a site-specific bases and not in this program-wide document, we did not add it as a reference for this document.

Comments and Responses to *Appendices*

FS Mitigation Measures and Background

Comment: *USFS to FS: A small item but isn't the USFS abbreviation incorrect and really should be either USDA-FS or just FS. [#36]*

Comment: *COMMENTS TO APPENDIX "F": USFS MITIGATION MEASURES AND BACKGROUND Page F-1: The reference on that page to BLM (middle of page) is inaccurate. The sentence should be revised to read: "These mitigation measures were developed based on current USFS Land and Resource Management planning documents." [#39]*

Response: Thank you. The corrections have been made.

Comment: *Page F-2: Second Bullet: Revise to read: "Proposals for herbicide use will be subject to the review, and either concurrence or approval, by an authorized Forest Officer." [#39]*

Response: Thank you; the revision has been made.

Comment: *Use of Herbicides: 1) Lolo National Forest Noxious Weed FEIS and Lolo Forest Plan Amendment 11 contains many mitigation measures for use of herbicides on Lolo National Forest. These requirements will need to be incorporated into any spray project proposals which will occur on the Lolo. I would suggest a copy of*

Amendment 11 be forwarded to BPA for inclusion into their planning documents if this has not already been done. [#36]

Response: This is a good example of the type of information that needs to be used in developing or updating right-of-way management plans with the Forest Service for corridors crossing FS-managed lands. As you mentioned, in this circumstance the mitigation measures for use of herbicides on Lolo National Forest should be incorporated into any spray project proposals for Bonneville corridors crossing these lands. Your comment will be forwarded to the Natural Resource Specialist in charge of Bonneville vegetation management activities in your area.

Comment: *Please change the mitigation measure on page F-2 of Appendix F to read, "When seeding, use native species unless the use of non-native species is approved. The appropriate Forest Service Line Officer must approve all seeding mixtures in advance. Consider topping trees as an alternative to felling." [#32]*

Response: Thank you; the change has been made.

Comment: *Also, DEIS Appendix F does not contain all of the mitigation measures found in Lolo Forest Plan Amendment 11. [#36]*

Response: We apologize if not all of the mitigation measures found in the Lolo plans are included in the Appendix; we recognize that they will need to be considered for site-specific vegetation projects. The Appendix is a tool to be used to help recognize and anticipate issues that may need to be addressed and documents that may need to be consulted for site-specific projects on Forest Service lands. It does not replace the need to work with the appropriate Forest when proposing vegetation management activities. The appendix is not all-inclusive, and is not meant to be, because the target is always moving — new Forest service plans are being developed, noxious weed EISs are being finalized, and so on. That is one reason that this information is in an Appendix for this EIS — because we did not want to "outdate" the Bonneville Vegetation Management EIS as soon as it was published.

Comment: *Page F-1: Fourth Paragraph under "Mitigation Measures Specific to the USFS": Revise the paragraph to read: "These mitigation measures will be used in reviewing, updating (as*

necessary) and developing site-specific vegetative management plans for BPA's facilities located on National Forest System lands. Additional measures may be used to adequately mitigate site specific environmental effects or concerns" . . . .

Page F-6, F-7: Recommend that the definitions of "Standards and Guidelines" be moved from Page F-7 and more appropriately be placed in front of all of the planning documents listed on these two pages, just prior to the list beginning with "Forest Plans". Standards and guidelines are common terms used in nearly all land and resource management planning documents. Placing the definitions of these terms as written makes it appear that they (the definitions) are applicable only to their use in the Interior Columbia River Basin Draft EIS's/Appendices. [#39]

Response: Thank you for the suggestions. Changes to this effect have been made.

Comment: *Page F-15, Third Bullet: We can't emphasize enough the importance of this bullet statement with respect to vegetative management activities on National Forest System lands. The statement: "Site specific analysis is needed for all projects" appears here under the "Wildlife and Fish" section of these Mitigation Measures. However, this is a statement that should more appropriately be stated elsewhere in Appendix F, to make it (a) direction applicable to ALL of the BPA's vegetative management activities on NFS lands. We recommend that at the very beginning of Appendix F, language be included which states the following: "Site-specific vegetative management plans, developed in accordance with the standards and guides of this programmatic EIS, should be developed by Program Managers in advance of implementing vegetative management activities on NFS lands. Existing vegetative management plans should be reviewed and revised, if necessary, to make them consistent with the Record of Decision and selected alternative of this EIS". [#39]*

Response: This statement regarding site-specific analysis through the development of vegetation management plans is stated in Chapter III. We have reiterated that statement in the appendix, as suggested.

Comment: *Herbicides and herbicide formulations: In Planning Step 2 (Identify Surrounding Land Use and Landowners/Managers), project*

managers are instructed to review site-specific vegetation management plans for consistency with both U.S. Forest Service and U.S. Bureau of Land Management mitigation measures, which are specified in Appendices F and G of the DEIS. Appendix F lists eight herbicide active ingredients that are approved for use by both USFS and BPA. Experience with USFS vegetation control in Oregon and discussions with USFS personnel indicate that only four herbicide active ingredients (glyphosate, picloram, dicamba, and 2,4-D) may be used in Oregon for any type of vegetation control on USFS lands. These herbicide restrictions result from the Mediated Agreement between the Northwest Coalition for Alternatives to Pesticides, the Secretary of Agriculture, and Oregonians for Food and Shelter (May 24, 1983). Similarly, Appendix G lists 20 active ingredients or combinations that are approved for use in vegetation control by both BLM and BPA. A footnote to this list indicates that throughout all of Oregon, herbicides may only be used for noxious weed control. Experience with BLM vegetation control in Oregon and discussion with BLM personnel confirms that throughout all of Oregon herbicides may only be used for noxious weed control. Only four active ingredients (glyphosate, picloram, or dicamba, and 2,4-D) or combinations (2,4-D plus glyphosate, picloram, or dicamba) may be used in Oregon on BLM lands. While these latter restrictions are stated on page G-2 of the DEIS, other comments by BPA about eastern Oregon restrictions are misleading. We recommend that project leaders carefully review these herbicide restrictions with USFS and BLM personnel as part of Planning Step 2, and that the Final Environmental Impact Statement reflect USFS and BLM policies more accurately. [#40]

Response: Thank you for noting the potential inconsistencies. We have reviewed the lists and made changes. Also, please note that the appendices are tools to help recognize and anticipate issues that may need to be addressed and documents that may need to consulted for site specific projects on Forest Service or BLM lands. They do not replace the need to work with the appropriate Forest or district when proposing vegetation management activities for decisions such as determining appropriate herbicides to be used. The appendix is not all-inclusive, and is not meant to be, because the target is always moving — new Forest service plans are being developed, noxious weed EISs are being finalized, etc. That is one reason that this information is in an Appendix for this EIS — because we did not want to outdate the Bonneville Vegetation Management EIS with old data as soon as it was published.

Comments and Responses to Other Topics Related to this EIS

Comment: *I have read through the DEIS and have no problems with it. [#10]*

Response: Thank you for your comment.

Comment: *I would appreciate a look at the final proposal when completed or any other documentation that may come up regarding noxious weed control on BPA ground. [#10]*

Response: You will be on our mail list to receive the final EIS.

Comment: *Several times the Neitzel 1999 report was mentioned in our comments. A hard copy of the report will be sent to your office, however, it can also be accessed at : http://www.hanford.gov [#22]*

Comment: *A copy of the Hanford Comprehensive Land Use Plan EIS, DOE/EIS-0222F, also mentioned in our comments was sent to Tom McKinney at the Portland office. [#22]*

Response: Thank you.

Comment: *An individual from the Confederated Tribes of the Warm Springs Indian Reservation expressed appreciation for Bonneville's active role in practicing good stewardship of natural resources. [#31]*

Response: Thank you.

Copies of All Letters Received

The 38 comment letters, emails, phone calls, and public meetings received on the Draft EIS are reprinted on the following pages. Each comment is given a unique identifying number that begins with the letters TVM (transmission vegetation management).

Log No.	Name	Affiliation/State
TVM-001	Larry Cooke	US Department of Agriculture, Washington
TVM-002	Matt Voile	Umatilla County Weed Control, Oregon
TVM-003	[Log No. Error]	
TVM- 004	[Log No. Error]	
TVM-005	H.E. Brooks	
TVM-006	Larry Purchase	BPA
TVM-007	Jack Triepke	Murphy Lake Weed Crew, Montana
TVM-008	Rikki Osborn	Idaho
TVM-009	Kim Antieau	Washington
TVM-010	Kevin L. Hupp	Lincoln County Noxious Weed Control Board, Washington
TVM-011	Jay Neil	Pacific Power and Light, Oregon
TVM-012	Mary Kay Leitka	Hoh Tribal Member, Washington
TVM-013	[NA]	Colville Confederated Tribes Vegetation Management Program Meeting Notes
TVM-014	Michelle Stevie	Squaxin Island Tribe, Natural Resources Department, Washington
TVM-015	Lenora A. Oftedahl	Washington
TVM-016	Roy Berger	US Department of the Interior, Fish & Wildlife Service, Idaho
TVM-017	[Log No. Error]	
TVM-018	David Radtke	Oregon
TVM-019	Logan A. Norris	Oregon State University, Forest Science

TVM-020	Sandy Daniel	Panhandle Weed Management Area Steering Committee, Idaho
TVM-021	Kimberly Grigsby	Oregon Department of Fish & Wildlife, Habitat Division
TVM-022	Paul F. X. Dunigan, Jr.	US Department of Energy, Richland Operations Office, Washington
TVM-023	duplicate copy of #21	
TVM-024	Robert L. Vaught	US Department of Agriculture, Forest Service, Colville National Forest, Washington
TVM-025	Bruce Buckley	Oregon
TVM-026	Caryn Miske	Alliance for the Wild Rockies, Montana
TVM-027	Terri Horness	Oregon
TVM-028	Dan Wallermeyer	Skamania County Noxious Weed Control Board, Washington
TVM-029	John Phipps	Mt. Baker–Snoqualmie National Forest, Washington
TVM-030	[NA]	Public Comments – 9/15/99 Public Meeting, Oregon
TVM-031	[NA]	Public Comments – 9/29/99 Affiliated Tribal Meeting
TVM-032	Scott D. Conroy	US Department of Agriculture, Forest Service, Modoc National Forest, California
TVM-033	Darrel L. Kenops	US Department of Agriculture, Forest Service, Willamette National Forest, Oregon
TVM-034	Richard E. Sanderson	US Environmental Protection Agency, Office of Federal Activities, Washington, DC
TVM-035	[Log No. Error]	
TVM-036	Fred Haas	US Department of Agriculture, Forest Service, Plains/Thompson Falls Ranger District, Montana

TVM-037	Terry Roberts	Governor's Office of Planning & Research, California
TVM-038	Paul Hiebert	Idaho Panhandle National Forest
TVM-039	Jack L. Craven	US Department of Agriculture, Forest Service, Washington, DC, Office
TVM-040	Preston A. Sleeger	US Department of the Interior, Office of the Secretary, Oregon
TVM-041	Marcia Cross	The Confederated Salish and Kootenai Tribes of the Flathead Nation, Montana
TVM-042	Elwood Miller, Jr.	The Klamath Tribes, Oregon

This page intentionally left blank.

BPA Public Involvement

RECEIVED BY BPA
PUBLIC INVOLVEMENT
LOG#: TSVM001-001
RECEIPT DATE: AUG 1 6 1999

From: Larry Cooke [larry.cooke@wa.usda.gov]
Sent: Thursday, August 12, 1999 2:07 PM
To: comment@bpa.gov
Subject: deis transmission vegetation

Comments:

figure V.2 Vegetation Type, you are showing light green (Majority deciduous) in many places in Eastern Washington and North Idaho. Most are wrong. The major river bottoms are deciduous and the uplands are coniferous.
page 118 table V.1 shows white fir in mid elevations of the Blues and North Idaho. This is wrong. White fir occurs in southwestern Oregon
page 119, T&E species are listed by both USFWS and NMFS
page 161, the buffer widths for NRCS code 391A are national standards used in a general scope. Most States have supplemented this standard to fit their conditions and situations. There can be many widths depending on the circumstances. You should contact each State to obtain the State supplement to the National Standard
page 275, definition of T&E. Add NMFS after USFWS
page 235. Benewah County should receive a copy

Larry Cooke, Environmental Specialist
316 W. Boone, Suite 450
Spokane, WA 99201
(509) 323-2954
larry.cooke@wa.usda.gov

BONNEVILLE POWER ADMINISTRATION

RECEIVED BY BPA
PUBLIC INVOLVEMENT
LOG#: TSVM001-002
RECEIPT DATE: AUG 1 1999

Transmission System Vegetation Management Program

"I'd Like to Tell You . . ."

1. Of the choices offered in the Draft EIS, I prefer: RH; VS3; MA2
BPA needs to keep all possible methods of "management" available to maintain safe and effective power production and transport.

2. I do not like: The policy that "No action" could be considered a management action

3. You can improve the choices by: Eliminating all but RH, VS3, MA2

4. I have these other comments: Do not weaken your position or stance by accepting any choice but RH, VS3, MA2

5. I need more information about: Nothing

(Use back of sheet if you need more room)

☑ Please put me on your project mailing list. (You are already on the mail list if you received this in the mail.)

Name: Matt Veale, Supervisor Umatilla County Road Dept, Weed Control
Address: 3920 Westgate, Pendleton, OR 97801

Please mail your comments by October 9, 1999 to:
Bonneville Power Administration
Communications Office - KC-7
P.O. Box 12999
Portland, Oregon 97212

Umatilla County Road Department
3920 Westgate • Pendleton, Oregon 97801

BPA Public Involvement

From: hebrooks@aep.com
Sent: Tuesday, August 31, 1999 1:05 PM
To: comment@bpa.gov
Subject: Bonneville Power Draft EIS for transmission

RECEIVED BY BPA
PUBLIC INVOLVEMENT
LOG#: TVM-005
RECEIPT DATE:

I have reviewed the August, 1999 draft. There seems to be adequate unit costs for the various process that tend to lead toward the more cost effective and easier to administer processes. However I feel efficiency which I define as cost divided by time should be the economic evaluation basis. Therefore I suggest the economic evaluation be based on cost per unit per year instead of just cost per unit.

Also, one should look at the cost to maintain the entire system per year instead of cost per unit. Although this may seem to be similar to cost per unit per year, there are differences.

You may wish to consider cycle length and type of cycle in your evaluation. Frequently vegetation on an entire rights of way does not develop at the same rate. However, a utility frequently treats everything as the slower growing vegetation will not wait until the next cycle. We utilize a "just in time" cycle. In this cycle, a vegetative cover type or tree is not worked until actually needed. THIS REDUCES THE COST PER YEAR TO MAINTAIN THE ENTIRE SYSTEM. Cycles within cycles require more intense planning and are trickier to manage but can reduce the frequency of impact for many sites and save money. A just in time cycle also reduces the visual impact to a rights of way.

1

BONNEVILLE POWER ADMINISTRATION

Transmission System Vegetation Management Program

"I'd Like to Tell You . . ."

RECEIVED BY BPA
PUBLIC INVOLVEMENT
LOG#: TVM-006
RECEIPT DATE:

1. Of the choices offered in the Draft EIS, I prefer:

2. I do not like:

3. You can improve the choices by: (1) The Draft EIS is lacking an analysis of the Threatened and Endangered Species. Particularly the effect of applying herbicides along streams, banks where Salmon spawn in cool water and are protected by riparian vegetation. (2) An analysis of the new (just now being drafted) Washington State Dept of Ecology's STORM WATER MANUAL (Vols. 1 through 5). How will that document fit in? (Notice is attached.

4. I have these other comments:

5. I need more information about:

(Use back of sheet if you need more room)

☒ Please put me on your project mailing list. (You are already on the mail list if you received this in the mail.)

Name: LARRY RICHASE (BPA) Ext. 3768

Address:

Please mail your comments by October 9, 1999 to:
Bonneville Power Administration
Communications Office - KC-7
PO Box 12999
Portland, OR 97212

BONNEVILLE POWER ADMINISTRATION

Transmission System Vegetation Management Program

"I'd Like to Tell You . . ."

RECEIVED BY BPA
PUBLIC INVOLVEMENT
LOG# TVM-00-?
RECEIPT DATE:

1. Of the choices offered in the Draft EIS, I prefer: R2 - V51

2. I do not like: Language written under Alternative V51 - Noxious Weeds (p. 5-15 that states "It would allow us to keep in compliance with controlling noxious weed" when the BPA is not currently in compliance with controlling noxious weeds (e.g. on the Kootenai NF) (for invasive weeds currently designated by the State of Montana).

3. You can improve the choices by:

4. I have these other comments: Noxious weed management needs to be more emphasized as a purpose (page 5-5) given the impact (existing or potential) that transmission system vegetation management has on plant communities and adjacent lands, as regards noxious weeds. Perhaps earlier noxious weed management is implied in the third purpose: comply with laws and regulations (1).

5. I need more information about:

(Use back of sheet if you need more room)

☐ Please put me on your project mailing list. (You are already on the mail list if you received this in the mail.)

Name Murphy Lake Weed Crew (c/o Jack Triepke)

Address Murphy Lake R.S. P.O. Box 116 Fortine, MT 59918

Please mail your comments by October 9, 1999 to:
Bonneville Power Administration
Communications Office - KC-7
P.O. Box 12999
Portland, OR 97212

BPA Public Involvement

RECEIVED BY BPA
PUBLIC INVOLVEMENT
LOG# TVM-00-?
RECEIPT DATE:

From: Rikki Osborn [nikki_osborn@hotmail.com]
Sent: Friday, September 10, 1999 10:08 AM
To: comment@bpa.gov
Subject: Transmission System Vegetation Management Program

1. Of the choices offered in the Draft EIS, I prefer any methods that give the biggest amount of tools in the tool box. This appears to be R4, V53, MA2, E1, and NE1. Anytime we can save money on high cost items - especially labor - and still reduce weeds and propagate a plant community of desirable vegetation that will reduce weeds and tall plants, I'm all in favor of it. I belive we can use herbicides to establish this desirable plant community then over time reduce the use of herbicides down to as necessary to combat invasive weeds that have no pathogens or parasites to keep them from spreading rapidly. If the above alternatives are not followed, I would think this would open up enforcement actions by both State and County Noxious Weed Authorities. This would result in fines and the work being done on large scale treatment and large amounts of herbicides which may or may not be on your approved list.

2. I do not like the use of "Environmentally Preferred Alternative". This reference is not in the best interests of long term vegetation management. Invasive weed species without their natural parasites or pathogens from their original homeland love to flourish in these areas. Uncontrolled rapid growth of exotic weeds is not in the best interests of the environment. A do nothing approach as suggested by anti herbicide groups is definitely anti environmental.

3. You can improve the choices by being scientific and not giving in to public action groups that claim to be "Environmental".

4. I would like to see consideration given to native vegetation to propagate your plant community, not just low growing grasses and forbs from where-ever. I think consideration should be given to pressure washing all vehicles and equipment that enter your Right of Way especially from other weed infested sites. This should be done with the view of washing radiator and under carriages where seeds and plant fragments hide.

5. No Comment

Rikki Osborn
Rt. 1 Box 116P
Lenore, ID 83541

Get Your Private, Free Email at http://www.hotmail.com

BPA Public Involvement

RECEIVED BY BPA
PUBLIC INVOLVEMENT
LOG#: TVM-019
RECEIPT DATE:
SEP 1 1

From: kim antieau [kantieau@hotmail.com]
Sent: Tuesday, September 14, 1999 8:55 AM
To: comment@bpa.gov
Subject: transmission system vegetation management program

September 11, 1999

Dear BPA

I was quite distressed upon reading your "transmission system vegetation management program." I am appalled that you are proposing (and probably already using) herbicides with a toxicity category II, III, and IV! These same herbicides are carcinogenic, teratogenic, mutagenic, and effect reproduction. (2,4-D is notorious for causing problems.) And you are actually proposing to use aerial spraying of some of these toxic chemicals?

As a government agency, you should be protecting us. Those of us who live in Skamania County are already bombarded by pesticides from the county, the state, Southwest Washington Health District, PUD, the railroad, gas lines, plus what private citizens spray. I am against any use of herbicides. Of course I understand the need to keep down vegetation but you have better, safer means. If you decide you must use herbicides (which I stronger protest), aerial and broadcast spraying should absolutely be banned from the program. You must consider the health of the entire ecosystem, of which we are a part. You are not the only ones using pesticides. Please keep that in mind.

Sincerely,

Kim Antieau

Get Your Private, Free Email at http://www.hotmail.com

BPA Public Involvement

RECEIVED BY BPA
PUBLIC INVOLVEMENT
LOG#: TVM-010
RECEIPT DATE:
SEP 1

From: Kevin Hupp [khupp@co.lincoln.wa.us]
Sent: Thursday, September 16, 1999 10:22 AM
To: 'comment@bpa.gov'
Subject: DEIS COMMENTS

To Whom it May Concern:

I have read through the DEIS and have no problems with it.

I am glad to see your continued hard-line approach to controlling noxious weeds.

I am also pleased to see your proposal to use Bio-control and Herbicides for these noxious weeds.

I am most happy to see your continued supply of herbicides and biocontrol to landowners who have land where power lines travel through.

I would appreciate a look at the final proposal when completed or any other documentation that may come up requarding noxious weed control on BPA ground.

Sincerely,

KEVIN L. HUPP, COORDINATOR
LINCOLN COUNTY NOXIOUS
WEED CONTROL BOARD
PO BOX 241
DAVENPORT, WA. 99122
(509 725-3646
<NOXIOUSWEEDS.COM>

Kuehn, Virginia (Ginny) -KCC-7

RECEIVED BY BPA
PUBLIC INVOLVEMENT
LOG#: TVM-011
RECEIPT DATE
SEP 1 '99

From: Jay Neil@PacifiCorp.com
Sent: Friday, September 17, 1999 7:21 AM
To: Kuehn, Virginia (Ginny) -KCC-7
Subject: External Generic (NOTA) information request

NOTE: A copy of what the sender submitted on the form was e-mailed back to them.

Submitter: Jay Neil

Their e-mail address: Jay_Neil@PacifiCorp.com

Date Submitted : 9/17/99 7:20:49 AM

Their address:

Pacific Power and Light
attn: Jay Neil
1247 Montgomery St. SE
Albany, OR. 97321

Their telephone: (541)967-4464

Their request or Comment:

In last night's Albany Democrat-Herald, there was a statement that BPA was seeking comments on your vegetation management program I am a Forester with Pacific Power and Light and what I would love to see you folks do is to start notifying property owners when your crews are coming through a right-of-way performing vegetation management work. We receive many irate calls every year here at Pacific Power from customers who think that work that was done by your crews was done by us. We end up having to go out and investigate each of these calls which costs us a good bit of time.Yor Vegetation Management Department could certainly improve your communications with your "neighbors" so that these folks know who to contact with their questions and/or concerns.

Technical web information on submitter.

Page they were on before submitting form: Manually entered URL or retrieved page from disk cache.

The IP address user is at: 205.168.193.29

The screen resolution of their browser (Width x Height): 640 480

The type of browser used: Mozilla/4.0 (compatible; MSIE 4.01; MSN 2.5; AOL 4.0; Windows 98)

1

BPA Public Involvement

RECEIVED BY BPA
PUBLIC INVOLVEMENT
LOG#: TVM-012
RECEIPT DATE
SEP 1 '99

From: Mary Leitka [maryleitka@hotmail.com]
Sent: Wednesday, September 15, 1999 8:26 AM
To: comment@bpa.gov
Subject: BPA

TO: BPA
FROM: Mary Kay Leitka

I am a Hoh Tribal member from the State of Washington and I am also a cultural teacher. I teach the traditional weaving of the coastal Indian throughout the Pacific Northwest. I attended a conference in Reno on June, 1999. During the Califomal Basketweavers conference I was on a panel with the Chief of Bureau of Land Management, Department of Fisheries and Forestry from Washington D.C. The weavers was presented with a draft administrative rules concerning the gathering sites and permits to gather. I told the parties on the panel that I felt it was a violation of my treaty right to gather where we have always gathered as stated in the treaty. I also stated that I do not believe that tribal council can change my treaty right and any agreement that is signed should have be reviewed by the traditional Indian people. I have been on the tribal 21 years before I resigned in 1996, so I know all of the administrative rules that the government can present only to the council and not the people. I have reviewed your draft and I was wondering if you have contacted the tribes that are in the area for any review about the use of herbicides. I think that the statement on the draft is very important and BPA should really take into consideration the Indian people and use of the materials throughout the country. "Intergrated Vegetation Management (IVM) is a strategy to cost-effective control vegetation with the most benign overall long-term EFFECT ON PUBLIC HEALTH AND SAFETY AND THE ECOSYSTEM. I was told by my mother that it is important to protect everything in our circle of life because one thing depends upon the other, everything on this earth has a purpose. As a traditional weaver and teacher I would oppose to the of any herbicides because of not knowing the effect on plants,animals, water, roots, and materials used for weaving. I think that it very important for the agencies to deal with the methods appropriately and with respect not only for Mother Earth but also the people. I would like to be informed of any hearings that will be held in the Aberdeen area so that I can attend.

Mary Kay Leitka

Get Your Private, Free Email at http://www.hotmail.com

1

Colville Confederated Tribes
Vegetation Management Program DEIS Meeting Notes
9/7/99

RECEIVED BY BPA
PUBLIC INVOLVEMENT
LOG#: TVm - 613
RECEIPT DATE:

Attendees:
Adeline Fredin – Tribal Historic Preservation Officer
Joaquin Cleveland – Vegetation Management Officer
Bob Shank – BPA Tribal Liaison
Hope Pennell – BPA Cultural Resources
Stacy Mason – BPA EIS Project Coordinator

Tribal fishing, hunting, and plant gathering areas extend much farther than reservation boundaries, and include the **traditional use areas** of the twelve tribes comprising the Colville Confederated Tribes. Because the Tribes retain rights in ceded and traditional use areas, Tribal representation on ROW Management plans developed for off-reservation areas used by the Tribes (in addition to management plans for the reservation) are necessary. Snoqualmie Pass, Moses Lake, Stevens Pass are some examples of CCT gathering areas. Some of the plants that are gathered annually by Tribal members include huckleberry, elder berry, mushrooms, willows, a variety of celery's, potatoes, carrots, camas root, bitter root etc.

We should have the opportunity to represent our interests in areas that are traditional (Colvilles did not sign any document abdicating their rights). [Will send Bonneville a map of Colville's traditional use areas.]

Spiritual values of **burial sites** must be considered as well as managing ancestral remains. Although you may not disturb the ground, herbicide spraying above the ground may impact spiritual value. If lines cross burial sites, some tribal members would not like herbicide used on those sites – others might want herbicide use if it controls knapweed.

It is a federal responsibility to identify and avoid burial sites if present. Even if identified, burial sites are not always managed respectfully. To better ensure burial sites aren't impacted during vegetation control activities, burial site locations should be recorded in a database so information is retrievable and accessible to managers prior to issuing work contracts.

Concerns with **weeds along all access roads** – they need to be treated. Sometimes access roads are owned by the county or others, and used by Bonneville and no one takes responsibility for treating weeds.

Regarding washing vehicles to prevent spread of weeds/seeds -- If there is a concern with washing vehicles with power washers (oils, metals) use an airgun to blow off noxious weeds.

SHPO's need to be on **mailing lists**.
THPO's, with facilities on their reservations, or off-reservation ceded and/or traditional use areas need to be on mail list.

Confederated Tribes of the Colvilles includes:
Wenatchee;
Moses;
Chelan;
Entiat;
Methow;
Okanogan;
Nespelem;
Sanpoil;
Lakes;
Colville;
Palouse; and
Chief Joseph Band of Nez Pierce

Regarding need for **formal consultation** – Bonneville will get back to Adeline and Joaquin on how we plan to address their comments, decide then if they need to review a draft of EIS before going Final, or if consultation more appropriate at the implementation stage.

This is an opportunity for weeds to be managed together with cultural resource and traditional use area management.

SQUAXIN ISLAND TRIBE

RECEIVED BY BPA
PUBLIC INVOLVEMENT
LOG# TVM - 014
RECEIPT DATE:
SL

Bonneville Power Administration
Communications Office
P.O. Box 12999
Portland OR 97212

September 15, 1999

Stacy Mason,

The Squaxin Island Tribe appreciates the opportunity to review and comment on BPA's Vegetation Management Program. As land and fisheries managers we are currently faced with many controversial issues. Several issues of concern include salmonid health, the preservation of fish habitat and water quantity and quality. In light of the Endangered Species Act and the numerous proposed listings for wildlife and salmonid species, it has become essential for managers to lessen the environmental impacts of their activities.

After careful review of the proposed Vegetation Management Program draft EIS we feel that the proposal is biased towards the use of herbicides rather than manual or mechanical forms of vegetation control. The Tribe advocates the use of manual and mechanical methods as well as the planting of low growing native plant species. While the Tribe does not oppose the use of pesticides, we recommend that pesticides only be used as a last resort when other strategies have failed or are impractical. The Tribe does not support the introduction of non-native biological control species.

All of the pesticides listed in the BPA proposal are restricted for use in or near water and/or wetlands. Several of the pesticides are toxic to fish and have the potential to cause ground water contamination. **All pesticides toxic to aquatic life and subject to soil leaching should be prohibited from further use.** These chemicals include but are not limited to: triclopyr, trifluralin, pendimethalin, dimethylamine (2,4D), benefin, bromacil, halosulfuron-methyl, hexazinone, and picloram.

The management proposal does not address buffers on streams and wetlands. We have concerns about the protection of these critical areas and recommend the following: pesticides should not be used in areas associated with water or riparian/wetland vegetation. Rashin's 1992 study on aerial application of pesticides showed that pesticides were detected in streams following application on all the study sites monitored, thus being out of compliance with label requirements. The study recommended that a 90 meter buffer be applied along flowing streams. Manual and mechanical applications typically are at higher concentrations and droplet size of drift is also larger. These applications need careful monitoring to ensure that herbicides are not entering buffer areas and water.

If pesticides are applied we recommend that a minimum 250 foot buffer be applied along all streams and wetlands and that drift into buffer areas be prohibited. Stream and wetland buffers provide many functions and by allowing herbicides to enter these protected areas certain functions are lost.

NATURAL RESOURCES DEPARTMENT / S.E. 3100 Old Olympic Hwy, Box 3 / Shelton, WA 98584
FAX 426-3971 / Phone (360) 426-9783

Another concern is the identification and location of streams and wetlands. What methodology is used to detect these areas? During Rashin's pesticide study it was noted that not all stream channels were identified prior to pesticide application. Methods to identify flowing water included aerial viewing and road crossings. We suggest that all streams and wetlands be field verified and their buffers flagged prior to any maintenance activity.

Program Alternative Recommendations

Right of Way Program

The Tribe supports the use of low growing vegetation to out-compete other plant communities as a way of controlling undesirable plant species. We recommend seeding only native and preferably indigenous plant and grass species. Using native/indigenous species which are climatically adapted to geographic areas raises the survivability rate and helps control the introduction of non-native/noxious weed species. Studies have also shown that native, indigenous plant species provide higher food values to animals species adapted to these regions.

For vegetation control we support the use of mechanical and manual methods. Soil disturbance can be kept at a minimum by raising mower heights as well as using vegetation species which do not require maintenance. When controlling noxious weeds many mechanical and manual methods can be very successful. We support utilizing these methods for primary control and the use of pesticides only in extreme circumstances.

Electric Yard Program

If ground cloths that help prohibit plant growth can be utilized in these areas it would reduce the need for maintenance as well as the use of pesticides.

Non Electric Program

It is preferable that landscaping utilize native plants to reduce the use of pesticides, fertilizers and water resources. Landscaping with native plants is aesthetically pleasing, virtually maintenance free, and requires no fertilizers and less irrigation.

Please continue to keep us informed; we look forward to your response to our recommendations. If you have any questions please contact me at 360-426-9783.

Sincerely,

Michelle Stevie
Habitat Biologist

BONNEVILLE POWER ADMINISTRATION

RECEIVED BY BPA PUBLIC INVOLVEMENT TM-C15
RECEIPT DATE: SEP 23 1999

Transmission System Vegetation Management Program

"I'd Like to Tell You . . .

1. Of the choices offered in the Draft EIS, I prefer: herbicide - spot and localized for noxious weeds only. I would vastly prefer a hedgerow approach where low growth vegetation is promoted to limit destruction of fish & wildlife habitat

2. I do not like: any kind of broadcast or aerial application of poisons of any kind.

3. You can improve the choices by: employing full time staff to do vegetation maintenance along rights of way. Employ people rather than poison to control plants.

4. I have these other comments: We need to keep as much green stuff as we can in a number of species, not just grass. Also if wildlife is allowed in the R.O.W. they will help inhibit plant growth to some degree. OVER for more →

5. I need more information about:

(Use back of sheet if you need more room)

☒ Please put me on your project mailing list. (You are already on the mail list if you received this in the mail.)

Name: Lenora A. Oftedahl

Address: 2814 NW 108th St Vancouver WA 98685

Please mail your comments by October 9, 1999 to:
Bonneville Power Administration
Communications Office - KC-7
P.O. Box 12999
Portland, OR 97212

Debris should be composted.
If you don't kill the plants but cut and prune you won't have a revegetation question.

United States Department of the Inte

FISH AND WILDLIFE SERVICE

Snake River Basin Office, Columbia River Basin Ecoregion
1387 South Vinnell Way, Room 368
Boise, Idaho 83709

RECEIVED BY BPA
PUBLIC INVOLVEMENT
LOG#: TVM-016
RECEIPT D: SEP 8 1999

September 13, 1999

Stacy Mason, Project Manager
Department of Energy
Bonneville Power Administration
P.O. Box 3621
Portland, Oregon 97208-3621

Subject: Draft Environmental Impact Statement (DOE/EIS-0285) for the Transmission System Vegetation Management Program
File #501.0000

Dear Ms. Mason

We have reviewed the subject document, and have the following comments. We recommend that you conduct detailed ground surveys for listed plant species, particularly *Spiranthes diluvialis* (Ute ladies'-tresses) along the South Fork of the Snake River in eastern Idaho, prior to implementing any form of vegetation management in areas where this species is known to occur or areas that support potential habitat for this species. If this species is found in the project area, efforts to avoid impacts to *S. diluvialis* should be pursued.

Please contact Edna Rey-Vizgirdas of my staff at (208) 378-5259 if you have any questions regarding this matter.

Sincerely,

Supervisor, Snake River Basin Office

David Radtke
PO Box 244
Yachats OR 97498
541 547-3087

RECEIVED BY BPA
PUBLIC INVOLVEMENT
LOG#: TVM-018
RECEIPT: OCT 01 1999

September 12, 1999

BPA
Communications Office KC-7
PO Box 12999
Portland OR 97208

Subject: Comments on Draft EIS for the BPA transmission system Vegetation Management System

In the Siuslaw Forest, Waldport Ranger District, a major north-south BPA transmission line cuts a swath about 300 yards wide through areas of timber that will never be cut again under the National Forest Plan. These areas used to be sprayed with herbicides, creating a grassy meadow area miles long.

As we understand the BPA-USFS agreement, these transmission right-of-way areas were supposed to be managed for "wildlife". Keeping the areas in a brush cycle now does not accomplish this earlier objective. We would like the BPA and USFS to honor their past agreement by keeping the areas in a grassy meadow condition. This would provide an alternative for wildlife such as deer and elk, etc. to the older forests surrounding these transmission lines. Could the BPA and USFS return to controlling brush (by mechanical or manual means) for grassy growth?

David Radtke

David Radtke

Hans Radtke

HANS RADTKE

Kuehn, Virginia (Ginny) -KCC-7

RECEIVED BY BPA
PUBLIC INVOLVEMENT
LOG#: TVM-019
RECEIP
OCT 0 1 1999

From: Mason, Stacy L. - KECP
Sent: Tuesday, October 05, 1999 2:30 PM
To: Kuehn, Virginia (Ginny) -KCC-7
Subject: FW: Draft EIS

Ginny -

If it hasn't already, the comment below from Logan Norris needs to be added into the Transmission System Vegetation Management EIS comment log.

thanks
stacy x5455

----Original Message----
From: Powers, Eric N. - KECN
Sent: Tuesday, October 05, 1999 1:55 PM
To: Mason, Stacy L. - KECP; Beraud, Bob - KECN; Graetzer, Inez - KECN
Subject: FW: Draft EIS

I believe this comment belongs to you Stacy.

----Original Message----
From: Logan A. Norris [mailto:norrisl@FSL.ORST.EDU]
Sent: Tuesday, October 05, 1999 1:52 PM
To: ea_coordinator@bpa.gov
Subject: Draft EIS

I have reviewed the draft EIS on vegetation management. It incorporates the concepts of integrated vegetation management, making use of a variety of approaches to achieve the vegetation management goals of your program. In my opinion it takes a balanced and scientifically sound approach to the issues involved. Based on my personal scientific and technical knowledge, I believe the use of a combination of the chemicial, mechanical and manual methods outlines in the EIS will be effective and can be carried out with little or no adverse environmental impact or impacts on the health of humans.

Logan Norris, Ph.D.
Professor of Forest Science
Oregon State University

BPA Public Involvement

RECEIVED BY BPA
PUBLIC INVOLVEMENT
LOG#: TVM-020
RECEIP?
OCT 0 1 1999

From: Sandy Daniel [sdaniel@co.kootenai.id.us]
Sent: Monday, October 04, 1999 3:33 PM
To: 'comment@bpa.gov'
Cc: 'ggibson@uidaho.edu'
Subject: BPA response

BPA response.doc

Attached is the comment form for the BPA Transmission System Vegetation Management Program Draft EIS. We appreciate the opportunity to comment.

Your EIS was reviewed by the Panhangle Weed Management Area Steering Committee. This group is formed of federal, state and local agency folks, as well as private citizens, and others with an interest in noxious weed control. The purpose of the group is to "erase" jurisdictional boundaries and work toward the common goal of noxious weed control and eradication. The PWMA covers the five northern counties of Idaho; Spokane and Pend Oreille Counties in Washington; Lincoln, Sanders, and Mineral Counties in Montana; and the East Kootenai District of British Columbia.

The Steering Committee voted unanimously to support BPA's preferred alternative for vegetation control. One caveat was voiced, however, that it will be important to monitor the treatment and effectiveness over a long period of time. At first blush, it appears BPA is hoping to decrease manhours and costs in annual treatments after the initial emphasis period. While such a goal can be realized, the fact is that noxious weeds can move in quickly without constant watchfulness to ensure they don't. In other words, don't turn your back after 5 years, hoping the good control you've achieved is all that needs to be done.

Thank you again for the opportunity to comment. Please let us know if we can be of assistance. Partnering to control these invaders is the best way to ensure success.

Sandy Daniel
Vice-Chair
Panhandle Weed Management Area

BONNEVILLE POWER ADMINISTRATION TVM-020

Transmission System Vegetation Management Program

"I'd Like to Tell You..."

1. Of the choices offered in the Draft EIS, I prefer: We agree with the Bonneville Power Administration preferred alternatives.

2. I do not like:

3. You can improve the choices by:

4. I have these other comments: The Panhandle Weed Management members urge you to consider scheduled visits to the sites to ensure undesirable vegetation, and particularly noxious weeds, are controlled after your emphasis period is completed. Noxious weeds, because of the longevity of viable seed, can quickly take over these sites even though you may have actively controlled the area for 5 years. Long-term monitoring will be required.

5. I need more information about:

☐ Please put me on your project mailing list. (You are already on the mail list if you received this in the mail.)

Name

Address

Please mail your comments by October 9, 1999, to:

Bonneville Power Administration
Communications Office – KC-7
P.O. Box 12999

BPA Public Involvement

From: Annabelle_L_Rodriguez@RL.gov
Sent: Wednesday, October 06, 1999 2:07 PM
To: comment@bpa.gov
Cc: Paul_F_Jr_Dunigan@apimc01.rl.gov; Annabelle_L_Rodriguez@apimc01.rl.gov
Subject: U.S. DOE - Richland Operations Office Comments on Transmission Sy stem Vegetation Management DEIS

RECEIVED BY BPA
PUBLIC INVOLVEMENT
LOG#: TVM-023
RECEIP
OCT 0 7 1999

Attached are the comments from the Richland Operations Office. Thank you for giving us the opportunity to comment.

Several times the Neitzel 1999 report was mentioned in our comments. A hard copy of the report will be sent to your office, however, it can also be accessed at: http://www.hanford.gov

A copy of the Hanford Comprehensive Land Use Plan EIS, DOE/EIS-0222F, also mentioned in our comments was sent to Tom McKinney at the Portland office. However, if an additional copy is needed please call me at the phone # below or email at: annabelle_l_rodriguez@rl.gov <mailto:annabelle_l_rodriguez@rl.gov>

Annabelle L. Rodriguez for Paul F.X. Dunigan Jr., RL NEPA Compliance Officer
NEPA
(509) 372-0277

Bonneville Power Administration Transmission System
Vegetation Management Program
Draft Environmental Impact Statement
(DOE/EIS-0285)

General Comment: The BPA EIS did a fairly good job in presenting the case but there are a few areas that could be enhanced with a little more detail or thought. In particular, it appears that they have not given the shrub-steppe ecosystem much attention during their analysis but instead dwell mainly on forest system. The reader is supplied with reasonable maps within the document which show the location of transmission lines, but unless I missed it, there was no text on the mileage of the transmission lines in each of the major ecosystems – grasslands, shrub, and forest.

Specific Comments:

1. No text on mileage of transmission lines in each of the major ecosystems within the text.
2. No discussion about partnerships with public and private industries to utilized transmission right-of-ways for compatible uses that would maintain vegetation at optimum heights. Such actions as the berry industry, pulp and paper industry or Christmas tree farming were not reviewed.
3. Vegetation types need to be revised and possibly expanded. Little mention is made of the shrub-steppe ecosystem although BPA on page117 wants the reader to consider the shrubland ecosystem as containing the shrub-steppe ecosystem. Shrublands according to BPA can be located in high precipitation areas or low precipitation areas and is also Range Land. This classification is not practical and takes in too many independent ecosystems. I feel that the shrub-steppe ecosystem, a low precipitation ecosystem, warrants its own discussion since according to the maps provided, many miles of transmission lines cross this ecosystem type.
4. Figure V-2, Vegetation Types, does not depict the shrubland ecosystem as stated on page116 of the text.
5. The reader is at a loss as to what BPA will do where transmission lines cross shrubland ecosystems. If no vegetation management will be done in these ecosystems it should be mentioned in the document.
6. BPA failed to review the alternative method of running transmission lines underground through specially constructed cooling system thus eliminating the extensive need for vegetation management.
7. I did not find in the text of the document any discussions on State Sensitive Species, nor did I locate any information on the Migratory Bird Treaty Act.
8. For any actions that may take place on the Hanford Site, BPA must consult the document Biological Resources Management Plan.
9. For any actions on the Overlay Wildlife Refuges on the Hanford Site, BPA must consult with the US Fish and Wildlife Service which manages these lands for DOE-RL.
10. Page 28, last ¶: should *troller* read roller?
11. Page 31, 4th ¶, Does this statement mean BPA has also worked with Hanford?
12. Section on Replanting: has replanting been done on the Hanford site?
13. Page 59, last bullet: add "*and the U.S. Department of Energy*"
14. Page 119, Table V-2, see Neitzel 1999
15. Page 121, last ¶, "…crosses 10 sole-source…" however there are only 9 listed.
16. Page 122, 1st ¶, sentence 3, clarify Snake River: "…and flows through Idaho *and along the Oregon-Idaho border* into *Washington*…"
17. Page 131, **Land Use Section:** Add a Section for the **Hanford Site.** Indicate that "*Coordination must be done with DOE, Richland Operations Office and the U.S. Fish and Wildlife Service for actions that take place on the Hanford Site*"
18. Page 132, Under **Washington** add a discussion on Federal Lands in Eastern Washington, such as DOE.
19. Page 135, 5th ¶. U.S. DOE also complies with NEPA
20. Page 138, 2nd bullet: add *Confederated Tribes of the* Umatilla Indian Reservation
21. Page 139: see Neitzel 1999
22. Page 164, **Herbicide Impacts:** The Hanford site has a Weed Control Plan. A copy will be provided to BPA.
23. Page 165, **Mitigation Measures:** at Hanford a Cultural Resource Survey is needed before any ground disturbance is done.
24. Page 174, **Mitigation Measures:** Hanford shrub-steppe has not been designated as Critical Habitat, but the State of Washington has classified it as "priority habitat"
25. Pages 184 and 185: Need to include discussion of other federal managed lands (DOE, etc.)
26. Page 187, 5th bullet: To what degree has the notification been done? It appears that it was not done for Hanford, unless receiving the draft was the extent of the notification.
27. Page 195, 6th ¶, 2nd sentence: at the end of the sentence add "*or exposure to downwind draft*". Page 195, last ¶: is "nearby residents" an Environmental Justice concern? Are there lower income people that live closer to the corridors than others?
28. Page 232, under **Department of Energy**: Delete Battelle Labs, replace with *Pacific Northwest National Laboratory*. Delete Hanford, replace with *Richland Operations Office*. Add *Idaho Operations Office*.
29. Page 233: Add *Wanapum People* to list of Tribal Governments.
30. Page 234: Under Washington, add the Department of Fish & Wildlife
31. Page 237: Should the Benton County PUD be added to the list of Electric Utilities?
32. Page 240: Include *Tri-City Herald* and *Spokane-Spokesman Review*.
33. Page 250: If information is used, add *DOE 1999. Hanford Comprehensive Land-Use Plan Environmental Impact Statement, DOE/EIS-0222F.*

Oregon
John A. Kitzhaber, M.D., Governor

Department of Fish and Wildlife
Habitat Division
2501 SW First Avenue
PO Box 59
Portland, OR 97207
(503) 872-5255
FAX (503) 872-5269
TTY (503) 872-5259
Internet www.http://www.dfw.state.or.us/

October 5, 1999

RECEIVED BY BPA
PUBLIC INVOLVEMENT
LOG# TVm - 023
RECEIPT DATE: OCT 07 1999

Bonneville Power Administration
Communications Office – KC-7
P.O. Box 12999
Portland, OR 97208

RE: Comments on Draft EIS for the Transmission System Vegetation Management Program

The Oregon Department of Fish and Wildlife (Department) appreciates the opportunity to comment on Bonneville Power Administration's Transmission System Vegetation Management Program. The Department's comments pertain to the vegetation management in rights-of-way, rather than electric yards and non-electric facilities.

The Department generally support's Bonneville Power Administration's (BPA) proposed mitigation measures to reduce the impacts on fish, wildlife and their habitat. However, the Department would request that BPA consider the following changes or additions to those mitigation measures.

First, the Department strongly supports the use of riparian buffer zones and herbicide-free zones described in Tables VI-2 and VI-3. However, due to their high toxicity, the Department requests that BPA refrain from using the following herbicides within 30.5 m (100ft.) of waterways, **regardless of the application method**: 2,4-D (highly toxic to aquatic organisms in some formulations), Benefin (highly toxic to aquatic organisms), Diuron (highly toxic to aquatic invertebrates); Pendimethalin (highly toxic to aquatic organisms); and Trifluralin (very highly toxic to aquatic organisms).

Second, the Department requests that BPA limit use the following herbicides due to the lack of data on the toxicity to fish and/or wildlife: Halosulfuron-Methyl; Imazapyr; and Sulfometuron-Methyl.

Third, the site-specific planning steps for water resources state that "(i)f using herbicides, it may be necessary to leave untreated zones (filter strips) to preclude the possibility of herbicide movement from the application site to adjoining water bodies." (emphasis added). The Department requests that BPA always apply this mitigation measure near adjoining water bodies.

Fourth, the mitigation measures for soils state BPA will "consider reseeding or replanting seedlings on slopes with potential erosion problems." (emphasis added). The Department requests that BPA actually reseed or replant seedlings on slopes with potential erosion problem (rather than just considering doing so), for slopes with 10 percent of soils exposed.

Finally, the Department requests that BPA consider timing restrictions to reduce impacts on wildlife species in addition to federally listed threatened and endangered species. The state of Oregon has listed several species as threatened or endangered that have not been listed by the federal government. These species include the Arctic Peregrine Falcon (*Falco peregrinus tundrius*), the Kit Fox (*Vulpes macrotis*) and the Wolverine (*Gulo gulo*). The Department has also listed numerous species as "sensitive." Prior to significant vegetation management activities, BPA should contact local Department biologists to discuss timing such activities to avoid unnecessarily impacting these species.

If you have any questions, please contact me at (503) 872-5255, extension 5587.

Sincerely,

Kimberly Grigsby
Special Projects Coordinator
Habitat Division

C David McAllister, HD, ODFW

United States Department of Agriculture
Forest Service
Colville National Forest
Federal Building
765 South Main
Colville, WA 99114
509-684-7000
Fax: 509-684-7280

File Code: 2150

Date: October 4, 1999

BONNEVILLE POWER ADMINISTRATION
COMMUNICATIONS OFFICE - K-7
PO BOX 12999
PORTLAND OR 97212

RECEIVED BY BPA
PUBLIC INVOLVEMENT
LOG#: TVm-024
RECEIPT
OCT 1 7 1999

Dear Sirs:

We are responding to your request for comment on your Draft EIS Transmission System Vegetation Management Program. BPA has several transmission lines that cross the Colville National Forest. Many of these rights of ways contain noxious weeds, and we are very concerned that if these infestations are not treated, they will remain a perennial source of reinfestation of adjoining National Forest System lands. For this reason we are supportive of your preferred alternative R4, which approves all methods of control.

However, when planning ROW treatments on the Colville Forest, as well as other National Forest lands in Region 6, I want to remind you that BPA must also comply with the terms of the Mediated Agreement to the EIS Managing Competing Unwanted Vegetation. This document emphasizes prevention activities, but it also restricts the types of chemicals that can be used on National Forest System lands. If you do not have a copy of this document you can obtain one from our Portland Office or from our office in Colville.

When you plan a specific project on the Colville Forest, we are more than willing to coordinate with you and help insure that the terms of the Mediated Agreement, as well as other applicable laws and regulations regarding vegetative treatment on National Forest System lands are followed. Please contact John Ridlington at our Colville office (509-684-7191) if you have further questions or need assistance.

Sincerely,

ROBERT L. VAUGHT
Forest Supervisor

cc: jridlington

Caring for the Land and Serving People

Printed on Recycled Paper

RECEIVED BY BPA
PUBLIC INVOLVEMENT
LOG# TVm-025
RECEIPT
OCT 12 1999

BPA F 1240.02
(04-91)
(Previously BPA 1508)

U.S. DEPARTMENT OF ENERGY – BONNEVILLE POWER ADMINISTRATION
800 TELEPHONE LOG

LOG NO.
DATE 10/12/99
TIME
NAME Bruce Buckley
FIRM (IF APPLICABLE) PO Box 525
ADDRESS Waldport, OR 97394
PHONE NO. 541-563-2726
CALL RECEIVED BY GK
INFORMATION REQUESTED/COMMENT
Comment – Vegetational Mgmt Program

Due to the fact that there is a number of domestic water systems, particularly with the first few towns south of the Alsea River. Doesn't want to see any herbicide application in those areas. They have a number of surface systems in the area and some wells south of the first few towns.

Thank you for letting me comment.

Alliance for the Wild Rockies
PO Box 8731 • Missoula, Montana • 59807
Ph. 406-721-5420 • Fax. 406-721-9917
Web: http://www.wildrockies.org/awr
Email: awr@wildrockies.org

RECEIVED BY BPA
PUBLIC INVOLVEMENT
LOG#: TVM-C-26
RECEIPT
OCT 12 1999

Bonneville Power Administration
Communications Office
P.O. Box 12999
Portland, OR 97212

October, 1999

Re: Transmission System Vegetation Management Program

Dear Bonneville Power Administration:

On behalf of the Alliance for the Wild Rockies (AWR), I am submitting comments pertaining to the Transmission System Vegetation Management Program DEIS. AWR appreciates the opportunity to participate in this planning process and we support the Administration's effort to control vegetation using means which minimize adverse environmental impacts.

However, AWR is concerned several of the preferred alternatives, especially alternatives, especially the R4/VS3 alternative which would permit Bonneville to utilize broadcast and aerial herbicide treatments, impacting both target and non-target vegetation. Herbicide treatments have caused historic and repeated problems at numerous junctures, including manufacturing, transport, storage, application, dispersal, transformation into other toxic chemicals and disposal. In particular, herbicide applications do nothing to change the conditions which allowed the noxious weeds or other vegetation to establish in the first place, and such applications may leave the soil bare, a condition that favors re-establishment. Therefore, the dependency on toxic chemicals to manage vegetation is difficult to overcome unless it is part of an explicit program to prevent the re-establishment of such vegetation and to eliminate the need to use herbicides in the future.

In addition, the direct effects of numerous herbicides are being found to affect the endocrine systems of both wildlife and humans. This can compromise development, reproduction, behavior, sexual integrity, and immune and nervous system functioning. Furthermore, herbicide use may include the removal of vegetation upon which wildlife species rely, increases in water temperature as vegetation is removed, etc. Finally, the cumulative effect of herbicide applications are difficult to quantify and are not adequately understood.

AWR appreciates the Administration's need to control vegetation. However, based upon the above discussion, the use of chemical control agents should be revisited. More specific comments on the DEIS are provided below.

Biological Control Agents (S-9) - the usefulness of sheep were discounted due primarily to logistics. However, Bonneville could utilize the services of a 3rd party to provide sheep, thereby eliminating logistical problems. The use of sheep should be revisited.

Herbicide Use - the DEIS states that wildlife would not be impacted by herbicide use. Since the direct impacts associated with herbicides are at best uncertain, and will vary depending upon the chemical agent, this statement does not seem well founded (S-7). Will areas be surveyed in advance to ascertain the presence of organic farming operations (S-7)? Will Bonneville map all right of ways to determine soil conditions, slope, etc. in order to determine whether or not granular herbicides should be prohibited (S-7)?

Reseeding (S-9) - when reseeding is undertaken will native species be used? More specifically, will the Administration select plants that will provide food, hiding cover, thermal cover, nest sites, etc. for grizzly bear, elk, migratory birds and other wildlife?

Alternative MA2 (S-11)- AWR supports this alternative assuming that native plants will be used and habitat improvements will be incorporated into this program. The reliance on spot-herbicide treatments should be minimized or eliminated.

Alternative VS3 (S-16)- if herbicides are used, only noxious weeds and deciduous plants that compete with the low growing plants should be targeted. Using herbicides on any type of vegetation would likely have adverse environmental impacts and should not be undertaken. In particular, the Administration should not use herbicides on plant species consumed by wildlife.

Alternative NE2 (S-17) - the argument for using herbicides is often related to access and cost effectiveness. Therefore, landscaping at non-electric facilities should be readily able to utilize non-herbicide methods to manage noxious weeds.

Corridors (pg. 12-13) - the EIS discusses feathering. However, inadequate analysis is presented as to edge effects, how to minimize such effects, impacts on interior forest. The vegetation management plan for right of ways should consider corridors and their impacts on particular wildlife species in more detail. Although the Administration wants the longest possible maintenance free period, shorter period should be considered if impacts to threatened and endangered species are possible.

AWR supports the MA2 alternative, with a focus on manual and biological control agents. Mechanical methods should be used sparingly, and only where soil conditions and wildlife can readily tolerate such invasive procedures. Herbicides should not be utilized based on the above discussion. However, if such chemicals are used, under no circumstances should broadcast and aerial methods be employed.

AWR appreciates the opportunity to comment on the proposed noxious weed control strategy.

Sincerely,

Caryn Miske
Ecosystem Defense Intern

Missoula Office:
801D Sherwood St. • Missoula, MT • 59802
406-721-5420 • awr@wildrockies.org

Boise Office:
1714 Heron • Boise, Idaho • 83702
208-386-9014 • wildrockies@fastbois.com

Ecosystem Defense Program
406-542-0050
ecosystem-defense@wildrockies.org

BONNEVILLE POWER ADMINISTRATION

Transmission System Vegetation Management Program

"I'd Like to Tell You . . ."

RECEIVED BY BPA
PUBLIC INVOLVEMENT
LOG#: TVM-017
RECEIPT: Oct 11 1999

1. Of the choices offered in the Draft EIS, I prefer:

2. I do not like:

3. You can improve the choices by:

4. I have these other comments: I would like to see prior notification of exactly when our area will be aerial sprayed. This could be done through newspapers giving us an approximate date of application, and then you supplying us with a hot-line number to call to get a specific date and time (subject to change because of weather) we may have to call more than once as the hot line is updated. This would be so beneficial because we could keep our children in on that particular day and not ~~So I need more information about~~ allow them to play outside (especially beneficial for those of us who live very near power lines) we could also move livestock, change out water supplies etc just for safety measures.

Also, I know you need to be in the growing season for aerial spray, but if there is anyway you could spray before apples and berries have been set on (in other words, spray during the bloom stage or prior - the earlier the better) This would greatly reduce any chance of ingesting contaminated fruit by our children (we do have orchards from old homesteads close to power lines where drift could be questionable in my opinion)

Thankyou for putting such a nice informational packet together. While I personally am not too comfortable with aerial spraying, I understand it is least cost and most effective for you. All that I personally can ask is that you please keep us informed so that we have the opportunity to use as many safety measures on our behalf as we see fit to protect our families

(Use back of sheet if you need more room) over please

☐ Please put me on your project mailing list. (You are already on the mail list if you received this in the mail.)

Name Terri Harness

Address 24192 Cox Rd. Rainier OR. 97048

Please mail your comments by October 9, 1999 to
Bonneville Power Administration
Communications Office - KC-7
P.O. Box 12999
Portland, OR 97212

BONNEVILLE POWER ADMINISTRATION

RECEIVED BY BPA
PUBLIC INVOLVEMENT
LOG#: TM-02
RECEIPT DATE: OCT 14 1999

Transmission System Vegetation Management Program

"I'd Like to Tell You . . .

1. Of the choices offered in the Draft EIS, I prefer: MA2 on ROW; R4, Best Alt.; VS3 Any Veg.; E1, selective herbicide

2. I do not like: Current noxious weed control or lack of noxious weed control as currently practiced in Skamania County (Westend) by Mr. Jellison of your Olympia Office.

3. You can improve the choices by:

4. I have these other comments: Your idea of controlling all vegetation as necessary while establishing ground cover will prove to be the best! economically and environmentally

5. I need more information about: What low growing species do you plan to use that will out-compete noxious weeds - any suitable for roadside use?

(Use back of sheet if you need more room)

☐ Please put me on your project mailing list. (You are already on the mail list if you received this in the mail.)

Name: Dan Wallemyer

Address:

Please mail your comments by October 9, 1999 to:
Bonneville Power Administration
Communications Office - KC-7
P.O. Box 12999
Portland, OR 97212

SKAMANIA COUNTY
Noxious Weed Control Board
P. O. Box 790
Stevenson, Washington 98648

USDA United States Department of Agriculture — Forest Service

Mt. Baker-Snoqualmie National Forest
21905 64th Avenue West
Mountlake Terrace, WA 98043-2278

File Code: 2080

Date: October 13, 1999

Ms. Stacy Mason
Bonneville Power Administration
Communications Office
P.O. Box 12999
Portland, OR 97212

RECEIVED BY BPA
PUBLIC INVOLVEMENT
LOG#: TM-029
RECEIPT DATE: OCT 14 1999

Dear Ms. Mason:

Thank you for the opportunity to comment on BPA's Draft Environmental Impact Statement for your Transmission System Vegetation Management Program (DOE/EIS-0285).

In your Electric Yard Program, we support Alternative E1, because it appears that other alternatives pose a direct threat of electrocution to your maintenance workers.

In your Right-of-way Program, we support Alternative MA2 (Promotion of low-growing plant communities). We support Method Package R3 (herbicides permitted with spot, localized, and broadcast application). We feel that the environmental risks of aerial application of herbicides to non-target species are unacceptable. We support Vegetation Selection VS-1 (herbicides will only be used on noxious weeds). We support the use of alternative methods to control other non-desirable vegetation. Impacts from other methods can be mitigated in various ways (e.g. noise disturbance to T&E wildlife can be timed to avoid their nesting and denning periods).

In your Non-electric Program we support Alternative NE1 *if* the herbicides will only be used on noxious weeds and not to control other undesirable vegetation. It is unclear from the description if this was your intent since it just mentions "weeds" and not "noxious weeds." If the intent is to use herbicides to control any undesirable vegetation, then we support Alternative NE2.

Please contact us if you would like us to elaborate on the rationale for our preferences described above. Again, thank you for the opportunity to comment.

Sincerely,

John Phipps

JOHN PHIPPS
Forest Supervisor

(625) 775-9772

Caring for the Land and Serving People

Printed on Recycled Paper

RECEIVED BY BPA
PUBLIC INVOLVEMENT
LOG#: TVM-030
RECEIPT DATE: OCT 1 ...

Vegetation Management Draft EIS

Comments - 9/15/99 Public Meeting
Oregon State Office Building

Commenter	Comment
2	Will BPA allow removal of vegetation along the right-of-way by the general public?
2	Don't spray any poisons
3	Plant trees under the lines that don't grow high
3	Low-growing is better than herbicides
3	Fish and animals need protection against herbicides
9	Vegetation maps - do they show the vegetation types under all the lines? Portland shows-up as agriculture.
9	Like idea of vegetation management alternatives and discussing them with landowners.
6	Really like your meeting layout and graphics.
7	What do you do with the trees you cut?
11	I want to know why (the) Al Gore mandate to sell electric power to aluminum companies reduced rate. I pay for I that through my bill.
11	Aluminum companies aren't giving much to NW (not many jobs) while we support them.
11	Aluminum companies nickel and dime the working person
11	Old plants are gone in a few years anyway

***

ijk/KECN vegmgt/pi

RECEIVED BY BPA
PUBLIC INVOLVEMENT
LOG#: TVM-031
RECEIPT DATE: OCT 1 ...

Affiliated Tribal Meeting
Comments Received at
Vegetation Management Program DEIS Display Table
9/29/99

- An individual from the Quinalt Tribe had a comment regarding herbicides as they relate to labor; that local labor should be used to control vegetation in lieu of herbicides. Un- or under-employment was unacceptably high on tribal lands.
- An individual from the Warm Springs Tribe had concerns that Bonneville had incessant intrusions upon the reservation lands; the cumulative effects of all activities was disruptive to their lifestyle and may negatively impact the cultural value of tribal lands.
- An individual from the Warm Springs tribe commented that extreme care should be taken to ensure that herbicides are correctly applied.
- An individual from the Colville Tribe was concerned that noxious weeds were becoming ubiquitous on tribal lands. The member also commented that bio-control agents for noxious weeds are not very effective.
- An individual from the Warm Springs Tribe that worked in cultural resource section commented that Bonneville needs to consider the value of the Tribe's cultural sites when planning vegetation control activities. The commentor expressed appreciation for Bonneville's active role in practicing good stewardship of natural resources.
- An individual from the Yakama Nation had general question regarding the scheduling and implementation of operation and maintenance activities, including vegetation control and personnel performing vegetation control.
- One visitor had questions about the planning steps.
- Several commentors stated that trust needs to be built between Bonneville and the Tribes for planning and implementing programs. Firmly established mutual trust would provide long-term relations between the Tribes and Bonneville.

United States Department of Agriculture
Forest Service
Modoc National Forest
800 West 12th Street
Alturas, CA 96101
530-233-5811

File Code: 1950
Date: October 9, 1999

Carol Borgstrom, Director
Bonneville Power Administration
Communications office
P.O. Box 12999
Portland OR 97212

RECEIVED BY BPA
PUBLIC INVOLVEMENT
LOG#: TUm-032
RECEIPT DATE:

Dear Ms. Borgstrom:

The Modoc National Forest would appreciate your consideration of the following comments in development of the Final Transmission System Vegetation Management Program Environmental Impact Statement.

- Formal tribal consultation on a government-to-government basis with potentially affected tribes is required for the federal lands under the administration of the Modoc National Forest. This consultation requires a one on one meeting between the tribes and a decision maker for the Bonneville Power Administration in addition to providing opportunities for written comments. The Modoc NF has provided the list of tribal representatives. Please let us know if this consultation has already taken place and the results.

- It is our understanding that the current authorizations and agreements between Bonneville Power Administration and the Modoc National Forest continue to be in effect. The process outlined in the DEIS is not consistent with these agreements. Until such time as Bonneville Power Administration completes the processes necessary to formally transfer land management responsibilities from the USDA Forest Service to the US Department of Energy for the right-of-way, the approving and deciding official for site-specific projects, which may effect the environment, remains the appropriate Forest Service line officer.

- BPA can greatly assist Forest Service decision makers by documenting environmental effects and considerations in a more complete statement than a checklist (Environmental documentation – page 81).

- Page 136 identifies the current BPA facilities covered by direction in the Northwest Forest Plan on the Modoc National Forest. This is not currently the case. All current facilities operated by BPA under agreements with the Modoc National Forest are outside the area of the Northwest Forest Plan.

- Please change the mitigation measure on page F-2 of Appendix F to read, "When seeding, use native species unless the use of non-native species is approved. The appropriate Forest Service Line Officer must approve all seeding mixtures in advance. Consider topping trees as an alternative to felling."

- Page 56, provides for the use of "public contact to help find out about any special uses of the land, or other issues or concerns that might need consideration when determining or scheduling vegetation control" on an only if needed basis. We suggest always use public contact and involvement within Modoc County. The Modoc County Board of Supervisors has established a land use committee to consider and comment on Federal Agency actions that may occur within the county.

Please contact Robert Haggard, Public Services Staff Officer, of my staff if you have any questions or comments concerning these issues.

Sincerely,

/s/ Robert T. Haggard
for
SCOTT D. CONROY
Forest Supervisor

United States Department of Agriculture | Forest Service | Willamette National Forest | 211 East 7th Avenue P. O. Box 10607 Eugene, OR 97440

File Code: 2600 Wildlife/Fish and Sensitive Plant Habitat Management

Date: October 7, 1999

RECEIV BPA
PUBLIC EMENT
LOG#: TVm-033
RECEIPT

Stacy Mason, Project Manager
BPA
Communications Office-KC-7
PO Box 12999
Portland, Oregon 97208

Dear Ms. Mason,

Thank you for the chance to review the Transmission System Vegetation Management Program DEIS. Overall we feel the document does a good job of providing alternatives for management of vegetation as well as providing a process to accomplish site specific plans that will meet a variety of resource needs on the ground. We look forward to working with you on site specific management plan updates for each of the three corridors that are located on the Willamette National Forest as a follow up to this EIS. It appears that the planning steps outlined in the document will ensure that site specific concerns are addressed.

Our greatest concern with the powerline corridors at this time is centered on noxious weeds. A sizeable population of spotted knapweed has been located within the corridor near Blue River along the McKenzie River. This species is considered a new invader and as such has the highest priority for treatment on this forest. Each of the three corridors also have large amounts of scotch broom, blackberry and other noxious weeds. We would like to work with the BPA to develop an active management strategy to address this concern.

The following are comments specific to the DEIS.

Approach
We support the overall approach described in Alternative MA2 using Integrated Vegetation Management. We feel as if the overall management strategy, to focus on creating low-growing (preferably native) plant communities under powerline corridors, is a sound one.

Our Forest is in the process of completing a new Environmental Assessment for Integrated Weed Management. Mark Newbill, from your Eugene office, is on our mailing list. Many parts of the BPA preferred alternative will dovetail well with the Willamette EA.

Methods
Alternatives R2 or R3 are both consistent with the methods outlined in our new EA. The Willamette EA addresses manual, mechanical, biological and herbicide control methods in powerline corridors. Treatment methods will be dominantly spot and localized, although some boom spraying from ATVs or trucks could be done.

Vegetation Selection
As stated above, the Forest is very supportive of vegetation treatments with herbicides for noxious weeds (VS1). If deciduous species need to be treated on Willamette NF land (VS2 or VS3), additional NEPA analysis will need to occur because the 1999 forestwide Integrated Weed Management EA covers herbicide use on only newly invading weed species.

General Comments

Page 35. It may be helpful to add a sentence to the 4th paragraph that explains perhaps only a subset of these herbicides may be available to use on certain lands. The Willamette EA only provides for the use of 2 of these herbicides, glyphosate and/or triclopyr.

Page 55. Mitigation measures for noxious weeds. Bullet #5: Washing vehicle clause. How about adding wording about developing sites to wash vehicles in association with land owners/managers as part of site-specific management plans.

Page 56. Mitigation measures for noxious weeds. Bullet #6: Reseeding should follow all ground-disturbing activities to help compete with weed seed in the soil. All seed should be state-certified weed-free. If one were to use a modifier on this sentence, it would be more appropriate to use "when appropriate" not "when practical".

Page 62 and Page 161. It's somewhat unclear exactly what these riparian zones apply to. It appears to be a mix of different standards, some are BPA some are BLM and others are NRCS. The Northwest Forest Plan buffers are only displayed in Appendix F. Perhaps it would be better to state that these are examples of potential riparian zones but that site specific locations and management plans will dictate the actual distances. Restrictions on buffer distances may also be applied as a result of consultation for listed fish species under the Endangered Species Act.

Corridor Specific Issues
Although some of these issues will be addressed only at the site specific scale we list them here for your consideration.

- The corridor near Blue River has a new invader noxious weed (as mentioned above) that needs immediate treatment. This corridor is also very densely stocked with scotch broom. We are very interested in updating the managment plan soon. The Blue River District is currently looking at options to restrict access along the road beneath the powerline with a gate. BPA access would still be provided.
- The corridor near Lowell was mentioned extensively in the watershed analysis for Lookout Point. The BPA corridor is located in and around western pond turtle (a Forest Service Region 6 sensitive species requiring special management) habitat. Specifically, timing of vegetation

management needs to take into account the migration of pond turtle mothers through the corridor for nesting.

- Detroit Ranger District personnel will be writing a comprehensive management plan for the Pacific Gas and Electric (PGE) powerline corridor, which parallels the Detroit BPA corridor for approximately 18 miles, in the next year, as a part of the relicensing process for the PGE corridor. It would be beneficial for BPA to be involved with this site-specific management because working together could potentially lower costs for both PGE and BPA for management activities, surveys, etc. It would be beneficial for the Willamette NF to have a single set of guidelines for managing both corridors.

We look forward to the FEIS and to the update of site specific management plans for each of the three corridors that pass through the Willamette National Forest.

Thank you for the opportunity to review the DEIS.

Sincerely,

for DARREL L. KENOPS
Forest Supervisor

cc: Russell Peterson, USFWS State Supervisor
William Stelle, Jr., Regional Administrator NMFS
Katherine Beale, Wildlife Biologist Army Corps of Engineers
Greg Concannon, Wildlife Biologist Pacific Gas & Electric

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

RECEIVED BY BPA
PUBLIC INVOLVEMENT
LOG#: TUM-034
RECEIPT

OCT 8 1999

OFFICE OF
ENFORCEMENT AND
COMPLIANCE ASSURANCE

Bonneville Power Administration
Communications Office
P.O. Box 12999
Portland, OR 97212

Dear Sir/Madam,

In accordance with the National Environmental Policy Act (NEPA) and Section 309 of the Clean Air Act (CAA), the U.S. Environmental Protection Agency (EPA) is providing comments on the Department of Energy Bonneville Power Administration's Draft Environmental Impact Statement (DEIS) on the Transmission System Vegetative Management Program (DOE/EIS-0285).

Thank you for the opportunity to review this DEIS which establishes planning steps for managing vegetation for projects in the states of CA, ID, MT, OR, UT, WA and WY. Projects in these states will be tiered off of this EIS. Bonneville Power prepared this DEIS because of their responsibility to manage vegetation beneath power lines and at electric substations. The DEIS analyzes four vegetation control methods, 24 herbicide ingredients, and four herbicide application techniques. It examines alternative management approaches for rights-of-way, electric yards and non-electric facilities.

EPA has rated this DEIS EC-1. The rating of "EC" indicates that EPA has *environmental concerns* with the preferred alternatives. We suggest measures to reduce the environmental impacts of these alternatives. The rating of "1" indicates that the analytical information presented is adequate, although we suggest some clarifying language.

EPA agrees with Bonneville's preferred management approach (alternative MA2) that allows use of herbicides in combination with other methods to promote low-growing plant communities at rights-of-way. This approach should minimize impacts on non-target species.

EPA would prefer a management plan that avoids the use aerial or broadcast methods for applying herbicides. However, we understand that there are terrain or weed conditions where aerial or broadcast spraying of powerful herbicides according to the label is the only feasible approach. Accordingly, EPA agrees with alternative R4, but urges Bonneville Power to restrict the use of aerial and broadcast methods in upcoming projects as much as possible so as to avoid

Internet Address (URL) • http://www.epa.gov
Recycled/Recyclable • Printed with Vegetable Oil Based Inks on Recycled Paper (Minimum 25% Postconsumer)

2

deleterious effects on non-target plants and wildlife.

EPA can also support alternative VS3 which would allow herbicide use on any vegetation, but urges Bonneville Power to limit application whenever feasible to noxious weeds and deciduous plants and trees capable of re-sprouting.

Finally, EPA agrees with Bonneville's proposed approaches to managing vegetation at electric yards and non-electric facilities, although Bonneville should attempt to minimize the use of herbicides when implementing these approaches.

In addition to the mitigation measures Bonneville proposes to minimize adverse ecological impacts, EPA suggests that the Final EIS reflect the following:

- Vegetation management projects should select herbicides, application rates, and methodologies that are the least disruptive for adequately controlling the weed situation.
- When selecting a particular herbicide, consider using newer products, which often pose lower risks. Also, consider applying the herbicide at less than the maximum label rate where the lower level is efficacious.
- Projects should avoid to the extent feasible certain ingredients which are broad-spectrum and/or persistant and/or appear to affect non target species. Of particular concern are bromacil, 2,4 D, dichlobenil, oryzalin, pendamethalin, triclopry, and trifluralin. EPA is reassessing these ingredients for future use under the Food Quality Protection Act of 1996 which requires the Agency to consider all non-occupational avenues of exposure in its risk assessment.
- Bonneville should develop guidance for field staff responsible for implementing the program on use of low-impact approaches.

Finally, EPA suggests clarifying language on page 61 under the Section 404 discussion. The sentence in parentheses should be revised as follows:

(In certain circumstances vegetation debris left in a stream or wetland could be considered fill material for purposes of Section 404 of the Clean Water Act. Questions concerning the regulation of particular activities under Section 404 should be directed to the Regulatory Branch of the local U.S. Army Corps of Engineers District Office.)

3

Again, we appreciate the opportunity to review this DEIS. Please contact Susan Absher at 202-564-7151 if you have any questions about these comments.

Sincerely,

for Richard E. Sanderson, Director
Office of Federal Activities

David Radtke
PO Box 244
Yachats OR 97498
541 547-3087

RECEIVED BY BPA
PUBLIC INVOLVEMENT
LOG#: TUm-635
RECEIPT: OCT 0 0 1999

September 12, 1999

BPA
Communications Office KC-7
PO Box 12999
Portland OR 97208

Subject: Comments on Draft EIS for the BPA transmission system Vegetation Management System

In the Siuslaw Forest, Waldport Ranger District, a major north-south BPA transmission line cuts a swath about 300 yards wide through areas of timber that will never be cut again under the National Forest Plan. These areas used to be sprayed with herbicides, creating a grassy meadow area miles long.

As we understand the BPA-USFS agreement, these transmission right-of-way areas were supposed to be managed for "wildlife". Keeping the areas in a brush cycle now does not accomplish this earlier objective. We would like the BPA and USFS to honor their past agreement by keeping the areas in a grassy meadow condition. This would provide an alternative for wildlife such as deer and elk, etc. to the older forests surrounding these transmission lines. Could the BPA and USFS return to controlling brush (by mechanical or manual means) for grassy growth?

David Radtke
David Radtke

Hans Radtke
HANS RADTKE

RECEIVED BY BPA
PUBLIC INVOLVEMENT
LOG#: TUm-636
RECEIPT: OCT 21 1999

United States Department of Agriculture
Forest Service
Plains/Thompson Falls Ranger District
(406)826-3821
P.O. Box 429
408 Clayton
Plains, MT 59859

File Code: 2730
Route To: Lolo Lands

Date: October 4, 1999

Subject: Comments to BPA's Draft EIS for Transmission System Vegetation Management

To: Lisa Subcaskey

Here are my comments on BPA's DEIS, they are broken out into the following categories: Riparian Protection, Use of Herbicides, Project Proposal Notification, NEPA Responsibility, Other Alternatives and USFS to FS.

Riparian Protection
1) Table III-1 Riparian Buffer Zones (page 62) needs to be thoroughly reviewed by fisheries biologist to ensure INFISH standards are being meet with the proposed buffer zones.

2) Table III-2 Herbicide Free Zones (page 62) should be expanded to describe how close to natural streams the various proposed herbicides can be used.

3) The study cited on page 167 has been taken completely out of geographical context. The climate, soils, vegetation are all completely different between New York and the Pacific Northwest. Surely there is a study applicable to the Pacific and Inland Northwest that discusses the impacts of removing overstory along stream reaches.

4) Page 169, Mitigation Measures, states "Apply all appropriate mitigation measures for water bodies". These "appropriate mitigation measures" should be referenced or stated as there is no way of knowing what these measures are.

Use of Herbicides
1) Lolo National Forest Noxious Weed FEIS and Lolo Forest Plan Amendment 11 contains many mitigation measures for use of herbicides on Lolo National Forest, these requirements will need to be incorporated into any spray project proposals which will occur on the Lolo. I would suggest a copy of Amendment 11 be forwarded to BPA for inclusion into their planning documents if this has not already been done. Also DEIS Appendix F does not contain all of the mitigation measures found in Amendment 11.

2) The BPA DEIS seems have a fairly subjective tone making assertions that herbicides are not harmful, yet the DEIS does not cite references to fully support this position. For example, on page 168, the DEIS states "There is little potential for fish to be exposed to herbicides: mitigation measures.....only a relatively small amount of area would be treated within a landscape." The DEIS does not state the effectiveness of the mitigation measures nor does it cite research work that confirms this assertion.

The DEIS also makes some contradictory statements. For example, on page 168, the DEIS states that "many of the herbicides proposed by Bonneville are low in toxicity to fish" yet in Table VI-6 (page 175) 11 of the 24 herbicides are listed as moderately to highly toxic to aquatic resources, in addition, 2 of the herbicides listed in this table do not have any aquatic toxicity data. 11 of 24 possibly

Caring for the Land and Serving People

13 of 24 herbicides being moderately to highly toxic does not match the assertion on page 168 that many of the herbicides are low in toxicity.

NEPA Responsibility
On Page 185, BPA makes the statement that "the decisions on vegetation management of rights-of-way across USFS and BLM managed lands are Bonneville's and therefore Bonneville is responsible for complying with NEPA." And goes on to state "The USFS and BLM usually would not have a decision to make (that would trigger their NEPA process) unless the proposed vegetation management were not consistent with their existing plans and regulations."

The Memorandum of Understanding between BPA and USFS dated 1974 (FSM 1531.73a) provides for BPA's occupancy and use of National Forest lands consistent with laws applicable to the management of National Forest System in Item 1. Also, Item 6 provides for a subsidiary MOU to implement the master agreement. In the Subsidiary Memorandum of Understanding dated 1974 (FSM 1531.72a, FSM 8/83 R-1 Supp 41) Section 1B. *Environmental Analyses and Environmental Impact Statements* states that "Bonneville and the Forest Service will conduct environmental analyses and prepare environmental impact statements in accordance with their individual procedures". It also states that "When an environmental statement is to be prepared, the agency initiating the proposal will take the lead in statement preparation. The other agency will actively participate in development of the statement by (1) providing.....exisitng information..... and (2) review and comment on the draft and final environmental statement."

Thus the wording in the DEIS is not entirely correct and could mislead agency as well as public individuals as to whose responsibility the decision making really is. As I see it the FS has only granted BPA the occupancy and use of National Forest lands not the ownership nor management responsibility of these lands, in addition the FS and BPA have agreed that environmental assessments will be conducted in accordance with their individual procedures. The fact that (1) National Forest land management under BPA facilities is a responsibility that remains with the Forest Service and (2) the FS must comply with FS NEPA procedures, places the decision making responsibility squarely with the Forest Service for activities on National Forest lands.

This section should be rewritten inorder to clarify BPA's role as they cross National Forest lands. The existing MOUs provide alot of direction regarding roles of the various agencies.

Project Proposal Notification
Another bullet on page 58 under USFS managed lands needs to be added which includes BPA Project Mangers notifying the FS in advance of any proposed projects (non-emergency) involving NF lands. This is needed inorder that FS NEPA procedures are complied with. This requirement is already contained in the Right of Way Management Plan for BPA facilities on the Plains/Thompson Falls Ranger District but I'm not sure of other Districts and Forests thus would be helpful to reiterate the message again in the FEIS

Other Alternatives
The DEIS only addresses alternatives that manage vegetation inorder to maintain safe operating clearances. The EIS does not address any alternative which manages the transmission facilities in order to maintain safe operating clearances. I'm not an expert of transmission facility engineering but would think that in some specific instances in which raising tower structures, adding new towers, minor route realignments, possible even managing current loads during periods of high temps to prevent unsafe line sags could be implemented as a way to allow vegetation to develop naturally and provide critical resource benefits while continuing to transmit electricity safely. This EIS process could address the specific planning steps which would identify specific conditions/locations where managing the transmission facilities rather than the vegetation would be appropriate. Further site specific analysis would be needed to determine exact locations of new towers, right of-way clearings, etc.

USFS to FS
A small item but isn't the USFS abbreviation incorrect and really should be either USDA-FS or just FS.

Sincerely,

Fred Haas
Resource Forester
Plains/Thompson Falls Ranger District

STATE OF CALIFORNIA

Governor's Office of Planning and Research

State Clearinghouse

Gray Davis
GOVERNOR

Loretta Lynch
DIRECTOR

STREET ADDRESS: 1400 TENTH STREET, ROOM 222, SACRAMENTO, CALIFORNIA 95814
MAILING ADDRESS: P.O. BOX 3044, SACRAMENTO, CA 95812-3044
916-445-0613 FAX 916-323-3018 www.opr.ca.gov/clearinghouse.html

October 4, 1999

RECEIVED BY BPA
PUBLIC INVOLVEMENT
LOG#: TVM-037
RECEIPT: OCT 21

Stacy Mason
Bonneville Power Administration
905 NE 11th Avenue
KECP-4
Portland, OR 97232

Subject: Transmission System Vegetation Management Draft EIS
SCH# 99084004

Dear Stacy Mason:

The State Clearinghouse submitted the above named environmental document to selected state agencies for review. The review period closed on October 1, 1999, and no state agencies submitted comments by that date. This letter acknowledges that you have complied with the State Clearinghouse review requirements for draft environmental documents, pursuant to the California Environmental Quality Act.

Please call the State Clearinghouse at (916) 445-0613 if you have any questions regarding the environmental review process. If you have a question about the above-named project, please refer to the eight-digit State Clearinghouse number when contacting this office.

Sincerely,

Terry Roberts

Terry Roberts
Senior Planner, State Clearinghouse

Kuehn, Virginia (Ginny) -KCC-7

RECEIVED BY BPA
PUBLIC INVOLVEMENT
LOG#: TVM-038
RECEIPT: OCT 21 1999

From: Mason, Stacy L. - KECP
Sent: Friday, October 22, 1999 11:44 AM
To: Kuehn, Virginia (Ginny) -KCC-7
Subject: FW: BPA right of way EIS

Ginny -
Another comment for the Transmission System Vegetation Management Program EIS comment log.
stacy

-----Original Message-----
From: Hiebert_Paul_A/r1_ipnf@sv2wo [mailto:Hiebert_Paul_A/r1_ipnf@sv2wo]

Sent: None
To: ballen/r1@sv2wo; Anderson_Scot_L/r1_ipnf@sv2wo; Mousseaux_Mark_R/r1_ipnf@sv2wo; Bain_George_M/r1_ipnf@sv2wo
Subject: BPA right of way EIS

bruce, i supervise the noxious weeds program on the south zone (st.joe) of the ipnf. mark
mousseaux told me that you are the one gathering input for the BPA EIS. it seems to me that
there should be some shared responsibility for noxious weeds control in not only the right of way
but also the roads that access the towers. portions of roads within the forest service road system,
i am sure, are maintained and left open and maintained solely because of the need for access to
the towers. it seems to me that there should be a shared responsibility for weed control on these
roads.
just some thoughts for your input to the EIS

1

United States Department of Agriculture | Forest Service | Washington Office | 14th & Independence SW
P. O. Box 96090
Washington, DC 20090-6090

File Code: 2720

Date:

RECEIVED BPA OCT 22 1999
PUBLIC INVOLVEMENT
LOG: TVM-039
RECEIPT DATE:
NOV 10 1999

Bonneville Power Administration
Communications Office - KC - 7
P.O. Box 12999
Portland, Oregon 97208

RE: USDA-Forest Service Comments to DOE/EIS-0285; Draft Environmental Impact Statement (DEIS), Transmission System Vegetative Management Program

With this correspondence, the Forest Service is submitting additional, programmatic comments in response to our review of the above referenced document, dated August, 1999. Additional comments have previously been provided submitted by the Forest Supervisors of the Flathead and Kootenai National Forests in Montana, in a letter from the Forest Supervisors of those Forests, dated October 5, 1999. The following are intended to be supplementary to those "Forest - specific" concerns.

CHAPTER I - PURPOSE AND NEED

Page 3: Reasons for the EIS: Your document states that:

"Preparation of this document is intended to fulfill the requirements of the National Environmental Policy Act (NEPA) for Bonneville"

What does this mean? What specific NEPA requirements is this EIS intending to fulfill (if any)? The Forest Service does not believe that this programmatic analysis is adequate to account for the environmental effects of site specific vegetative management activities along every mile of Bonneville's transmission facilities on National Forest System lands. Statements like that quoted above have the potential of implying otherwise. This statement should be clarified to more appropriately state something to the effect that:

"This document discloses the estimated environmental effects of a variety of vegetative management methods that may be considered and applied at Bonneville facilities. Decisions for treatment methods will be made in accordance with existing and/or future site-specific vegetative management plans".

Page 4: Efficiency and Consistency; Your document states:

"Site-specific analysis would be in the form of a Supplemental Analysis"

Recommend you add to this statement the following:

"Supplemental, site-specific analyses will be documented, and appropriate decision documents written, in accordance with the policies and procedures for the implementation of NEPA of the

agency having land management jurisdiction on the affected area, and in accordance with all other applicable State and federal laws and regulations".

Pages 18-19: Forest Service and Bureau of Land Management Documents/Projects:

Please add to the listing of documents provided the following:

- **Forest Land and Resource Management Plans -** The plans provide for the allocation of National Forest System (NFS) lands and resources for a variety of management purposes. They include management direction, objectives, prescriptions, standards and guidelines, etc. applicable to each National Forest, and to designated management areas within each Forest. Pursuant to the National Forest Management Act of 1976, all site specific (or "project level") management activities must be consistent with the direction in each applicable land and resource management plan.

- **Other Forest Service Land or Resource Management Plans -** Management direction, prescriptions, and guidelines in other management plans, such as Wild and Scenic River Management Plans, may also have applicability in the consideration of vegetative treatment methods used in developing site specific vegetation management plans.

Although this document lists Forest Land and Resource Management Plans as Guidance Documents in Appendix F, we believe that such Plans are of such importance in guiding management activities on NFS lands, that they should also be listed in this part of the document.

CHAPTER III - SITE-SPECIFIC PLANNING STEPS

Page 58: USFS-Managed Lands: Recommend revising the fifth bullet statement under this heading to read as follows:

"If expecting the USFS to require environmental data collection for evaluation, allow more than one year for completion, and be prepared to reimburse the USFS for its cost to collect and analyze data, conduct the environmental analysis, document that analysis, and/or the cost to contract for such activities".

Page 58: USFS-Managed Lands: Recommend revising the seventh bullet statement under this heading to

read as follows:

"Comment and engage in all Forest Service proposals to revise or amend Forest Land and Resource Management Plans, to assure that the designation and management of utility corridors are adequately addressed wherever appropriate."

Page 58: Recommend that BPA also consider including, either in the selected alternative itself, or in the Record of Decision, specific direction that will require BPA's Project Managers to review all

EXISTING site-specific vegetative management plans, for consistency with the selected alternative of this programmatic analysis, and to revise or amend those existing plans as necessary to make them consistent with the findings, standards, guides, management direction, etc. in the selected alternative/Record of Decision of this EIS.

COMMENTS TO APPENDIX "F": USFS MITIGATION MEASURES AND BACKGROUND

Page F-1: The reference on that page to BLM (middle of page) is inaccurate. The sentence should be revised to read:

"These mitigation measures were developed based on current USFS Land and Resource Management planning documents."

Page F-1: Fourth Paragraph under "Mitigation Measures Specific to the USFS": Revise the paragraph to read:

"These mitigation measures will be used in reviewing, updating (as necessary) and developing site-specific vegetative management plans for BPA's facilities located on National Forest System lands. Additional measures may be used to adequately mitigate site specific environmental effects or concerns".

Page F-2: Second Bullet: Revise to read:

"Proposals for herbicide use will be subject to the review, and either concurrence or approval, by an authorized Forest Officer".

Page F-6, F-7: Recommend that the definitions of "Standards and Guidelines" be moved from Page F-7 and more appropriately be placed in front of all of the planning documents listed on these two pages, just in prior to the list beginning with "Forest Plans". Standards and guidelines are common terms used in nearly all land and resource management planning documents. Placing the definitions of these terms as written makes it appear that they (the definitions) are applicable only to their use in the Interior Columbia River Basin Draft EIS's/Appendices.

Page F-15: Third Bullet:

We can't emphasize enough the importance of this bullet statement with respect to vegetative management activities on National Forest System lands. The statement: "Site specific analysis is needed for all projects" appears here under the **"Wildlife and Fish"** section of these Mitigation Measures. However, this is a statement that should more appropriately be stated elsewhere in Appendix F, to make it direction applicable to ALL of the BPA's vegetative management activities on NFS lands. We recommend that at the very beginning of Appendix F, language be included which states the following:

"Site-specific vegetative management plans, developed in accordance with the standards and guides of this programmatic EIS, should be developed by Program Managers in advance of

implementing vegetative management activities on NFS lands. Existing vegetative management plans should be reviewed and revised, if necessary, to make them consistent with the Record of Decision and selected alternative of this EIS".

GENERAL COMMENTS - - -RECOMMENDATIONS/CONSIDERATIONS FOR REALIZING THE FULL POTENTIAL BENEFIT OF THIS PROGRAMMATIC PLANNING EFFORT

The Forest Service sincerely appreciates the BPA's efforts to reach out, solicit the concerns of the Forest Service, and to address those concerns in this programmatic analysis. We believe that most of the Forest Service's concerns, previously provided to the BPA in the course of this analysis, have been adequately disclosed and addressed in this DEIS. Our agency's concerns can be more fully addressed with revisions to the document, as identified in this correspondence (above) and in additional comments that have been submitted by individual National Forests.

In more general terms, however, and as reflected in these most recent comments, the Forest Service has consistently represented to the BPA that a product of this programmatic analysis, and its Final EIS/Record of Decision, will NOT be Forest Service approval for the BPA to begin the implementation of vegetative treatment methods along it rights-of-way on National Forest System lands. We believe that existing, revised, and/or new site-specific vegetative management plans are needed as the basis for vegetative treatment activities on any segment of BPA's authorized use and occupancy on NFS land. Such plans need to be developed and adopted for use in accordance with the provisions of NEPA, and pursuant to the provisions of the outcome of this EIS/ROD.

As you have disclosed in this document, the programmatic approach that you are undertaking will serve to identify the environmental effects of various treatment methods. Its primary benefit will be its availability as a source of reference in the development of site specific management plans. In tiering to the environmental effects of various treatment methods, as disclosed and documented in this analysis, the need to repeatedly (and potentially, inconsistently) cite those effects in individual site-specific plans will be precluded.

However, with your adoption of this programmatic plan, there will be a potential opportunity created to more fully realize its benefits with respect to vegetative management activities on NFS lands. That can happen if the BPA is willing to consider a comprehensive revision to the manner in which its facilities on NFS lands are now authorized. Currently, BPA's generation and transmission facilities are authorized on NFS lands under a wide variety of old, and in some cases, obsolete, forms of authorizations. They include unique Land Use Grant Instruments ("LUGI's") (that were created specifically for the BPA), Memorandums of Understanding, and various forms of our more standardized special use permits. There is little to no consistency in the terms and conditions between these different types of authorizations. Some include requirements which suggest that the Forest Service is responsible for the development of vegetative management plans (for review and approval by the BPA); a concept that is totally contrary to our management of special uses. Others have little to no reference to vegetative management activities whatsoever. In such cases, BPA has suggested that vegetative management is part of the all-inclusive concept of authorized "maintenance" of the facilities, as provided in the authorization.

BPA's Programmatic Vegetative Management Plan (DEIS) 5

We recommend that upon the adoption of this programmatic plan, the BPA enter into discussions with the Forest Service to consider the potential of replacing all of these existing Forest Service authorizations with current special use authorizations for its facilities on NFS lands. Those discussions should address the feasibility of replacing all of BPA's existing authorizations with long-term, transferrable easements that:

a) Are minimal in number (perhaps no more than one easement per National Forest on which BPA's facilities are located, or maybe no more than one easement per Forest Service administrative Region;

b) Have standard terms and conditions, including standardized provisions for operation and maintenance of authorized facilities;

c) Include a standardized format for operation and maintenance plans; AND

d) Tier to the BPA's Record of Decision/Final EIS for its Programmatic Vegetative Management Plan, provide for an Authorized Forest Officer's to simply "concur" with site-specific vegetative management plans (rather than "approve" them), when such plans are developed consistent with and tiered to the provisions of the programmatic plan.

e) Will provide the BPA with a long term assurance of tenure, and a transferrable interest in the NFS lands being used and occupied.

We believe that this approach has the potential to benefit both of our agencies, and provides the opportunity for your agency to realize a significant increase in the value of the programmatic vegetative management plan you are now working towards adopting. I encourage you to pursue the feasibility of this approach with Randy Karstadt, our Special Uses Program Leader here in this office, at 202-205-1256.

Sincerely,

for JACK L. CRAVEN
Director of Lands

United States Department of the Interior

OFFICE OF THE SECRETARY
Office of Environmental Policy and Compliance
500 NE Multnomah Street, Suite 356
Portland, Oregon 97232-2036

RECEIVED BY BPA
PUBLIC INVOLVEMENT
TVM-ojo
RECEIPT DATE
NOV 16 1999

IN REPLY REFER TO

November 10, 1999

ER 99/0750

Bonneville Power Administration
Communications Office
P.O. Box 12999
Portland, Oregon 97212

The Department of the Interior (Department), has reviewed the Draft Environmental Impact Statement (DEIS) for the Transmission System Vegetation Management Program, Idaho, California, Montana, Utah, Wyoming, Oregon and Washington. The following comments are provided for your use and information when preparing the Final Environmental Impact Statement (FEIS).

GENERAL COMMENTS

In general, the Department supports the integrated approach which uses manual, mechanical, biological, and chemical methods to control vegetation on Bonneville Power Administration's (BPA) electric facilities, namely rights-of-way, electric yards, and non-electric facilities. In addition to previously utilized chemical control agents for the program, the current document now proposes the use of a total of 24 herbicidal compounds singly and in combination. While we applaud the document for not suggesting solely the use of toxic herbicides, the Department has concerns over the effects that several of the herbicides may have on non-target species, particularly endangered, threatened, and proposed species. The Fish and Wildlife Service (Service) has provided a list of such species for western Washington appears at the end of this comments section. Other Service offices can provide endangered species lists for their geographic areas. Prior to the site specific use of chemical control methods via spot, localized, broadcast and especially aerial applications, we urge BPA to work closely with the Service's field offices to minimize effects to non-target species.

The document refers to herbicides simply in terms of 'active ingredient'. Several of the compounds listed in the program have different formulations such as glyphosate and triclopyr. The different formulations contain different amounts of active ingredient, different inert compounds, and different adjuvants all of which determine the fate and effects in the environment, thus making it difficult to assess the potential toxicity to our trust resources.

Also, several of the herbicides selected for the program are very persistent in soil. An example of this is isoxaben, which has a soil half life of 5 to 6 months. Since the document states that herbicide application in electric fields may occur as often as once a year, the Department would

advise BPA to assess if chemical control is needed every year, and if so, to select compounds that are less persistent reducing the potential for accumulation and residual levels of these chemicals in the soil.

We also suggest the use of secondary containment of chemicals during transportation and storage to reduce the risk of a spill. Due to the potential for additive and synergistic interactions between chemical compounds, the use of two chemicals as a mixture should be used sparingly and with great caution in order to minimize environmental repercussions. It is imperative when formulating your tiered project specific planning steps to take into consideration the comments listed above.

Please be advised that several of the land owners involved in the program, including the U.S. Forest Service (USFS), restrict the types of chemical agents that are allowed to be used on their lands. Typically only five herbicides are approved for use on Washington State USFS land. These compounds are 2,4-D, dicamba, glyphosate, picloram, and triclopyr. Coordination between land owners and BPA should take place during the planning steps and prior to herbicide application to ensure the interests of all parties are addressed.

The program allows for the approval of new techniques and new herbicides that are not presently listed by name in the document. We have reservations about the approval process, which allows BPA to determine the environmental impacts of newly registered compounds using EPA risk assessment data without contacting the Service. Threatened and endangered species may have different considerations than risk assessment models assume and may be more sensitive to particular compounds than the organisms tested during the registration process. Thus, we urge BPA to contact and involve the Service if they contemplate adding any new herbicide to the program. Finally, in our opinion the use of a newly registered herbicide would require BPA to consult with the Service regarding effects to threatened and endangered species.

The Department does not object, in a programmatic sense, to BPA's preferred alternatives. However, the DEIS does not provide sufficient implementation detail, mitigation commitments, or alternative analysis to determine site specific impacts. Specifically, we would like to have the same mitigation measures listed for electric fields also apply to rights-of-way, non-electric fields, and noxious weed control. We recommend that site specific plans be completed for this work or that the information lacking be included in some other format. We would like to be involved in the future review of this program if BPA decides to significantly change the described preferred alternatives or follows through on our recommendation to produce site specific plans for the program in our region. We applaud BPA's effort to integrate environmentally preferred alternatives into the program and encourage the implementation of any habitat enhancing measures for fish and wildlife that can be undertaken as part of the program (i.e., allow for the growth and establishment of low growing vegetation, leave debris and brush piles in place to provide habitat, and top trees while leaving the stumps in place).

SPECIFIC COMMENTS

Herbicide mitigation measures

Under Planning Step 1 (Identify Facility and the Vegetation Management Needs), herbicide mitigation measures are specified only for electric yards. We recommend that the same mitigation measures also be specified in this planning step for rights-of-way, non-electric facilities, and noxious weed control throughout the BPA service territory. Specifically, these mitigation measures include rotating herbicide use to prevent resistance, avoiding spray drift, determining if water bodies require monitoring for herbicide contamination, and observing riparian buffer and herbicide-free zones defined on page 62 of the DEIS.

Herbicides and herbicide formulations

In Planning Step 2 (Identify Surrounding land Use and Landowners/Managers), project managers are instructed to review site-specific vegetation management plans for consistency with both U.S. Forest Service (USFS) and U.S. Bureau of Land Management (BLM) mitigation measures, which are specified in Appendices F (USFS) and G (BLM) of the DEIS. Appendix F lists eight herbicide active ingredients that are approved for use by both USFS and BPA.

Experience with USFS vegetation control in Oregon and discussions with USFS personnel indicate that only four herbicide active ingredients (glyphosate, picloram, dicamba, and 2,4-D) may be used in Oregon for any type of vegetation control on USFS lands. These herbicide restrictions result from the Mediated Agreement between the Northwest Coalition for Alternatives to Pesticides, the Secretary of Agriculture, and Oregonians for Food and Shelter (May 24, 1983). Similarly, Appendix G lists 20 active ingredients or combinations that are approved for use in vegetation control by both BLM and BPA.

A footnote to this list indicates that throughout all of Oregon, herbicides may only be used for noxious weed control. Experience with BLM vegetation control in Oregon and discussions with BLM personnel confirms that throughout all of Oregon herbicides may only be used for noxious weed control. Only four active ingredients (glyphosate, picloram, dicamba, and 2,4-D) or combinations (2,4-D plus glyphosate, picloram, or dicamba) may be used in Oregon on BLM lands. While these latter restrictions are stated on page G-2 of the DEIS, other comments by BPA about eastern Oregon restrictions are misleading. We recommend that project leaders carefully review these herbicide restrictions with USFS and BLM personnel as part of Planning Step 2, and that the Final Environmental Impact Statement reflect USFS and BLM policies more accurately.

Under Planning Step 3 (Identify Natural Resources), general riparian buffer and herbicide-free zones are presented as mitigation measures to reduce potential contamination of water resources. As discussed in Chapter VI of the DEIS, the physical properties of herbicides partly determine environmental fate. In addition, different formulated products of the same active ingredient often have different environmental fates and effects (e.g., Roundup and Rodeo formulations of glyphosate, Garlon 3A and 4 formulations of triclopyr). The DEIS does not specify which formulated herbicide products will be used in vegetation management, so the Service cannot comment on potential adverse effects. However, since there are differences in environmental fate among herbicides, the use of generic riparian buffer and herbicide-free zones for all herbicide applications is not justified.

We recommend that site-specific planning include a detailed examination of the environmental fate and effects of proposed formulated herbicide products such that more restrictive riparian buffer and herbicide-free zones may be used when necessary to protect natural resources, particularly endangered and threatened species, other wildlife, fish and aquatic organisms, and water.

As part of Planning Step 4 (Determine Vegetation Control Methods), specific weather restrictions are presented as one mitigation measure to reduce herbicide drift and leaching. However, as described in Chapter IV, geology and soil types also are important in determining if herbicides will migrate to water resources. We recommend that climate, geology, and soil types be included in Planning Step 4 as factors to consider in selecting vegetation control methods.

Chapter IV also discusses toxicity as one factor that determines if an herbicide will cause adverse effects to fish or other aquatic resources. In addition, differential toxicity among herbicides is described and BPA states that using less toxic herbicides "in the vicinity of fish-bearing lakes or ponds would reduce the potential for adverse effects." The Service agrees with this assessment, however we recommend that evaluation of the toxicity of formulated herbicide products (not active ingredients) be included in site-specific planning, perhaps under Planning Step 4.

Endangered Species

Because of time constraints in reviewing the DEIS, we are unable to comment specifically on potential impacts to endangered and threatened species. The Service agrees that the procedures outlined under Planning Step 3 will permit project managers to comply with the provisions of the Endangered Species Act, as amended. However, we recommend that BPA consider, for the sake of efficiency, a programmatic consultation at the appropriate level (e.g., state, watershed, or species). We also recommend that any such programmatic consultation address potential project impacts to all species proposed for listing, regardless of whether BPA reaches the statutory conference threshold of being likely to jeopardize such proposed species. Chapter II of the DEIS describes the process whereby BPA may approve of new techniques if they are judged more effective or more "environmentally benign." The Service points out that new techniques may result in new effects to listed species not previously considered in consultation and therefore may trigger reinitiation of consultation.

Canada Lynx - Due to the recent proposal to list the Canada lynx (*Lynx canadensis*) as threatened and potential impacts to lynx from the proposed vegetation management program, it is appropriate to provide comments specific to this species. In addition to being proposed for listing, the Canada lynx is a USFS sensitive species, a Northwest Forest Plan "survey and manage" species (in Oregon and Washington), and is listed as a threatened species by the State of Washington. The proposed BPA vegetation management activities would potentially impact Canada lynx throughout their range.

The abundance of snowshoe hares significantly influences lynx populations (Parker et al. 1983, Brittell et al. 1989, Koehler and Brittell 1990, Koehler and Aubry 1994). Prime snowshoe hare habitat includes dense coniferous and deciduous thickets approaching 14,000 stems or bought per acre. These conditions are often found beneath BPA transmission lines at higher elevations. To be available for snowshoe hare during the winter months, forage cover must be 6 to 8 feet tall where average snow depth does not exceed 3 to 4 feet (Brocke 1975, Wolff 1980, Litvaitis et al. 1985, Monthey 1986, Brittell et al. 1989, Koehler 1990). Some hardwoods, particularly willow, are also used by snowshoe hares during the winter months (Conroy et al. 1979, Brittell et al. 1989, Koehler 1990, Koehler and Brittell 1990).

Providing adequate winter forage for snowshoe hares is a key component of maintaining or expanding snowshoe hare and Canada lynx populations. The habitat beneath transmission lines provides lynx forage cover if it consists of at least 4,700 stems or boughs per acre (1,210 trees per acre, 8 feet tall, with 6-foot spacing). This height and spacing provides adequate snowshoe hare forage and cover during average winter snow depths. The BPA management approach of promoting "low-growing plant communities" in rights-of-way using herbicides or other vegetation control methods is incompatible with management for hare and lynx. Impacts to lynx would be minimized by maintaining dense thickets of coniferous/deciduous vegetation of adequate height.

Listed species: Washington Cascades Only

The western portion of the Cascade Mountains in the State of Washington are associated with federally listed and proposed threatened and endangered species under the Endangered Species Act (ESA). Of the species that may be impacted by the program, the bald eagle, the spotted owl, the marbled murrelet, and bull trout are of particular concern.

Not only are direct, indirect, and cumulative effects of concern, but secondary poisoning is also an issue that will need to be addressed when considering the use of chemical control methods around habitats that contain higher trophic level organisms. Temporal issues are also of concern. The time of year chemical control agents are used is critical and should not coincide with such activities as bald eagle and marbled murrelet nesting as well as bull trout spawning and incubation.

Also, any application around water bodies should be done with the utmost care, especially when using products such as benefin, pendimethalin and trifluralin which are highly toxic to numerous aquatic species. We would advise the maximization of buffer and herbicide-free zones when applying all compounds but especially when highly toxic compounds would be applied around water. Also, low level aerial applications of herbicides may cause disturbances to threatened and endangered species.

Due to the aforementioned concerns, information provided in the proposed integrated approach, especially the chemical control methods, may have adverse impacts and may have effects on listed species. Finally, the document states that formal consultation is not needed for species previously consulted on, such as the marbled murrelet. It is our opinion that this program constitutes a new action and as such, if effects are likely to be expected from this new action, consultation on all currently listed species must be conducted.

We hope these comments are both constructive and helpful in completing the final Transmission System Vegetation Management Program - Environmental Impact Statement. We appreciate the opportunity to review and provide comments on this matter.

Sincerely,

Preston A. Sleeger
Regional Environmental Officer

Literature Cited for Canada Lynx

Brittell, J. D., R. J. Poelker, S. J. Sweeney, and G. M. Koehler. 1989. Native cats of Washington-Section III: Lynx. Unpublished report, Washington State Department of Wildlife, Olympia, WA.

Brocke, R. H. 1975. Preliminary guidelines for managing snowshoe hare habitat in the Adirondacks. Trans. Northeast Wildl. Soc. Fish and Wildl. Conf. 32: 46-66.

Conroy, M. J., L. W. Gysel, and G. R. Dudenar. 1979. Habitat components of clear-cut areas for snowshoe hares in Michigan. J. Wildl. Manage. 43: 680-690.

Koehler, G. M. 1990. Demographic and habitat characteristics of lynx and snowshoe hares in north-central Washington. Can J. Zool. 68: 845-851.

Koehler, G. M. and J. D. Brittell. 1990. Managing spruce-fir habitat for lynx and snowshoe hares. J. For. 88(10): 10-14.

Koehler, G. M. and K. B. Aubrey. 1994. Lynx. Pages 74-98 *in* Ruggiero, L.F., K. B. Aubrey, S. W. Buskirk, L. L. Jack, W.J. Zielinski, and J. Williams eds. The scientific basis for conserving forest carnivores: American marten, fisher, lynx, and wolverine in the western United States. USDA, USFS Rocky Mountain Forest and Range Experiment Station, GTR RM-254.

Litvaitis, J. A., J. A. Sherburne, and J. A. Bisonette. 1985. Influence of understory characteristics on snowshoe hare habitat use and density. J. Wildl. Manage. 49: 866-873.

Monthey, R. W. 1986. Responses of snowshoe hares, *Lepus americanus*, to timber harvesting in northern Maine. Can. Field-Nat. 100: 568-570.

Parker, G. R., J. W. Maxwell, L. D. Morton, and G. E. J. Smith 1983. The ecology of the lynx (*Lynx canadensis*) on Cape Breton Island. Can. Zool. 61: 770-786.

Wolff, J. O. 1980. The role of habitat patchiness in the population dynamics of snowshoe hares. Ecol. Monogr. 50(1): 111-130.

FLATHEAD NATION

THE CONFEDERATED SALISH AND KOOTENAI TRIBES
OF THE FLATHEAD NATION
P.O. Box 278
Pablo, Montana 59855
(406) 675-2700
FAX (406) 675-2806

PUBLIC INVOLVEMENT
DOC#: Tim-041
RECEIPT DATE: DEC 14 1999

Joseph E. Dupuis - Executive Secretary
Vern L. Clairmont - Executive Treasurer
Frederick Cordier - Sergeant at-Arms

Tribal Preservation Office

TRIBAL COUNCIL MEMBERS:
† Michael T. Pablo - Chairman
D. Fred Matt - Vice Chairman
Carole J. Lankford - Secretary
Wm. Joseph Moran - Treasurer
Donald "Donny" Dupuis
Michael Durglo, Jr.
Jerri Hamel
Mery Lefthand
Elmer "Sonny" Morigeau
Lloyd D. Irvine

December 8, 1999

Alexandra Smith
Vice-President of Environment, Fish and Wildlife
Bonneville Power Administration
P.O. Box 3621
Portland OR. 97208

Dear Ms. Smith:

Thank you for the chance to comment on the Bonneville Power Administration's Transmission System Vegetative Management Program DEIS. Our meeting with Stacy Mason of the BPA was very informative and we consider this meeting the beginning of a cooperative effort to protect cultural resources on BPA managed transmission right-of-ways. Though it is late in the comment period there are some major concerns that our Tribes feel the need to address.

First, we wish to address the apparent lack of an intensive cultural resource survey within the BPA transmission line corridors and at electrical facilities on and adjacent to the Flathead Indian Reservation. We are unable to locate any record concerning prior cultural resource survey or National Historic Preservation Act consultation with the CSKT on BPA transmission lines on or off the reservation in northwestern Montana. Lacking specific cultural resource data, it is simply impossible to assess proposed vegetation control impacts on cultural resources, or ongoing impacts to cultural sites from other transmission line management activities.

Secondly, for the CSKT, cultural resources include traditionally used cultural plant communities and plant harvest and processing areas as well as archaeological properties. Tribal elders have expressed their concerns in the past that chemical agents may pollute the native cultural plants they use for food, medicine and ceremony. Therefore, we believe that certain manual, biological and chemical vegetation control measures can adversely impact traditional cultural use properties and archaeological sites, and that these impacts should be taken into account under Section 106 of the National Historic Preservation Act (NHPA).

The Confederated Salish and Kootenai Tribal Preservation Office (CSKTPO) is responsible for protection of historic and prehistoric cultural resources on the Flathead Indian Reservation and also has an obligation to protect cultural resources off the reservation within our ceded or aboriginal territories. These rights and responsibilities are clearly delineated within the 1999 revised regulation for implementing Section 106 of the NHPA. Therefore we provide the following recommendations:

- Implement a cultural resources inventory including a traditional cultural plant survey within the transmission line corridors and electrical facility sites on and adjacent to the Flathead Indian Reservation to identify cultural plant communities and other cultural resources.
- Develop a right-of-way management plan in consultation with the CSKT for power system corridors on and adjacent to the Flathead Indian Reservation.
- Employ tribal members to perform management tasks on and adjacent to the reservation.
- Use CSKT tribal vegetative guidelines on and adjacent to the Flathead Indian Reservation.
- Define a consultation protocol with the CSKTPO for potential impacts to cultural resources on and off reservation.

We look forward to an opportunity to meet with you or your staff soon to discuss these recommendations. We believe that it is critical to continue consultation with Joanne Bigcrane, CSK Tribal Ethnobotanist concerning native plant revegetation and the posting of chemically treated plants in plant harvesting areas. Our staff is also prepared to undertake the cultural resource studies recommended above in conjunction with the Salish and Kootenai Culture Committees and the Elders Advisory boards. Please contact Tim Ryan of our staff with your ideas for a time and place to meet. You can reach him at (406) 675-2700 ext.1081

Sincerely,

Marcia Cross
Tribal Preservation Officer

CC: Stacy Mason

† In honor of the years of dedicated service to the Tribes by the late Michael T. Pablo, the position of Chairman will remain vacant until January 2000, with the Vice Chairman assuming the duties as provided by the CSKT constitution.

The Klamath Tribes
P.O. Box 436
Chiloquin, Oregon 97624
Telephone (541) 783-2219
Fax (541) 783-2029
800-524-9787

PUBLIC INVOLVEMENT
LOG#: TKM-042
RECEIPT DATE: JAN 18 2000

January 4, 2000

Stacy Mason
Communications Office - KC-7
P.O. Box 12999
Portland, OR 97208

RE: BPA Transmission System Vegetation Management Plan DEIS

Dear Stacy:

This letter is to reiterate and clarify previously communicated concerns and recommendations of the Klamath Tribes on the Draft EIS for the BPA Transmission System Vegetation Management Plan. The Klamath Tribes' Natural Resource Department has reviewed the DEIS. The DEIS was also discussed with the Klamath Tribes' Culture and Heritage Department Director. Following are comments and recommendations.

It is important to ensure that proper consultation occurs with potentially affected tribes during NEPA planning of site-specific vegetation management projects. Though chapter three ("Site Specific Planning Steps") includes text pertaining to tribal consultation, it is recommended that this section be revised to more clearly describe the need for tribal consultation.

Maps of the general area of concern to the Klamath Tribes are enclosed for reference and, and if appropriate, inclusion into the Final EIS. Additional pertinent information on the history of the Klamath Tribes is also included.

The enclosed maps depict the area recognized by the U.S. Government as the homeland of the Klamath, Modoc, and Yahooskin Band of Snake Indians during negotiation of the Treaty of 1864 (CEDED LANDS). *(Note: Until recently, because of language within the treaty, the three tribes were referred to collectively as the Klamath Tribe. In recognition of the fact that tribal membership consists of members from three distinct tribes, the name was changed to the Klamath Tribes through a recent tribal governmental action.)* In terms of cultural resource protection and management, the homeland of the three tribes is often referred to as "The Klamath Tribes' Area of Cultural Influence." Physical and historical evidence indicates that the Klamath Tribes used this area historically. Because artifacts attributable to the Klamath Tribes have also been discovered outside the area depicted on the maps, it is recognized that the maps describe only the Tribes, general area of concern. In addition, it is important to note that this area was not used exclusively by the Klamath, Modoc, and Yahooskin Band of Snake Indians, and that historical use by other tribes and bands overlap in some areas.

Though the Klamath Tribes were "terminated" from federal recognition as an Indian tribe in 1954 (see enclosed literature), the Tribes' rights to hunt, fish, trap and gather, free of state and federal regulation, survived "termination." The Tribes currently exercise these rights within the former reservation boundary. In addition, there are locations outside of the 1954 Treaty Boundary within the Tribes' area of concern where tribal members continue to gather traditional plants, roots, berries, etc., and where other cultural, religious, and spiritual activities are practiced.

Because of potential impacts to fish, wildlife, and their habitats, plants and other resources pertinent to the exercise of treaty rights, it is imperative that the Tribes be consulted during consideration and planning of site-specific vegetation management projects within and adjacent to the former reservation boundary area. It is important to note that because of the migratory nature of fish and wildlife species relied upon by the Tribes, management concerns often extend beyond the former reservation boundary. Because of potential impacts to cultural resources, and cultural, religious, hunting, fishing, gathering and other Treaty uses, the Klamath Tribes request to be informed of all site-specific projects that will be considered or planned within The Klamath Tribes' Area of Cultural Influence. Where appropriate, the Tribes may wish to participate in development of site-specific mitigation measures to ensure protection of cultural resources and cultural/religious uses and values important to the Tribes.

Contact with the Klamath Tribes should occur early in the scoping or planning phase for site specific projects. It will be helpful to send copies of scoping letters or other notification of intent for site-specific projects (one copy or set of copies each) to the Klamath Tribal Chairman, Natural Resource Department Director, and to the Culture and Heritage Department Director.

Due to staff illness and absence during the holiday season, the Klamath Tribes' Natural Resource Department was not able to document the Tribes' comments as agreed in your previous communication with Don Gentry, the Klamath Tribes' Natural Resource Specialist. I apologize for any inconvenience this may cause. Don informed me, however, that the substance of these comments was communicated in earlier communication with you, and that this letter is a follow-up to that communication.

Thank you for the opportunity to comment on the Draft EIS. If you have questions, need additional information or clarification, or wish to discuss this issue further, please feel free to contact Don Gentry here at the Klamath Tribes Natural Resource Department.

Sincerely,

Elwood Miller, Jr
Natural Resource Department Director

C: Allen Foreman, Klamath Tribal Chairman
Dino Herrera, Culture and Heritage Department Director

Enclosures: 5

5 Enclosures:
The History of Klamath Treaty Hunting, Fishing, and Gathering Rights brochure
The Klamath Tribe, Welcome Everyone pamphlet
The Klamath and Modoc Tribes and The Yohooskin Band of Snake Indians Under the treaty of 10/14/1864 map
Small Washington, Oregon, California, Nevada and Idaho colored map
Large Washington, Oregon, California, Nevada and Idaho colored map

GLOSSARY AND ACRONYMS

Glossary

Adaptive Management Areas (AMAs): areas especially designated by the U.S. Forest Service under the Northwest Forest Plan [Final supplemental environmental impact statement on management of habitat for late-successional and old-growth forest related species within the range of the northern spotted owl; April 1994]

Adjuvants: wetting agents, sticking agents, stabilizers or enhancers, thickening agents, and so on, used to enhance the usefulness of herbicides.

Allelopathic: used to describe an interaction between plants, one of which produces a chemical that keeps other plant(s) from establishing themselves nearby.

Backline: the line painted on trees (on or off the right-of-way) that encompasses most of the trees that could fall or bend into a transmission line or that the line could swing into. The line is placed where most of the trees inside the line are dangerous to the transmission line and most of the trees outside the line are safe. All the trees inside the backline would be cut (including safe trees). Individual "danger trees" would then be marked and cut outside of the back line. A "full safe" backline is a line that encompasses all the trees mentioned above. In this case the line would be painted around all the "danger trees" and all trees within the line (including safe trees) would be cut.

Best Management Practices (BMPs): a practice or combination of practices that is the most effective and practical means of preventing or reducing the amount of pollution generated by non-point sources to a level compatible with water quality goals.

Bioaccumulation: the accumulation of a substance in a living organism.

Biodiversity: a measure of the number of different species in a given area' species richness.

Biological methods: control of vegetation through the planned release of insects that like to feed on undesirable vegetation, and/or through promoting the growth of low-growing vegetation. Also, release of **plant-eating insects or pathogens** (agents such as bacteria or fungus that can cause diseases in target plants) and fostering of low-growing plant communities[1].

Blading: using a steel blade or steel fork attachment on a tracked or rubber-tired vehicle that removes vegetation through a combination of pushing and/uplifting motions.

Compaction: the result of rolling, tamping, or use of heavy equipment on soil. Soils becomes hardened, difficult to cultivate, and impermeable to air and water.

Corrective action: the vegetation management needed on a right-of-way where the target vegetation is tall and dense

Corridor: a strip of land forming a passageway for transportation or utility facilities.

Critical habitat: an area with the physical or biological features essential to the conservation of a threatened or endangered species and that may require special management consideration or protection

Cultural resources: a general term frequently used to refer to a wide range of archeological sites, historic structures, museum objects, and traditional cultural places.

Cumulative impact: according to the Council on Environmental Quality Regulations, "cumulative impact" is the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions, regardless of who or what undertakes such actions.

Danger trees: trees that could potentially grow, fall, or bend into the lines from the area next to the right-of-way. They are picked for removal based on the tree's overall condition; the ground around it; the tree species; and any other defect that might cause the tree to be "unstable" and more likely to fall into our transmission line.

---

[1] Promoting low-growing plant communities is classified as a "biological" method in this EIS. It can also be considered a "cultural" method or a "prevention" method.

Diversity (species): See Biodiversity.

Edge effect: a place where two differing habitats meet, in this case as created when a transmission line is built and maintained over time. This 'edged effect" is beneficial for those animals that live in the forest but like to use adjacent open areas such as a right-of-way for foraging and hunting.

Endangered species: (see Threatened and endangered species)

Fault: an unintentional short-circuit in a power system, due to a breakdown in insulation and causing abnormal current flow.

Flashover: a disruptive discharge through the air around or over the surface of an insulator. Can result from a lightning surge on a conductor.

Floodplain: that portion of a river valley adjacent to the stream channel that is covered with water when the stream overflows its banks during flood stage**.**

Girdling: cutting a ring around the trunk of the tree deep into the cambium layer, killing the tree but leaving it standing (see also **Snag**)

Ground mat: a metal grid is buried under substation soil; it protects people from being shocked or injured by electricity "attracted" to a body by the difference in electric potential.

Growth regulator(s): substances that slow or stop the growth of plants (as compared to herbicides, which kill plants)

Herbicide: a chemical substance used to kill, slow, or suppress the growth of plants

Herbicide uses/application:

Aerial spray aerial herbicide applications treat large areas that usually have heavy, dense vegetation needing control, steep slopes that make other methods unsafe, or poor road access. This would frequently include rights-of-way thick with tall-growing vegetation and/or noxious weeds. Aerial applications are always made during the growing season. Herbicide drift is controlled by immediate shut-off devices, close monitoring of weather conditions, and the use of adjuvants to enlarge and weight the herbicide droplet size. Spray may be made by fixed-wing aircraft or by helicopter.

Backpack spray an herbicide spray device worn as a backpack by a worker. Used where localized or spot treatment is needed (not for broadcast application).

Bare-ground (treatment) (1) as a localized treatment, via backpack sprayer, ATV or tractor with a handgun, treats the *ground or soil* to keep any vegetation from growing, rather than treating the vegetation itself. The herbicide used can be in liquid or granular formulations. This technique is used in places like substations and around wooden poles. ***(2)*** as a broadcast treatment, herbicide is sprayed by ATV or tractor with a handgun, or by trucks with mounted booms. As with bare-ground localized treatments, this application treats the ground or soil to keep vegetation from growing.

Basal (treatment) a method of localized treatment. Using a squirt bottle or backpack, workers apply herbicides at the base of the plant (the bark or stem from the ground) up to knee height. The herbicide is usually mixed with an oil carrier to enhance penetration through the bark, and applied to the point short of run-off. These treatments can be done during the dormant season or active growing season.

Broadcast this category of herbicide applications treats an area, rather than individual plants. It is used on rights-of-way with heavy density of stems, for noxious *weeds, and in electrical yards.*

Cut-stubble treatment a broadcast treatment method. Herbicide is sprayed from a truck with a mounted boom over large swaths of freshly mechanically cut areas. It is intended to keep plants from resprouting.

Foliar (1) "low-volume" foliar is a localized treatment method. using a backpack sprayer, all terrain vehicle or tractor with a handgun, workers apply herbicide to the foliage of individual or clumps of plants during the growing season, just enough to wet them lightly. A relatively high percentage of herbicide is used mixed with water. Thickening agents are added where necessary to control drift. Dyes may also be added to see easily what areas have been treated. ***(2)*** "high-volume" (broadcast) treatments are applied by truck, ATV, or tractor with handgun, broadcast nozzle, or boom. Foliage and stems of target vegetation are sprayed with a mixture of water and a low percentage of herbicide.

Granular (1) "localized" granular application means that granular or pellet forms of herbicide are hand-applied to the soil surface beneath the driplines of an individual plant, or as close to a tree trunk or stem bases as possible. Herbicide is applied when there is enough moisture to dissolve and carry the herbicide to the root zone—but not so much water that it washes the granules off-site. ***(2)*** "broadcast" granular herbicide is spread by hand, belly grinder, truck or tractor over a large area, such as in an electrical yard, or around tower legs.

Injection treatment a method of spot treatment. Herbicide is injected into the tree around the base.

Localized treatment the treatment of individual or small groupings of plants, normally used only in areas of low to medium target-plant density. See **basal, foliar, granular, and bare-ground** applications.

Notch treatment a method of spot treatment. Herbicide is squirted or sprayed into notches or cups chopped around the base of individual trees or shrubs.

Spot a spot application treats plants using the smallest amount of herbicide possible. The two methods are (1) stump treatment and (2) injection and notch treatment.

Stump (treatment) a method of spot treatment. Herbicide is applied by hand (squirt bottle) or backpack to freshly cut stumps of broadleaf trees and shrubs to prevent resprouting.

Host-specific: insects that feed *only* on a target plant and will not switch to crops, native flora, or endangered plant species when the target vegetation becomes scarce.

Integrated Vegetation Management (IVM): a strategy to control unwanted vegetation by considering the use of all suitable control methods within the context of the whole environment (ecosystem). An array of control methods is used, and methods are chosen based on the vegetation needing control and the environmental conditions present. The goal is to have the most benign overall long-term effect on the ecosystem.

Late successional (reserves) (areas): areas set aside for long-term protection as old-growth forest

Leaching: for this EIS, to move through or from one medium (such as the ground) by the percolating action of water

Lop and scatter: this method cuts (or *lops*) off the branches on two sides of a fallen tree by ax or chainsaw, so the tree trunk lies flat on the ground. The trunks are usually cut in sections. The cut branches are then scattered on the ground, laid flat, and left to decompose.

Low-growing plant communities: a dense population of relatively short plants (e.g., grasses, shrubs, forbs, herbs) that can "out-compete" trees and tall-growing brush for sunlight and nutrients, thereby reducing the presence of trees. Low-growing plants shade the ground and absorb available moisture, making it harder for the trees to germinate underneath the shrubs or to grow up through the low-growing plant cover. This is essentially vegetation "self-management."

Managing vegetation: cutting or killing vegetation, disposing of vegetative debris, and reseeding or replanting vegetation.

Manual methods: the removal or cutting of vegetation using the hand or hand-held tools such as saws, or by burning or steaming it, or by girdling a tree (see **Girdling**)

Mechanical methods: the removal or cutting of vegetation using larger mowing-type equipment on rubber-tired or –tracked tractors.

Microbes : a minute life form; a microorganism.

Mitigation: steps taken to lessen the effects predicted for each resource as potentially caused by a vegetation management program. They may include reducing the impact, avoiding it completely, or compensating for the impact.

Native plant/Native species: species of plants, animals, or birds that originated in a given ecological area. Native plants or species are often best adapted to a given area.

Non-native species: species that have migrated or been imported into an ecological area. Non-native plants or species may compete for space and nutrients with a (more desirable) native species.

Noxious weeds: plants that are injurious to public health, crops, livestock, land, or other property.

Outage: interruption of the power flow such that electric facilities stop operating.

Pathogen: agents such as bacteria or fungus that can cause diseases in target plants

Program E: the alternative vegetation management program that focuses on electrical facilities

Program NE: the alternative vegetation management program that focuses on non-electrical facilities

Program R: the alternative vegetation management program that focuses on transmission line rights-of-way

Pruning: the removal of selected branches from tree trunks, without felling the whole tree.

Residual/ Non-residual: **u**sed to describe herbicides. *Residual* herbicides are soil active products that provide total vegetation control. Some residual herbicides are active for 6 to 8 weeks; others are active for 2 to 3 years. These herbicide are often used to treat the ground in electrical yards and create a constant impact on any vegetation that attempts to grow. By contrast, *non-residual* herbicides do not stay active very long, and are used to kill vegetation that is present when it is applied.

Restricted/non-restricted: Environmental Protection Agency terms applied to herbicides or pesticides. "Non-restricted" pesticide products can be purchased at the local hardware store and used by the general public. "Restricted" products are those that cannot be bought by or used by an untrained person.

Resprouting: the sending out of new, often multiple, branches from the cut surface of the stump of a tree or bush.

Right(s)-of-way (ROW)
an easement for a certain purpose over the land of another, such as a strip of land used for a road, electric transmission line, pipeline, and so on.

Riparian: of, or pertaining to, the bank of a river, stream, lake, or other watercourses. Often applied to the characteristic water-loving vegetation of such an area.

Scoping: an early opportunity for the public to tell a federal agency what issues they think are important and should be considered in the environmental analysis of a proposed federal action.

Sensitive species: those plants and animals identified by the Regional Forester for which population viability is a concern, as evidenced by significant current or predicted downward trend in populations or density and significant or predicted downward trend in habitat capability**.**

Slash: woody debris left after a tree or trees have been felled.

Snag: a tree, or part of a tee, usually dead, that remains upright. Wildlife and birds often use snags as perches, nesting places, and food sources (insects).

Supplement Analysis: an environmental analysis to help determine if there are substantial changes to the proposal in an EIS or significant new circumstances or information relevant to environmental concerns. Department of Energy Regulations 1021.314(a)

Threatened and endangered species [birds/animals/plants]: the Endangered Species Act provided a means to identify, list, and protect certain species whose low population numbers made them vulnerable to extinction. Endangered species are those species officially designated by the U.S. Fish and Wildlife Service or the National Marine Fisheries Service that are in danger of extinction through all or a significant portion of their range; threatened species are those so designated that are likely to become endangered within the foreseeable future through all or a significant portion of their range. Both species are protected by Federal law.

Tier/tiering: as used here, to establish a relationship between a broader environmental investigation and a (usually subsequent) more narrowly focused one, so that the focused statement can reference the previous broad study and not repeat material that has already been discussed.

Topping: removing the top one-third or less of an evergreen tree

Toxicity: The quality of potential of a substance to cause injury, illness, or other undesirable effects.

Traditional use plants: native plants associated with traditional cultural practices including sustenance, ceremony, medicine, tools, garments, or other uses.

Turbidity: the extent to which a body of water is muddy or cloudy with particles of sediment stirred up or suspended in it.

Unstable (trees): trees that are diseased, dying, or likely to fail into the transmission line. See **Danger tree**

Volatilization: the evaporation of a (usually liquid) substance into a gaseous form

Wetlands: an area where the soil experiences anaerobic (no oxygen) characteristics because water inundates the area during the growing season. Indicators of a wetland includes types of plants, soil characteristics, and hydrology of the area

Woody debris: materials left over from cutting or harvesting, such as limbs of branches of a tree. Woody debris may be placed in stream channels to slow and divert water flow and improve habitat for fish.

Acronyms

Units of Measure

ac.	**acre** 1 ac.	[metric equivalent: = 0.4 ha]
cm	**centimeter** 1 cm	[English equivalent: = 0.4 in.]
ft.	**foot/feet** 1 ft.	[metric equivalent: = 0.3 m]
ha	**hectare** 1 ha	[English equivalent: = 2.5 ac.]
in.	**inch** 1 in.	[metric equivalent: = 2.5cm.
kg	**kilogram** 1 kg.	[English equivalent: = 2.2 lbs.]
km	**kilometer** 1 km	[English equivalent: = 0.6 mi.]
kV	**kilovolts**	
LC50	**lethal concentration 50**	
LD50	**lethal dose 50**	
lb.	**pound** 1 lb.	[metric equivalent: = 0.45 kg]
m	**meter** 1 m	[English equivalent: = 3.3 ft.]
mg	**milligram** 1 mg.	[English equivalent: = 0.015432 grains]
mi.	**mile** 1 mi.	[metric equivalent: = 1.8 km]
mph	**miles per hour**	
ppm	**parts per million**	

yr. **year**

Terms and Titles

AMA	Adaptive Management Area
ATV	All-terrain-vehicle
BLM	Bureau of Land Management
BMP	Best Management Practices
Bonneville	Bonneville Power Administration
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CFR	Code of Federal Regulations
Corps	US Army Corps of Engineers
CWA	Clean Water Act
CX	categorical exclusion
DEIS	draft environmental impact statement
DOE	U.S. Department of Energy
e.g.	Latin, common shorthand meaning "for instance"
EA	environmental assessment
EIS	environmental impact statement
EPA	U.S. Environmental Protection Agency
EPCRA	Emergency Planning and Community Right-to-Know Act
ESA	Endangered Species Act
et al.	*"et alia"* - Latin for "and the others" in cases where a list of authors is too long to put in the text
et seq.	*"et sequens"* - Latin for "and following"

EXTOXNET	Extension Toxicology Network
FACT	Food, Agriculture, Conservation, and Trade Act
FIFRA	Federal Insecticide, Fungicide and Rodenticide Act
FS	U.S. Forest Service [also: USDAFS]
i.e.	Latin, common shorthand meaning "that is"
IPM	Integrated Pest Management
IVM	Integrated Vegetation Management
LS/OG	Late Successional/Old Growth
MA	Management Area
MAD	minimum approach distance
MSDS	Material Safety Data Sheet
NEPA	National Environmental Policy Act
NESC	National Electric Safety Code
NF	National Forest
NMFS	National Marine Fisheries Service
NPDES	National Pollutant Discharge Elimination System
NSA	National Scenic Area
OSHA	Occupational Safety and Health Administration
PFS	(Bonneville Power Administration) Pesticide Fact Sheets
PLS	pure live seed
PNW	Pacific Northwest
RCRA	Resource Conservation and Recovery Act
RED	[Environmental Protection Agency] Reregistration Eligibility Decision
RMP	Resource Management Plan

ROD	Record of Decision
ROW	Right-of-way
SARA	Superfund Amendments and Reauthorizations Act
SHPO	State Historic Preservation Office
SMZ	Streamside Management Zone
SWPP	Storm Water Pollution Prevention plan
T&E	Threatened and Endangered (species)
TES	Threatened, Endangered, and Sensitive [species]
TSCA	Toxic Substance Control Act
USFWS	U.S. Fish and Wildlife Service
WSSA	Weed Science Society of America

This page intentionally left blank.

List of Preparers and Reviewers

BRUCE ALLEN, Realty Specialist, Special Uses /USDA Forest Service, Region 1. Responsible for: content review. Education: BA History, BFT Foreign Trade. Experience: special use grants, hydroelectric projects; in Special Uses since 1983.

MOLLY KOESTER BROWN, Construction Clearing Coordinator/NSRI Inc. Responsible for: early EIS development and review. Education: B.S. Environmental Studies. Experience: NEPA coordination, coordination of clearing on new line construction, contractor to Bonneville from 1991 to 1998.

DANA COLLINS, GIS Specialist/NSRI Inc. Responsible for: Geographic Information System (GIS) database automation, spatial analysis and map production. Education: B.S. Geography. Experience: Database compilation analysis; contractor to Bonneville since 1992.

BILL ERICKSON, Natural Resource Specialist/Bonneville Power Administration, Walla Walla. Responsible for: program development and technical review. Education: B.S. Range Land Management. Experience: licensed pesticide consultant since 1979 and active in vegetation management for 20 years; with Bonneville since 1991.

KATHY FISHER, Environmental Specialist/Bonneville Power Administration. Education: B.A. Economics. Experience: Forest Planning, Environmental Coordination; with BPA since 1992.

JIM GALABA, Special Uses Program Manager/USDA Forest Service, Region 6. Responsible for: content review. Education: B.S. Forestry. Experience: Special uses and rights-of-way; 35 years with the U.S. Forest Service.

ANDY GODFREY, Environmental Coordinator/USDA Forest Service, Region 4. Responsible for: content review. Education: A.B. Geology, Ph.D. Physical Geography. Experience: Environmental Geology, Forest Planning, Public Affairs Coordination, NEPA Coordination; with the Forest Service since 1972.

ROBERT HAGGARD, Public Service Staff Officer/USDA Forest Service, Modoc National Forest. Responsible for: content review. Education: B.S. Forest Management. Experience: Forest management, recreation management. With the USFS since 1975; 12 years overall Forest Planning, NEPA Coordinator.

STEVE HALL, Wildlife Biologist/Jones & Stokes Associates, Inc. Responsible for: environmental analysis. B.S. Wildlife Management. Experience: 6 years conducting environmental impact analysis; 3 years as U.S. Forest Service wildlife biologist.

MARK HERMESTON, Environmental Scientist, Bonneville Power Administration. Responsible for: Coordinating herbicide issues, technical standards, and scientific review. Education: B.S. Geology. Experience: CERCLA, FIFRA, RCRA, and TSCA Project management; with Bonneville since 1986. District Geologist, USDOI-BLM.

RANDY KARSTAEDT, Special Uses Program Leader/USDA Forest Service, Washington D.C. Responsible for: Forest Service coordination and content review. Education: B.S. Forest Management. Experience: 23 years with the USFS; 21 in Special Uses.

LESLIE KELLEHER, Biologist/Bonneville Power Administration. Responsible for: technical content. Education: B.A. Biology, M.A. Secondary Education/Environmental Science. Experience: 6 years general environmental analysis, vegetation, floodplain and wetland analysis and NEPA process.

LINDA KRUGEL, AICP, Planning Consultant/Krugel & Associates. Responsible for: public involvement. Education: B.S. Related Arts, M. of City Planning, M. of Public Administration. Experience: policy development and public involvement; contractor to Bonneville since 1984.

LAWRENCE LARSEN, Silviculturist /USDOI Bureau of Land Management, Oregon State Office. Responsible for: Bureau of Land Management coordination and content review. Education: MS in Forestry. Experience: Silviculture, Forest Development, Vegetation Management, Issue Resolution Team (inter- and intra-agency); with BLM since 1969

STACY MASON, Environmental Coordinator/Bonneville Power Administration. Responsible for: EIS coordination and development. Education: B.A. Aquatic Biology. Experience: environmental analysis, cultural resources; with Bonneville since 1988.

PHIL MATTSON, Regional Environmental Coordinator/USDA Forest Service. Responsible for: content review. Education: B.S. Forestry. Experience: 18 years in environmental planning; 25 years with U.S. Forest Service.

TOM MCKINNEY, NEPA Compliance Officer/Bonneville Power Administration. Responsible for: cultural resources and NEPA compliance. Education: B. A. Geography. Experience: 17 years experience conducting and managing environmental impact analysis at Bonneville.

PRISCILLA MCLAIN, Realty Specialist, USDOI Bureau of Land Management, Oregon State Office. Responsible for: content review. Education: B.A. Geography, JD. Experience: 20 years with BLM in realty.

RANDY MELZER, P.E., Process Manager for Transmission Line Maintenance/Bonneville Power Administration. Responsible for: maintenance coordination and content review. Education: B.S. Electronic Engineering. Experience: 11 years experience in line maintenance with 4 years as line maintenance supervisor; with Bonneville since 1979.

JUDITH H. MONTGOMERY, Writer/Judith H. Montgomery/ Communications. Responsible for: writing and editing. Education: B.A. English Literature; M.A. English Literature; Ph.D. American Literature. Experience: writing and editing of environmental and public involvement documents for power agency; consultant to Bonneville since 1980.

TOM MURPHY, Natural Resource Specialist/Bonneville Power Administration, Spokane. Responsible for: program development and technical review. Education: B.S. Natural Resources. Experience: In forest industry since 1980; with Bonneville since 1983.

MARK NEWBILL, Natural Resource Specialist/Bonneville Power Administration, Eugene. Responsible for: program development and technical review. Education: B.S Forestry, M.S. Forest Products. Experience: 5 years of providing technical guidance for vegetation management, 2 years of managing vegetation on rights-of-way; with Bonneville since 1991.

LOGAN A. NORRIS, Professor and Department Head, Dept. Forest Science, Oregon State University. Responsible for: Technical content review of EIS with respect to environmental chemistry, risk assessment, and integrated vegetation management. Education: B.S. Forestry; M.S. Forest Science and Chemistry, Ph.D. Plant Physiology.

Experience: Research and consulting in environmental chemistry, risk assessment, and integrated vegetation management related to electric utility rights-of-way since 1962.

LEROY P. SANCHEZ, Visual Information Specialist/Bonneville Power Administration. Responsible for: EIS graphics. Education: Graphics Design. Experience: EIS graphics coordination, cartographic technical duties; with Bonneville since 1978.

PHILIP W. SMITH, GIS Specialist/Soil Scientist/NSRI Inc. Responsible for: Technical content and review. Education: B.S. Agronomy; M.S. Soil Science. Experience: soils and agriculture analysis; contractor to Bonneville since 1981.

ERIC STONE, Program Analyst/USDOI Bureau of Land Management, Oregon State Office. Responsible for: content review. Education: MS Forestry. Experience: land use and activity planning and analysis, intergovernmental coordination, tiered environmental analysis; with BLM since 1969.

KATHY STEPHENSON, Process Manager for Right-of-way Vegetation Maintenance/Bonneville Power Administration. Responsible for: program development and technical review. Education: B.S. Forest Management. Experience: silvicultural activities, technical guidance for vegetation management; with Bonneville since 1991.

TAMMIE VINCENT, Environmental Specialist/Bonneville Power Administration. Responsible for: early coordination with Forest Service, Bureau of Land Management, and Tribes. Education: B.A. Economics, M.A. Economics. Experience: environmental policy analysis and team lead; with BPA since 1991.

List of Agencies, Organizations, and Persons Sent the EIS

The project mailing list contains names of more than 1500 interested and affected individuals, Tribes, utilities, public officials, interest groups, businesses, landowners, libraries, media, and local, state and Federal agencies. They have received information on the project. They were given information on how to receive all project information made available so far and will have an opportunity to review the Draft and Final EIS.

Congressional

U. S. Senate

Senator Max Baucus
Senator Conrad Burns
Senator Larry Craig
Senator Slade Gorton
Senator Michael Crapo
Senator Patty Murray
Senator Gordon Smith
Senator Ron Wyden

U. S. House of Representatives

Representative Rick Hill
Representative Helen Chenoweth
Representative Jack Metcalf
Representative Earl Blumenauer
Representative David Wu
Representative Greg Walden
Representative Brian Baird
Representative Jay Inslee
Representative Michael Simpson
Representative Peter DeFazio
Representative Richard Hastings
Representative Darlene Hooley
Representative George Nethercutt
Representative Norman D. Dicks
Representative Jim McDermott
Representative Jennifer Dunn
Representative Adam Smith

Federal Agencies

Department of Agriculture

Forest Service

Applegate Ranger District
Ashton Ranger District
Augusta Information Station
Avery Ranger District
Barlow Ranger District
Bear Springs Ranger District
Bear Valley Ranger District
Beartooth Ranger District
Beaverhead DeerLodge National Forest
Belt Creek Information Station
Bend Ranger District
Big Summit Ranger District
Big Timber Ranger District
Bitterroot National Forest
Blue River Ranger District
Bly Ranger District
Boise National Forest
Bozeman Ranger District
Bridgeport Ranger District
Bridger Teton National Forest
Burley Ranger District
Burns Ranger District
Butte Ranger District
Cabinet Ranger District
Canoe Gulch Ranger Station
Caribou National Forest
Cascade Ranger District
Central Zone, Coeur D'Alene
Challis Ranger District
Chelan Ranger District
Chemult Ranger District
Chetco Ranger District
Clackamas Ranger District
Cle Elum Ranger District
Clearwater National Forest
Coeur D'Alene Kaniksu St Joe National Forests
Columbia River Gorge National Scenic Area
Colville National Forest
Cottage Grove Ranger District
Crescent Ranger District
Crooked River National Grassland
Custer National Forest
Darby Ranger District
Darrington Ranger District
Deerlodge National Forest
Deerlodge Ranger District
Deschutes National Forest
Detroit Ranger District
Devil's Garden Ranger District
Diamond Lake Ranger District
Dillon Ranger District
Doublehead Ranger District
Dubois Ranger District
Eagle Cap Ranger District
Eastside Engineering Zone 1
Elk City Ranger District
Emmett Ranger District
Entiat Ranger District
Estacada Ranger District
Fairfield Ranger District
Fernan Ranger District
Fisher River Ranger District
Flathead National Forest
Fort Rock Ranger District
Fortine Ranger District
Fremont National Forest
Galice Ranger District
Gallatin National Forest
Gardiner Ranger District
Gifford Pinchot National Forest
Glacier View Ranger District
Gold Beach Ranger District
Hebgen Lake Ranger District

Hebo Ranger District
Helena National Forest
Helena Ranger District
Heppner Ranger District
Hood Canal Ranger District
Hood River Ranger District
Hungry Horse Ranger District
Idaho City Ranger District
Idaho Panhandle National Forest
Illinois Valley Ranger District
Intermountain Region, Ogden
Island Park Ranger District
Jackson Ranger District
Jarbidge Ranger District
Jefferson Ranger District
Judith Ranger District
Ketchum Ranger District
Kettle Falls Ranger District
Kings Hill Ranger District
Klamath Ranger District
Kootenai National Forest
Krassel Ranger District
Lagrande Ranger District
Lakeview Ranger District
Lake Wenatchee Ranger District
Leadore Ranger District
Leavenworth Ranger District
Lewis & Clark National Forest
Libby Ranger District
Lincoln Ranger District
Livingston Ranger District
Lochsa Ranger District
Lolo National Forest
Long Creek Ranger District
Lost River Ranger District
Lowell Ranger District
Lowman Ranger District
McCall Ranger District
McKenzie Ranger District
Madison Ranger District
Malad Ranger District
Malheur National Forest
Methow Valley Ranger District
Middle Fork Ranger District
Missoula Ranger District
Modoc National Forest
Mon & Challis National Forest
Montpelier Ranger District
Moose Creek Ranger Station
Moscow Office
Mount Adams Ranger District
Mount Baker Snoqualmie National Forest
Mount Hood National Forest
Mountain Home Ranger District
Murphy Lake Ranger Station
Musselshell Ranger District
Naches Ranger District
Nature of the Northwest Information Center
New Meadows Ranger District
Newport Ranger District Headquarters
Nez Perce National Forest
Ninemile Ranger District
North Bend Ranger District
North Fork John Day Ranger District
North Umpqua Ranger District
Northern Region, Missoula
Oakridge Ranger District
Ochoco National Forest
Office of General Council
Okanogan National Forest
Olympic National Forest
Pacific Northwest Region, Portland
Packwood Ranger District
Paisley Ranger District
Palisades Ranger District
Palouse Ranger District
Paulina Ranger District
Payette National Forest
Pierce Ranger District
Pine Ranger District
Plains/Thompson Falls Ranger District

Pocatello Ranger District
Pomeroy Ranger District
Powers Ranger District
Prairie City Ranger District
Priest Lake Ranger District
Prineville Ranger District
Prospect Ranger District
Quilcene Ranger District
Quinault Ranfer District
Randle Ranger District
Red River Ranger District
Region 1
Region 4
Region 5
Region 6
Republic Ranger District
Rexford Ranger District
Rigdon Ranger District
Rocky Mountain Ranger District
Rogue River National Forest
Salmon & Challis National Forests
Salmon Cobalt Ranger District
Salmon River Ranger District
Sandpoint Ranger District
Sawtooth National Forest
Seeley Lake Ranger District
Selway Ranger District
Silverlake Ranger District
Sioux Ranger District
Siskiyou National Forest
Siuslaw National Forest
Skykomish Ranger District
Snow Mountain Ranger District
Spotted Bear Ranger District
St Maries Ranger District
Stanley Zone Office SNRA
Stevensville Ranger District
Sula Ranger District
Sullivan Lake Ranger District
Superior Ranger District
Swan Lake Ranger District
Sweet Home Ranger District
Tally Lake Ranger District
Targhee National Forest
Teton Basin Ranger District
Three Rivers Ranger District
Tiller Ranger District
Tonasket Ranger District
Townsend Ranger District
Twin Falls Ranger District
Umatilla National Forest
Umpqua National Forest
Unity Ranger District
Waldport Ranger District
Walla Walla Ranger District
Wallowa National Forest
Wallowa Valley Ranger District
Wallowa-Whitman National Forest, Washington D.C. Office
Weiser Ranger District
Wenatchee National Forest
West Fork Ranger District
White River Ranger District
Willamette National Forest
Wind River Ranger District
Winema National Forest
Wisdom Ranger District
Wise River Ranger District
Yankee Fork Ranger District
Zigzag Ranger District

Natural Resource and Conservation Service

California State Conservationist
Idaho State Conservationist
Oregon State Conservationist
Washington State Conservationist
West Regional Conservationist
Wyoming State Conservationist

Department of Interior

Bureau of Land Management

Alturas Resource Area
Arcata Resource Area
Baker Field Office
Bighorn Basin Resource Area
Buffalo Resource Area
Burley District Office
Burns District Office
Butte District Office
California State Office
Casper District Office
Clear Lake Resource Area
Cody Resource Area
Coos Bay District Office
Eagle Lake Resource Area
Eastern States Director
Eugene District Office
Great Divide Resource Area
Green River Resource Area
Idaho State Office
Kemmerer Resource Area
Klamath Falls Field Office
Lander Resource Area
Lower Snake River District
Lakeview District Office
Medford District Office
Missoula Field Office
Montana State Office
National Office of Fire & Aviation
Newcastle Resource Area
Oregon State Office
Pinedale Resource Area
Platte River Resource Area
Prineville District Office
Rawlins District Office
Redding Resource Area
Regional Environmental Office - Portland
Rock Springs District Office
Roseburg District Office
Salem District Office
Spokane District Office
Surprise Resource Area
Tillamook Resource Area
Upper Columbia - Salmon/Clearwater Districts
Upper Snake River District
Utah State Office
Vale District Office
Washington D.C.
Wenatchee Resource Area
Worland District Office
Wyoming State Office

Bureau of Indian Affairs

Colville
Portland
Salish Kootenai
Seattle
Yakama
Warm Springs

Bureau of Reclamation

Boise Project Office
Columbia Basin Project
Grand Coulee Project Office
Umatilla Yakama Construction Office
Yakima District
Yakima Project Office

Fish and Wildlife Service

Region 1 Headquarters
Eastern Washington Ecological Services Office
Montana Ecological Services Office
Oregon State Office
Sacramento Office
Idaho State Office
Western Washington Office
Wyoming Ecological Services Office

National Park Service
Columbia River Gorge National Scenic Area

National Recreation Area
Oregon Dunes National Recreation Area
Sawtooth National Recreation Area

Department of Commerce

National Marine Fisheries Service

Department of Defense

Corps of Engineers, Fort Lewis
USA Corps of Engineers
USA Corps of Engineers - Portland

Department of Energy

Idaho Operations Office
Los Alamos National Labs
Pacific Northwest National Laboratory
Richland Operations Office
Southwestern Power Administration
Tennessee Valley Authority
Western Area Power Administration

Environmental Protection Agency

Seattle Region X
U.S. Environmental Protection Agency, Washington D.C.
U.S. Environmental Protection Agency Region 8
U.S. Environmental Protection Agency Region 10

Regional Agencies

Northwest Power Planning Council
Columbia River Inter-Tribal Fish Commission
Northwest Indian Fisheries Commission

Tribal Government

Alturas Rancheria
Blackfeet Tribe
Burns Paiute Tribe
California Indian Basket Weavers Association
Cedarville Rancheria
Chehalis Business Council
Coeur D'Alene Tribe
Confederated Salish & Kootenai Tribes of the Flathead Reservation
Confederated Tribes of Chehalis
Confederated Tribes of the Colville Reservation
Confederated Tribes of Coos, Lower Umpqua & Siuslaw Indians
Confederated Tribes of the Grande Ronde
Confederated Tribes of the Umatilla Indian Reservation
Confederated Tribes of the Warm Springs Reservation of Oregon
Coquille Indian Tribe
Cow Creek Band of Umpqua Indians
Cowlitz Indian Tribal Office
Crow Tribe of Montana
Fort Bidwell Reservation
Fort McDermitt Tribal Council
Hoh Tribal Business Council
Hoopa Valley Tribal Council
Jamestown S'klallam Tribal Council
Kalispel Tribe
Klamath Indian Tribe
Kootenai Tribe
Lower Elwha Community Council
Lummi Business Council
Makah Tribal Council
Muckleshoot Tribe
Nez Perce Tribe
Nisqually Indian Tribe
Nooksack Indian Tribal Council
Northwestern Band of Shoshone Nation
Pit River Tribe
Port Gamble S'klallam Tribe
Puyallup Tribe of Indians
Quileute Tribal Council
Quinault Indian Nation
Samish Indian Tribe
Sauk-Suiattle Tribal Council
Shoalwater Bay Tribe
Shoshone Bannock Tribes of Fort Hall
Shoshone Paiute Tribes of Duck Valley
Siletz Tribal Council
Skokomish Tribal Council
Spokane Tribe of Indians
Squaxin Island Tribal Council
Stillaquamish Board of Directors
Summit Lake Paiute Tribal Council
Suquamish Tribal Council
Swinomish Indian Tribal Community
Tulalip Tribes of Washington
Upper Skagit Tribal Council
Yakama Indian Nation
Wanapum People

State Government

California

Department of Agriculture and Weed Control
Department of Food & Agriculture
State Clearinghouse

Idaho

Governor Dirk Kempthorne
Senator Robert Geddes
Senator Jack Riggs
Senator John Sandy
Senator Denton Darrington
Representative Shirley McKague
Representative Paul Kjellander
Representative Sher Sellman
Representative John Stevenson
Representative JoAnn Wood
Representative Larry C. Watson
Council on Industry & Environment
Department of Extension Services
Department of Fish & Game
Department of Lands
Department of Transportation
Department of Water Resources
Division of Financial Management Clearinghouse
Idaho State Historical Society
INEL Oversight Program
Interior Columbia Basin Ecosystem Mgt. Project

Montana

Governor Marc Racicot
Representative John Cobb
Representative Stanley Fisher
Representative Doug Mood
Representative Jim Shockley
Department of Agriculture and Livestock
Department of Community Affairs
Department of Natural Resources
Local Government Energy Office
Legislative Environmental Quality Council
State Historic Preservation Office

Oregon

Governor John Kitzhaber
Senator Bill Fisher
Senator David Nelson
Representative Ken Messerle
Extension Service Columbia County
Department of Agriculture, Weed Control
Department of Fish & Wildlife
Department of State Lands
Department of Agriculture Soil & Water Conservation
Oregon Governors Watershed Enhancement Board
Public Utilities Commission
State Parks and Recreation
Tualatin Valley Irrigation District
Upper Rogue Watershed Council
Utility Safety & Reliability
Committee on Indian Services

Washington

Governor Gary Locke
Senator Dan McDonald
Senator Dan Swecker
Senator Pat Thibaudeau
Representative Dawn Mason
Representative Al O'Brien
Representative Tomiko Santos
Representative Mark Schoesler
Columbia County Extension Service
Department of Community Development
Department of Ecology, Environmental Review Section
Department of Fish & Wildlife Region 3
Department of State Lands
Division of Energy
Energy Facility Site Evaluation Council
Extension Service, County of Benton
Extension Service, Cowlitz County
Extension Service, Ferry County
Extension Service, Island County
Extension Service, San Juan County
Intercounty Weed District No 52
Kittitas Valley Irrigation Association
Office of Archeology and Historic Preservation
Port of Skamania County
Washington Conservation Committee/Ecology
Weed Board

Wyoming

Governor Jim Geringer
Wyoming Federal Land Policy Office, State Clearinghouse
Department of Agriculture and Weed Control
State Historic Preservation Office

Local Government

California

City of Alturas
City of Roseville
Modoc County

Idaho

City of Albion
City of Bonners Ferry
City of Burley
City of Delco
City of Heyburn
City of Minidoka
City of Idaho Falls
City of Plummer
City of Rupert
City of Soda Springs
City of Weiser
Benewah County
Bingham County
Bonneville County
Bonner County
Boundary County
Butte County
Cassia County
Clearwater County
Custer County

Elmore County
Fremont County
Gem County
Idaho County
Jefferson County
Kootenai County
Latah County
Madison County
Minidoka County
Nez Perce County
Teton County

Montana

City of Missoula
City of Troy
Broadwater County
Deer Lodge County
Flathead County
Gallatin County
Granite County
Jefferson County
Lake County
Mineral County
Missoula County
Powell County
Ravalli County
Sanders County
Silver Bow County

Oregon

Benton County
City of Albany
City of Ashland
City of Bandon
City of Cascade Locks
City of Drain
City of Eugene
City of Forest Grove
City of Portland
City of Monmouth
Clackamas County
Clatsop County
Columbia County
Coos County
Crook County
Curry County
Deschutes County
Douglas County
Gilliam County
Harney County
Hood River County
Jackson County
Jefferson County
Klamath County
Lake County
Lane County
Lincoln County
Linn County
Marion County
Morrow County
Multnomah County
Polk County
Sherman County
Tillamook County
Tualatin Valley Irrigation District
Umatilla County
Union County
Wasco County
Wheeler County
Yamhill County

Washington

Adams County
Asotin County
City of Kent
County of Benton
Chelan County
Clallam County
Clark County
Columbia County
Cowlitz County
Douglas County

Ferry County
Franklin County
Garfield County
Grant County
Grays Harbor County
Jefferson County
King County
Kitsap County
Kittitas County
Klickitat County
Lewis County
Lincoln County
Lower Elwha Community Council
Mason County
Okanogan County
Pacific County
Pend Oreille County
Pierce County
Skagit County
Skamania County
Snohomish County
Spokane County
Stevens County
Thurston County
Umatilla County
Wahkiakum County
Walla Walla County
Whatcom County
Whitman County
Yakima County
Foster Creek Conservation District
Intercounty Weed District
Methow Valley Irrigation District
South Columbia Basin Irrigation District
South Douglas Conservation District

Wyoming

County of Teton
Town of Jackson

Businesses

ACRT Inc.
Asotin Telephone Company
Avista Corporation
Barclay Construction
Beaver Creek Cooperative Telephone Company
Blake Environmental Technician Services
Bob Zimmerman Heating & Refrigeration
Boise Cascade Corporation
California Oregon Transmission Project
Canby Telephone Association
Cascade Natural Gas Corporation
Cascade Utilities Inc.
Citizens Telecom Company of Oregon
Clear Creek Mutual Telephone Company
Colton Telephone Company
Compliance Services International
Cascades Utilities Inc.
Citizens Telecom Company of Oregon
Dames & Moore
EDAW Inc.
Eagle Telephone
Foster Wheeler
GTE Northwest Inc.
Gervais Telephone Company
Golder Associates

Helix Telephone Company
Intermountain Gas Company
Jones & Stokes Associates Inc
Krugel & Associates
MCI Telecommunications
MHA Environmental Consulting Inc.
Malheur Home Telephone Company
Marine Environmental & Development Inc.
Marine Environmental Testing
Midvale Telephone Exchange Inc.
Molalla Telephone Company
Monitor Cooperative Telephone Company
Monroe Telephone Company
Mount Angel Telephone Company
Nehalem Telephone & Telegraph
NEO Corporation
North State Telephone Company
Northwest Natural Gas Company
Northwest Pipeline Corporation
Oregon Idaho Utilities
Oregon Telephone Corporation
Pacific Gas Transmission Company
Pacific Telecom Inc.
Peoples Telephone Company
Petes Mountain Water Company Inc.
Pine Telephone System Inc.
Pioneer Telephone Cooperative
Prosource One
Rainer Seed Inc.
Richland Chamber of Commerce
Roome Telecommunications Inc.
Saint Paul Cooperative Telephone Association
Scio Mutual Telephone Association
Shapiro Associates
Spring Creek Company
Sprint Communications Company Inc.
Staley Construction
Stayton Cooperative Telephone Company
TDS Telecom
Telephone Utilities of Oregon Inc.
Terra Surveys Ltd.
The Gas Company, Los Angeles
Transmission Agency of Northern California
US West
Ultra Systems Environmental Inc.
Union Power Construction
Versar Inc.
United Telephone Company of Northwest Sprint
Warm Springs Power Enterprises
Westcoast Energy Pipeline Division

Libraries, Repositories, and Universities

California State Library
City of Boise Public Library
City of Brookings Public Library
City of Seattle Public Library
City of Spokane Public Library
Colorado State University Libraries - Monograph Acquisitions
Eastern Washington University
Humboldt State University Library
Idaho State University, Oboler Library
Lewis-Clark State College Library
Manitoba Hydro Library
Oregon State Library
Oregon State University, State Extension Service
Oregon State University, Department of Forest Science
Oregon State University, Vegetation Management Committee
Portland State University, Branford Price Millar Library
Powell Northwest College Federal Depository
Shasta County Library
State of Idaho Library
State of Idaho Supreme Court Law Library
State of Washington Regional Depository Library
Stevenson Public Library
University of Idaho Library
University of Montana, Mansfield Library
University of Montana, Montana Tech Library
University of Idaho, Cooperative Extension Service
University of Oregon, Department of Geography
University of Oregon, Law Library
University of Washington, School of Marine Affairs
Utah State University, Merrill Library
Washington State Library
Washington State University, State Extension Service
Wyoming State Library

Electric Utilities

Asotin County PUD No 1
Avista Utilities
Beartooth Electric Cooperative Inc.
Benton County PUD No 1
Big Flat Electric Cooperative Inc.
Big Horn County Electric Cooperative Inc.
Blachly Lane County Cooperative Electric Association
Canby Utility Board
Central Electric Coop Inc.

Central Lincoln PUD
Central Montana Electric Power Coop Inc.
Chelan County PUD No 1
Clallam County PUD No 1
Clark Public Utilities
Clatskanie County PUD
Clatskanie PUD
Clearwater Power Company
Columbia Basin Electric Coop Inc.
Columbia Power Coop Association
Columbia River PUD
Columbia Rural Electric Association Inc.
Consumer Power Inc.
Coos Curry Electric Coop Inc.
Cowlitz County PUD No 1
Douglas County PUD
Douglas Electric Coop Inc
Duke Energy Corporation Env. Center
East End Mutual Electric Company Ltd.
Emerald PUD
Eugene Water & Electric Board
Fall River Rural Electric Coop Inc.
Farmers Electric Company
Fergus Electric Cooperative Inc.
Ferry County PUD No 1
Flathead Electric Coop
Franklin County PUD No 1
Glacier Electric Coop Inc.
Goldenwest Electric Cooperative Inc.
Grant County PUD
Grays Harbor County PUD
Harney Electric Cooperative Inc.
Hill County Electric Cooperative Inc.
Hood River Electric Cooperative
Idaho County Light & Power Coop Assoc. Inc.
Idaho Power Company
Jefferson County PUD
Kitsap County PUD No 1
Kittitas County PUD
Klickitat County PUD No 1
Kootenai Electric Cooperative Inc
Lane Electric Coop Inc.
Lewis County PUD
Lincoln Electric Cooperative Inc
Lost River Electric Cooperative Inc.
Lower Valley Power & Light Company Inc.
Lower Yellowstone REA Incorporated
McCone Electric Cooperative Inc.
McMinnville Water & Light
Marias River Electric Cooperative
Mason County PUD No 1
Mason County PUD No 3
Mid Yellowstone Electric Cooperative Inc.
Midstate Electric Coop Inc.
Milton Freewater Light & Power Company
Mission Valley Power
Missoula Electric Coop Inc.
Montana Power Company
Nevada Power Company
Northern California Power Agency
Northern Electric Cooperative
Northern Lights Inc.
Northern Wasco County PUD
Okanogan County PUD No 1
Oregon Peoples Utility District Association
Oregon Trail Electric Coop

PG&E Gas Transmission Northwest
Pacific Gas & Electric Company
PacifiCorp
Pacific Northwest Generating Coop
Park Electric Cooperative Inc.
Pend Oreille County PUD
Portland General Electric Company
Puget Sound Energy
Puget Sound Power & Light Company
Raft River Rural Electric Cooperative Inc.
Ravalli County Electric Cooperative Inc.
Rural Electric Company
Sacramento Municipal Utility District
Salem Electric
Salmon River Electric Cooperative Inc.
Salt River Project
San Diego Gas & Electric Company
Seattle City Light
Sheridan Electric Cooperative Inc.
Sierra Pacific Power Company
Skagit County PUD
Skamania County PUD No 1
Western Montana Electric Generation & Transmission Coop Inc.
Whatcom County PUD No 1
Pacific County PUD No 2

Southern California Edison
Snake River Power Association Inc.
Snohomish County PUD
Southeast Electric Cooperative
Southern California Edison Company
Springfield Utility Board
Stevens County PUD
Sun River Electric Cooperative Inc.
Surprise Valley Electrification Corporation
Thurston County PUD
Tillamook PUD
Tongue River Electric Cooperative Inc.
Umatilla Electric Coop
Upper Missouri Generation & Transmission
Valley Electric Cooperative Inc.
Vigilante Electric Coop Inc
Wahkiakum County PUD No 1
Wasco Electric Coop Inc.
Washington Public Power System
West Oregon Electric Cooperative Inc.
Westcoast Energy Pipeline Division
Wisconsin Electric Power Company
Yellowstone Valley Electric Cooperative Inc.

Interest Groups

Alliance for the Wild Rockies
Association of Idaho Cities
Association of Idaho Counties
Association of Oregon Counties
Association of Washington Cities
Audubon Society, East Lake Washington Chapter
Audubon Society, Portland
Baker Chamber of Commerce
Central Washington Farm Crops Association
Columbia Basin Fish & Wildlife Authority
Columbia Gorge United
Defenders of Wildlife
Ducks Unlimited, Western Regional Office
Edison Electric Institute
Edwall Lions
Electric Power Research Institute
Farmers for Preservation of Wildlife
Federation of Western Outdoor Clubs
First Hill Lions
Freedom Stor
Friends of Buford Park
Friends of the Earth
Grassroots for Multiple Use
Heritage Resource Center Coach House
Hillsboro Kiwanis
Idaho Association of Commerce & Industry
Idaho Association of Countries
Idaho Conservation League
Idaho Environmental Council
Idaho Farm Bureau
Idaho League of Women Voters
Idaho State Historical Society
Idaho Wildlife Federation
Illinois Valley Historical Society
Interior Columbia Basin Project
Intermountain Forest Association
Intermountain Forest Industries Association
International Right-of-way Association
International Society of Arborists (Utility Arborist Association)
Intertribal Timber Council
Issaquah Valley Grange No 581
Keizer Chamber of Commerce
Kittitas Valley Irrigation Association
Klamath Forest Alliance
Lady Lions, Blackfoot
Lane County League of Women Voters
League of Oregon Cities
League of Women Voters of Oregon
Molson Grange No 1069
Monroe Chamber of Commerce
Montana Association of Counties
Montana League of Cities & Towns
Mount Angel Lions
National Audubon Society

National Conservation Service
National Wildlife Federation
Native Plant Society of Oregon
Nature Conservancy, Idaho
Nature Conservancy, Oregon
Nature Conservancy, Washington
Northwest Coalition for Alternatives to Pesticides
Oregon Cattlemen's Association
Oregon Citizens Utility Board
Oregon Council Federation of Flyfishers
Oregon Farm Bureau Federation
Oregon Idaho Utilities
Oregon Natural Desert Association
Oregon Natural Resources Council
Oregon State Federation of Garden Clubs Inc.
Oregon State Grange
Oregon Trout
Oregon Wildlife Federation
Oregon Women for Agriculture
Oregon Women for Timber
Oregonians for Food & Shelter
Quincy Lions Club
Richland Chamber of Commerce
Salmon Valley Chamber of Commerce
Save Our Ecosystems, Inc.
Sequim Chamber of Commerce
Sierra Club, Boise
Sierra Club, Cascade
Sierra Club, Kalispell
Sierra Club, Northern Rockies
Sierra Club, Oregon
Sierra Nevada Forest Protection Campaign
Society of America's Foresters
Northwest Environmental Watch
Northwest Farmers Union
Northwest Forestry Association
Northwest Indian Fisheries Commission
Northwest Timber Association

Southern Oregon Citizens Against Toxic Sprays
Southern Oregon NW Coalition for Alternatives to Pesticides
Spirit Lake Lions
State Grange, Washington
Superior Chamber of Commerce
Trout Unlimited, Northwest
Trust for Public Lands
Twisp Chamber of Commerce
Wallace Chamber of Commerce
Washington Association of Counties
Washington Association of Wheat Growers
Washington Cattlemen's Association
Washington Forest Protection Association
Washington Native Plant Society
Washington State Audubon Society
Washington State Grange
Washington State Society of American Foresters
Weiser Chamber of Commerce
Western System Coordinating Council
Wetlands Conservancy
Wilderness Society
Wildlife Society, Idaho
Wildlife Society, Washington

Individuals

John Abernathy
Jame Rockey Alward
R. L. Bud Andersen
Susan Applegate
Donald Au
Marcus W. Barnes
Marilyn Beckham
Amy Beller
Marian Benneson
Erwin Bergman
Cathy Boucher
Molly Brown
Alvin Bryant
Bruce Buckley
Susan Chapp
Nancy Craft
Ron Daoust
Maura Doherty
Eva Edehman
Donald and Ruth Edmondson
Raul Engelmeier
Vera Everman
Laurence and Mary Feltz
John K. Fisher
C. Fox
Howard Funke
Fred Gonzales
Monty Grenz
Bob Hagen
J. Henry
Jack Herbert
Georgia Hoglund
Terri Horness
Ben Hubbard
Bob Jones
Jeffery Jordan
Jerome Justice
Rosemary Kenny
Randy Knight
Chris Lawson
K. Lewis
Danna Lytjen
Charles and Ruth Mattinen
Maurice S. Methun
Mario Milosevic
Fonya Lee Morris
Anne Morrow
Tim Navarro
Logan Norris
Lenora A. Oftedahl
Cathy Olcott
Rikki Osborn
Dave Picco
Jay Picco
R. H. Powell
David Radtke
John Ritter
Mary Roberts
Floyd Rogalski
K. O. Rosenberg
Don J. Sautner
Dick Schlachter
Susan Scott
Joe Spirach
Roberta Stewart
Stephen Stifel
Rose Thomas
George F. Tyler
Patricia Vallerand
Toby G. Vilhauer
Stan Wallenmayer
Michael Williams
Delbert Winterfield
Herman Winterfield
Joan Wozniak
Steve Young

Media

Billings Gazette
Capital Press
Casper Star-Tribune
Clearing Up News
Idaho Statesman
Oregonian
Seattle Times
Tri-City Herald
Spokane - Spokesman Review

This page intentionally left blank.

REFERENCES

The list below comprises the literature and other sources consulted in the preparation of this draft EIS. Sources cited in the text are indicated with a symbol: ◆.

References for herbicides are listed separately at the conclusion of this appendix, beginning page 399, and proceeding by herbicide.

References

◆ **Labat-Anderson Incorporated.** 1992.
Risk assessment for herbicide use in Forest Service Regions 1, 2, 3, 4 and 10 and on Bonneville Power Administration sites. Prepared for the USDA Forest Service. Arlington, VA.

◆ **Beak Consultants Incorporated.** May 1993.
Protocol for assessing potential spotted owl nest trees during routine maintenance of utility rights-of-way. Kirkland, WA.

Bio-Integral Resource Center. 1997.
Integrated vegetation management for roadsides. Prepared for the Washington State Department of Transportation, Field Operations Support Service Center. Berkeley, CA.

◆ **Bramble, W.C. and W.R. Byrnes**. 1983.
Thirty years of research on development of plant cover on an electric transmission rights-of-way. *J. of Agriculture* 9:67-74.

◆ **Brisson, J., A, Meilleur, M-J. Fortin, and André Bouchard.** 1997.
Edge effects on vegetation in rights-of-way. *In:* The 6th international symposium on environmental concerns in rights-of-way management. J.R. Williams, J.W. Goodrich-Mahoney, J.R. Wisniewski, J. Wisniewski (eds.) Elsevier Science, Inc. N.Y. Pp. 25 – 33.

◆ **Bryant, M.D.** 1983.
The role and management of woody debris in West coast salmonid nursery streams. *N. AM. J. Fish Managem. 3:322-330.*

◆ **Burns, J.W.** 1972.
Some effects of logging and associated road construction on northern California streams. *Trans. Am. Fish. Soc.* 10(1);1-17.

California Web site:
California Agricultural Statistics Service (CASS):
[http://www.nass.usda.gov/ca/homepage.htm] [Summary of County Agricultural Commissioners' Report] [County Listing for "Top Ten Crops by County, 1995-6":
http://www.nass.usda.gov/ca/bul/agcom/index.htm]

- **Cavanaugh, J.B., D.P. Olson, and S.N. Macrigeanis.** 1976. Wildlife use and management of power line rights-of-way in New Hampshire. *In:* proceedings of the first national symposium on environmental concerns in rights-of-way management. Mississippi State University, Mississippi.

Compliance Services International, Dames & Moore, Inc., and Don Shimono Associates. February 1990. Transmission rights of way vegetation management plan. Final report. Prepared for Seattle City Light.

David Evans and Associates, Inc. 1994. Revegetation guidelines for BPA rights-of-way study. Final document. Prepared for the U.S. Department of Energy, Bonneville Power Administration.

_____. 1995. Report on transmission right-of-way management options in the Columbia River Gorge National Scenic Area. Prepared for the U.S. Department of Energy, Bonneville Power Administration and the U.S. Department of Agriculture, Forest Service.

_____. 1996. Prototype integrated, impact avoidance right-of-way management plan: Hanford-Ostrander Corridor and North Bonneville-Midway Corridors. Columbia River Gorge National Scenic Area. Portland, OR. March 12. Prepared for U.S. Department of Energy, Bonneville Power Administration and U.S. Department of Agriculture, Columbia River Gorge National Scenic Area.

- **Doucet, G.J., and D.T. Brown.** 1997. Snowshoe hare, red squirrel and gray squirrel activity in a 120 kV powerline right-of-way and in adjacent forests. *In:* The 6th international symposium on environmental concerns in rights-of-way management. J.R. Williams, J.W. Goodrich-Mahoney, J.R. Wisniewski, J. Wisniewski (eds.) Elsevier Science, Inc. N.Y. Pp. 295 — 298.

- **Doucet, G.J., D.T. Brown, and P. Lamothe.** 1987. Deer behavior in a powerline right-of-way located in a northern wintering yard. Presented at the Fourth Symposium on Environmental Concerns in Rights-of-Way Management, Indianapolis, in October 25-28, 1987.

- **Eaton, R.H. and J.E. Gates.** 1979. Transmission rights-of-way management and white-tailed deer habitat: a review. *In:* Proceedings of the second annual symposium on environmental concerns in right-of-way management. EPRI WS-78-141.

Edison Electric Institute. 1996.
Environmental stewardship strategy for electric utility rights-of-way. August. Washington, D.C.

- **EXTOXNET (Extension Toxicology Network).** University of California at Davis, Oregon State University, Michigan State University. Cornell University. USDA National Agricultural Pesticide Impact Assessment Program. 1998.
Web site (http://ace.orst.edu/info/extoxnet). Pesticide Information Profiles downloaded July/August 1998. [See also **Herbicide References**, under specific Herbicide names.]

- **Gardner, D.R, Panter, K.E., Molyneux, R.J., James, L.F., and Stegelmeier, B.L.** 1996.
Abortifacient activity in beef cattle of acetyl and succinylisocupressic acid from ponderosa pine. *J. Agricultural and Food Chemistry*. Vol. 44: 3257-3261.

- **Gardner, D.R., K.E. Panter, L.F. James, and B.L. Stegelmeier.** 1998.
Abortifacient effects of lodgepole pine (*pinus contorta)* and common juniper (*juniperous communis*). *J. Veterinary and Human Toxicology*. Vol. 40(5): 260-264.

- **Goodwin, J.G.** 1975.
Big game movement near a 500 kV transmission line in northern Idaho. Bonneville Power Administration Technical Report. Portland, OR.

Hazardous Substances Database [HSDB]. August 1998.
Printouts provided by EPA Seattle Office, Ecosystems and Communities Pesticide Unit.

- **Heede, B.H.** 1972.
Influences of a forest on the hydraulic geometry of two mountain streams. *Water. Res. Bull.* 8(3):523-530.

- **House, R.A. and P.L. Boehne.** 1985.
Evaluation of instream enhancement structures for salmonid spawning and rearing in a coastal Oregon stream. *N. Am. J. Fish. Manage.* 5:283-295.

Hurst, GA. 1994.
Rights-of-way for wildlife. Bulletin No. 20, National Wild Turkey Federation, Edgefield, SC. 8 Pp.

Idaho Web site: Idaho Agricultural Statistics Service
http://www.nass.usda.gov/id/homepage.htm [Idaho's Rank in the Nation's Agriculture, 1996] [1998 Annual Crop Summary, February 18, 1998] [Annual Crop Summary, 1997
http://www.nass.usda.gov/id/agid0398.htm]

International Programme on Chemical Safety [IPCS]. 1998.
Concise International Chemical Assessment Document No. 5 - Limonene.

Jones & Stokes Associates, Inc. 1991.
Caltrans' vegetation control program. Risk assessment for the draft environmental impact report. Sacramento, CA. In association with the Clement International Corporation, KS Crump Division, Ruston, LA. Prepared for the California Department of Transportation, Division of Maintenance, Sacramento, CA.

◆ _____. 1992.
Environmental impact report on Caltrans' vegetation control program. Final. (JSA 89-171.) Sacramento, CA. Prepared for California Department of Transportation, Division of Maintenance, Sacramento, CA.

_____. 1997.
California roadsides: a new perspective. Sacramento, CA. Prepared for California Department of Transportation, Maintenance Program, Sacramento, CA. January.

◆ **Lisle, T.E.** 1986.
Effects of woody debris on anadromous salmonid habitat, Prince of Wales Island, Southeast Alaska. *N. AM. Fish Manage.* 6:538-550.

◆ **McGinnis, W.J., and H.H. Christensen.** 1994.
(Citing U.S. Bureau of Census 1990 data, 1991) The interior Columbia River Basin: Patterns of population, employment, and income change. Draft. Social and Economic Values Research Program. PNW Research Station, U.S. Department of Agriculture, U.S. Forest Service, Portland OR

McLoughlin, K.T. 1997.
Application of integrated pest management to electric utility rights-of-way management in New York State. *In:* The 6th international symposium on environmental concerns in rights-of-way management. J.R. Williams, J.W. Goodrich-Mahoney, J.R. Wisniewski, J. Wisniewski (eds.) Elsevier Science, Inc. N.Y. Pp. 118 - 126.

Montana Web site:
Montana Agricultural Statistics Services
http://www.nass.usda.gov/mt/homepage.htm [Current Montana Agricultural Statistics:
http://www.nass.usda.gov/mt/bulletin/bulltoc.htm] [Agricultural Exports 1994,1995,1996] [Montana's Rank in the Nation's Agriculture, 1996] [Montana Department of Agriculture online] [Montana Agriculture Information and Statistics
http://161.7.66.167/agstat.htm]

- **MSDS (Material Safety Data Sheets).** July-August 1998. C&P Press (www.greenbook.net/free.asp) downloaded July/August 1998. [See also individual entries under **Herbicide References.]**
- **MSDS Pocket Dictionary.** 1988. Genium Publishing Corporation.
- **National Electric Safety Code (NESC).** 1997. 1997 Edition. Institute of Electrical and Electronic Engineers, Inc. for the American National Standards Institute. New York.
- **Norris, L.A., and P.M. Charlton.** 1995. Determination of the effectiveness of herbicide buffer zones in protecting water quality. *In:* Proceedings of the fifth international symposium on environmental concerns in rights-of-way management. G.J. Doucet, C. Segui, and M. Giguere (eds.). Hydro-Québec, Montréal, Québec, Canada. Pp. 147-152.
- **Nowak, C.A., L.P. Abrahamson, and D.J. Raynal.** 1993**.** Powerline corridor vegetation management trends in New York State: Has a post-herbicide era begun? J. Arbor. 19:20-26.

Oregon Web site:
Oregon Agricultural Statistic Services (OASS):
http://www.oda.state.or.us/oass/oass.htm [June 30, 1997 press release: http://www.oda.state.or.us/oass/junacre.htm] [1995 Oregon Field Crops: Usual planting and harvesting dates, by crop and producing area] [Oregon Fruit Tree Inventory, 1993] [1997 Berry Production] [Commercial hazelnut operations] [1997 Oregon Vineyard Report – January 22, 1998] [1996-1997 Oregon Agriculture and Fisheries Statistics] [Oregon's rank in nation's agriculture: 1996]

- **Pacific Northwest Weed Control Handbook.** 1997. R.D. William, D. Ball, T.L. Miller, R. Parker, J.P. Yenish, R.H. Callihan, C. Eberlein, G.A. Lee, and D.W. Morishita (Compilers). Oregon State University. Corvallis, OR.
- **Peterson, A.M.** 1993. The effects of electric transmission rights-of-way on trout in forested headwater streams in New York. *In:* Proceedings of the fifth international symposium on environmental concerns in rights-of-way management. G.J. Doucet, C. Segui, and M. Giguere (eds.). Hydro-Québec, Montréal, Québec, Canada. Pp. 315 - 318.
- **Peterson, R.D**. 1995. Biological Opinion. From Russell D. Peterson, USFWS State Supervisor to Robert W. Beraud, BPA Manager for Environmental Analysis Group. April 27, 1995.

Purdue University Department of Botany Web site. July 1998. (hermes.ecn.purdue.edu:8001). [Purdue] Herbicide Mode of Action Summary and Herbicide List. Downloaded July 1998.

- **Ricard, J-G. and G.J. Doucet.** 1993.
Moose (*Alces alces*) harvest by recreational hunting near powerline rights-of-way in Québec. *In:* Fifth international symposium on environmental concerns in rights-of-way management. Hydro-Québec, Montréal, Québec, Canada. Pp. 323-324

- **Sheridan, P.M., S.L. Orzell, and E.L. Bridges.** 1997.
Powerline easements as refugia for state rare seepage and pineland plant taxa. *In:* The 6th international symposium on environmental concerns in rights-of-way management. J.R. Williams, J.W. Goodrich-Mahoney, J.R. Wisniewski, J. Wisniewski (eds.) Elsevier Science, Inc. N.Y. Pp. 451 – 460.

- **Thomas, J. W. (Tech. Ed.)** 1979.
Wildlife habitats in managed forests: the Blue Mountains of Oregon and Washington. U.S. Department of Agriculture, Forest Service. Washington, D.C.

U.S. Department of Agriculture/Forest Service References

USDA/USFS (U.S. Department of Agriculture, Forest Service). 1984.
Pesticide Background Statements - Volume I, Herbicides. Agriculture Handbook No. 633. [Brown Book]

- **_____.** Northern Region. 1985.
Environmental impact statement for the Flathead National Forest land and resource management plan. Missoula, MT. December.

_____. 1986a.
Final environmental impact statement for the Helena National Forest land and resource management plan. Final environmental impact statement. Missoula, MT. April.

_____ 1986b.
Final environmental impact statement on the Lewis and Clark National Forest land and resource management plan. Missoula, MT. June.

- _____. 1986c.
Lolo National Forest plan. Missoula, MT. February.

_____. 1987a.
Environmental impact statement of the Clearwater National Forest land and resource management plan. Missoula, MT. September.

_____. 1987b.
Final environmental impact statement for the Bitterroot National Forest land and resource management plan. Missoula, MT. September.

_____. 1987c.
Final environmental impact statement for the Idaho Panhandle National Forests land and resource management plan. Missoula, MT. August.

◆ _____. 1987d.
Final environmental impact statement on the Kootenai National Forest land and resource management plan. Missoula, MT.

_____. 1987e.

Final environmental impact statement on the Nez Perce National Forest land and resource management plan. Missoula, MT. October.

_____. 1988a.
Colville National Forest land and resource management plan. Final environmental impact statement. Colville, WA.

_____. 1988b.
Managing competing and unwanted vegetation. Final environmental impact statement and record of decision. Portland, OR. November.

_____. 1989.
Final environmental impact statement for the Fremont National Forest land and resource management plan. Lakeview, OR. April.

_____. 1990a.
Deschutes National Forest land and resource management plan. Final environmental impact statement. Portland, OR.

_____. 1990b.
Final environmental impact statement for the Gifford Pinchot National Forest land and resource management plan. Portland, OR. June.

_____. 1990c.
Final environmental impact statement for the land and resource management plan. Olympic National Forest. Portland, OR. July.

_____. 1990d.
Final environmental impact statement for the land and resource management plan. Siuslaw National Forest. Portland, OR. February.

_____. 1990e.
Final environmental impact statement for the Rogue River National Forest land and resource management plan. Portland, OR. July.

_____. 1990f.
Malheur National Forest land and resource management plan. Final environmental impact statement. Portland, OR. May.

◆ _____. 1990g.
Mt. Baker-Snoqualmie National Forest land and resource management plan. Final environmental impact statement. Seattle, WA. June.

_____. 1990h.
Mt. Hood National Forest land and resource management plan. Final environmental impact statement. Portland, OR. October.

_____. 1990i.
Umatilla National Forest land and resource management plan. Final environmental impact statement. Portland, OR.

_____. 1990j.
Umpqua National Forest land and resource management plan. Final environmental impact statement. Portland, OR.

_____. 1990k.
Wallowa-Whitman National Forest land resource management plan. Final environmental impact statement. Portland, OR. April.

_____. 1990l.
Willamette National Forest land and resource management plan. Final environmental impact statement. Portland, OR. July.

_____. 1990m.
Winema National Forest land and resource management plan. Final environmental impact statement. Portland, OR.

_____**.** 1991a.
Integrated noxious weed management program. Environmental assessment. December. Prepared by Di Rienz, K. and E. Picard for Colville National Forest. Colville, WA.

◆ _____**.** Southwest Region. 1991b.
Modoc National Forest land and resource management plan. Final environmental impact statement. San Francisco, CA.

◆ _____**.** Pacific Northwest Region, Forest Pest Management. 1992a.
A guide to conducting vegetation management projects in the Pacific Northwest Region. (R6-FPM-TP-044-92) Portland, OR. November.

_____. 1992b.
Hexazinone: herbicide information profile. Portland, OR. March. [See also individual entries under Extension Toxicology Network, under **Herbicide References**.]

_____. 1992c.
Picloram: herbicide information profile. Portland, OR. April. [See also individual entries under Extension Toxicology Network, under **Herbicide References**.]

_____**.** 1992d.
Dicamba: herbicide information profile. Portland, OR. [See also individual entries under Extension Toxicology Network, under **Herbicide References**.]

_____. 1994.
Managing competing and unwanted vegetation. Methods information profiles: manual, mechanical, prescribed fire, biological, herbicide. (R6-FI&D-TP-13-94) Portland, OR. August.

_____. 1996.
Triclopyr: herbicide information profile. Portland, OR. November. [See also individual entries under Extension Toxicology Network, under **Herbicide References**.]

_____. Wenatchee National Forest, Leavenworth Ranger District. 1997a.
Biological evaluation/assessment for steelhead and bull trout for the Leavenworth Integrated Weed Management Program in the Rat/Hatchery Fire Analysis Areas. Chelan County, WA. February.

◆ **_____. _____.** Intermountain Region. 1997b.
Final environmental impact statement and revised forest plan for the Targhee National Forest Plan revision. St. Anthony, ID. April.

_____. Allegheny National Forest. 1997c.
Final environmental impact statement : vegetation management on electric utility rights-of-way. Prepared by Environmental Consultants, Inc. for GPU Energy, Allegheny Power Company, and The Allegheny National Forest. Warren, Pennsylvania. May

_____. 1997d.
Glyphosate: herbicide information profile. Portland, OR. February, 1997.
Glyphosate Herbicide Information Profile. Pacific Northwest Region. [See also individual entries under Extension Toxicology Network, under **Herbicide References**.]

Joint Agency (USFS/BLM/ Bonneville) Documents

◆ **USDA/USFS (U.S. Department of Agriculture, Forest Service), and USDOI/BLM (U.S. Department of Interior, Bureau of Land Management).** 1994a.
Standards and guidelines for management of habitat for later-successional and old-growth forest related species within the range of the northern spotted owl. April.

◆ ____. 1994b
Final supplemental environmental impact statement on management of habitat for late-successional and old-growth forest related species within the range of the northern spotted owl (Northwest Forest Plan). April.

_____. 1994c.
Record of Decision for Amendments to Forest Service and Bureau of Land Management Planning documents within the range of the northern spotted owl. April.

◆ **_____. Interior Columbia Basin Ecosystem Management Project.** 1997a.
Eastside draft environmental impact statement. May. Walla Walla, WA.

◆ **_____. Interior Columbia Basin Ecosystem Management Project.** 1997b.
Upper Columbia River Basin draft environmental impact statement. May. Boise, ID.

◆ **USDA/USFS (U.S. Forest Service), USDI/BLM (Bureau of Land Management), and USDOE/BPA (Bonneville Power Administration).** Various dates.
Pesticide Fact Sheets. [BPA PFS] **.** Various dates [1992, 1993, 1994]
[See also entries under 2,4-D, under Herbicide References.]

USDOE/ Bonneville Documents

USDOE/Bonneville (U.S. Department of Energy, Bonneville Power Administration). 1982.
Transmission facilities vegetation management program. Draft environmental impact statement. Washington, D.C.

◆ _____. 1983.
Transmission facilities vegetation management program. Final environmental impact statement. Portland, OR. August.

◆ _____. 1996.
Columbia River Gorge vegetation management project. Final environmental assessment. (DOE/EA-1162.) Portland, OR. September.

◆ **_____.** 1998a.
Bonneville-Hood River vegetation management environmental assessment. August.

◆ _____. 1998b.
Big Eddy-Ostrander vegetation management environmental assessment (in process).

USDOI/BLM

USDOI/BLM (U.S. Department of the Interior, Bureau of Land Management). Coeur d'Alene District Office. 1982.
North Idaho land use decisions summary. Coeur d'Alene, ID.

_____. Burley District Office. 1983.
Cassia resource management plan and environmental impact statement. Draft. Burley, ID. September.

◆ **_____.** Oregon State Office. 1985.
Northwest area noxious weed control program. Final environmental impact statement. Portland, OR. December.

◆ **_____.** Oregon State Office. 1987a**.**
Northwest area noxious weed control program. Supplemental environmental impact statement. BLM Washington, Oregon, Idaho, and Montana Districts.

_____. Spokane District Office. 1987b.
Spokane resource management plan record of decision. Rangeland program summary. Spokane, WA. May.

_____. Burns District Office. 1991a.
Proposed Three Rivers resource management plan. Final environmental impact statement. (BLM-OR-ES-91-29-1792.) Hines, OR. September.

◆ _____. Wyoming State Office. 1991b.
Vegetation treatment on BLM lands in thirteen western states. Final environmental impact statement. (BLM-WY-ES-91-022-4320.) Cheyenne, WY. May.

_____. Wyoming State Office. 1991c.
Vegetation treatment on BLM lands on thirteen western states. (BLM-WY-ES-91-035-4320.) Record of decision. Portland, OR. July.

_____. Spokane District Office. 1992a.
Proposed Spokane resource management plan amendment and final environmental impact statement. (BLM-OR-ES-92-19-1792.) Spokane, WA. June 22.

_____. Burns District Office. 1992b.
Three Rivers resource management plan, record of decision, and rangeland program summary. (BLM-OR-ES-92-29-1792.) Hines, OR. September.

◆ _____. Oregon State Office. 1992c.
Western Oregon Program-Management of Competing Vegetation – final environmental impact statement. Portland, Oregon. July.

_____. Coos Bay District Office. 1994a.
Final proposed resource management plan environmental impact statement. (BLM/OR/WA/ES-94/30+1792.) North Bend, OR. September.

_____. Oregon State Office. 1994b.
Noxious weed strategy for Oregon/Washington. (BLM/OR/WA/PT-94/36+4220.9.) Portland, OR. August.

_____. Lakeview District, Klamath Falls Resource Area. 1994c.
Proposed resource management plan/final environmental impact statement for the Klamath Falls Resource Area. (BLM/OR/WA/ES-94/31+1792.) Klamath Falls, OR. September.

_____. Coos Bay District Office. 1995a.
Coos Bay District record of decision and resource management plan. (BLM/OR/WA/PL-95-016+1792.) North Bend, OR. May.

_____. Eugene District Office. 1995b.
Record of decision and resource management plan. (BLM/OR/WA/PL-95/025+1792.) Eugene, OR. June.

_____. Roseburg District Office. 1995c.
Record of decision and resource management plan. (BLM/OR/WA/PL-95/020+1792.) Roseburg, OR. June.

_____. Salem District Office. 1995d.
Record of decision and resource management plan. (BLM/OR/WA/PL-95/029+1792.) Salem, OR. May.

_____. Lakeview District, Klamath Falls Resource Area. 1995e.
Record of decision for the Klamath Falls Resource Area resource management plan. (BLM/OR/WA/PL-95/022+1792.) Klamath Falls, OR. June.

_____. Lower Snake River District, Boise Field Office. 1996a.
Draft Owyhee resource management plan and draft environmental impact statement. Boise, ID. August.

_____. Idaho State Office, Upper Columbia-Salmon Clearwater Districts, Challis Resource Area. 1996b.
Draft resource management plan and environmental impact statement. (BLM/ID/PT-96-008+1610-1790.) Salmon, ID. May.

_____. 1996c.
Partners against weeds. An action plan for the Bureau of Land Management. (BLM/MT/ST-96/003+1020.) January.

_____. Medicine Lodge and Big Butte Resource Areas. 1997.
Decision record rationale and finding of no significant impact for the Medicine Lodge and Big Butte Resource Area noxious weed control program. (ID-030-97-020.) Idaho Falls, ID. March 24.

USEPA

◆ **USEPA (U.S. Environmental Protection Agency).** 1994.
Personal communications between Debra Malin (BPA) and David Turner (Region X EPA Labs, Corvallis, OR). Subject: Carbon released from timber harvesting. November 13, 1994.

_____. 1998.
Directions for Use Pamphlet for Permit Herbicide: Printouts provided by EPA Seattle Office, Ecosystems and Communities Pesticide Unit. August 1998.

◆ _____. Various dates.
Office of Pesticide Programs. Pesticide Fact Sheets. [EPA PFS]

◆ **_____.** Various dates.
Reregistration Eligibility Decisions [EPA RED]. Office of Pesticide Programs. Obtained from the Internet at www.epa.gov/REDs. [See also individual entries under **Herbicide References.**]

◆ **_____.** Various dates as noted.
US EPA Reregistration Eligibility Decision.

USFWS

- **US Fish and Wildlife Service (USFWS).** 1992. David Frederick and Russell Peterson, USFWS, to Cliff Perigo, Bonneville Power Administration. Memorandum regarding concurrence with no effect determination of Bonneville's ROW maintenance activities on spotted owls and critical habitat. June 4, 1992.
- **Washington Web site.** 1998
  Washington Agricultural Statistics Service
  http://www.nass.usda.gov/wa/homepage.htm [Introduction and State Information] [Washington 1997 Annual Bulletin, Top 40 Agricultural Commodities] [Washington 1997 Annual Bulletin, Washington's Rank in the Nation's Agriculture] [Washington 1997 Annual Bulletin, Agriculture in Washington] [County - Orchard Rankings, Washington 1992]
- **WSSA (Weed Science Society of America).** 1994.
  Herbicide Handbook. 7th Edition. Champaign, IL

Herbicide References

2-4,D

Albaugh, Incorporated, SOLVE ® Low Volatile Ester Herbicide, Specimen Product Label, Copied March 2000

BASF Corporation, Weedmaster® Herbicide, Specimen Product Label, NVA 97-4-69-0117, 1997

BASF Corporation, Weedmaster® Herbicide, Material Safety Data Sheet, E07248, June 6, 1999

Cornell University, Pesticide Active Ingredient Fact Sheet, 2,4-D, March 11, 1998 http://pmep.cce.cornell.edu/profiles/index.html

EPRI, Determination of the Effectiveness of Herbicide Buffer Zones in Protecting Water Quality, EPRI Final Report TR-113160, 1999

Extension Toxicology Network, Toxicology Information Briefs: Bioaccumulation, Revised 1993, http://ace.orst.edu/info/extoxnet/tibs/bioaccum.htm

Rhone-Poulenc Ag Company, WEEDONE® 638 Broadleaf Herbicide, Specimen Product Label, November 4, 1998

Rhone-Poulenc Ag Company, WEEDONE® 638 Broadleaf Herbicide, Material Safety Data Sheet, November 13, 1998

Rhone-Poulenc Ag Company, WEEDONE® LV4 Solventless Broadleaf Herbicide, Specimen Product Label, November 4, 1998

Rhone-Poulenc Ag Company, WEEDONE® LV4 Solventless Broadleaf Herbicide, Material Safety Data Sheet, November 13, 1998

Spray Drift Task Force, A Summary of Ground Application Studies, 1997
http://www.agdrift.com/publications/Body.htm

USDA Forest Service, Pesticide Fact Sheet, 2,4-D, November 1995

http://www.fs.fed.us/foresthealth/pesticide/index.html

Walters, Johanna, California Department of Pesticide Regulation, Environmental Fate of 2,4-Dichlorophenoxyacetic Acid, 1998

Azafenidin

Du Pont Agricultural Products, Milestone® Herbicide, Material Safety Data Sheet M0000386, January 22, 1998

Du Pont Agricultural Products, Milestone® Herbicide Technical Bulletin H-76229, October 1997

Du Pont Agricultural Products, Milestone® Herbicide Technical Bulletin H-81910, March 1999

EPRI, Determination of the Effectiveness of Herbicide Buffer Zones in Protecting Water Quality, EPRI Final Report TR-113160, 1999

Extension Toxicology Network, Toxicology Information Briefs: Bioaccumulation, Revised 1993,
http://ace.orst.edu/info/extoxnet/tibs/bioaccum.htm

Spray Drift Task Force, A Summary of Ground Application Studies, 1997
http://www.agdrift.com/publications/Body.htm

Bromacil

Du Pont Agricultural Products, Hyvar® X Herbicide, Specimen Product Label H-637906, 1999

Du Pont Agricultural Products, Hyvar® X Herbicide, Material Safety Data Sheet M0000018, December 12, 1996

Du Pont Agricultural Products, Hyvar® X-L Herbicide, Specimen Product Label H-63777, 1999

Du Pont Agricultural Products, Hyvar® X-L Herbicide, Material Safety Data Sheet M0000019, November 26, 1998

EPRI, Determination of the Effectiveness of Herbicide Buffer Zones in Protecting Water Quality, EPRI Final Report TR-113160, 1999

Extension Toxicology Network, Pesticide Information Profile, Bromacil,
http://ace.orst.edu/info/extoxnet/pips/ghindex.html

Extension Toxicology Network, Toxicology Information Briefs: Bioaccumulation, Revised 1993, http://ace.orst.edu/info/extoxnet/tibs/bioaccum.htm

New Jersey Department of Health and Senior Services, Hazardous Substance Fact Sheet, Bromacil, July 1998 http://www.state.nj.us/health/eoh/rtkweb/rtkhsfs.htm

Spray Drift Task Force, A Summary of Ground Application Studies, 1997 http://www.agdrift.com/publications/Body.htm

USDA Forest Service, Pesticide Fact Sheet, Bromacil, November 1995 http://www.infoventures.com/e-hlth/pestcide/pest-fac.html

USEPA, Office of Pesticide Programs, Reregistration Eligibility Decision, Bromacil, EPA-738-R-96-013, August 1996 http://www.epa.gov/oppsrrd1/REDs/

USEPA, Office of Pesticide Programs, R.E.D. Facts, Bromacil, EPA-738-F-96-013, August 1996 http://www.epa.gov/oppsrrd1/REDs/

Chlorsulfuron

Du Pont Agricultural Products, Escort®, Oust®, Telar® Herbicides, Product Information Bulletin, H-66607, June 1996

Du Pont Agricultural Products, Noxious/Selective Weed Control, Escort® and Telar® Herbicides, Product Information Bulletin, H-87254, January 2000

Du Pont Agricultural Products, Glean® Herbicide, Specimen Product Label, H-63102, August 22, 1996

Du Pont Agricultural Products, Glean® Herbicide, Material Safety Data Sheet M0000088, March 5, 1998

Du Pont Agricultural Products, Telar® DF Herbicide, Specimen Product Label, H-62770, August 22, 1996

Du Pont Agricultural Products, Telar® DF Herbicide, Material Safety Data Sheet M0000026, April 17, 1998

EPRI, Determination of the Effectiveness of Herbicide Buffer Zones in Protecting Water Quality, EPRI Final Report TR-113160, 1999

Extension Toxicology Network, Toxicology Information Briefs: Bioaccumulation, Revised 1993, http://ace.orst.edu/info/extoxnet/tibs/bioaccum.htm

Spray Drift Task Force, A Summary of Ground Application Studies, 1997 http://www.agdrift.com/publications/Body.htm

USDA Forest Service, Pesticide Fact Sheet, Chlorsulfuron, November 1995 http://www.infoventures.com/e-hlth/pestcide/pest-fac.html

Dicamba

BASF Corporation, Banvel® Herbicide, Specimen Product Label, NVA 97-4-63-0099, 1997

BASF Corporation, Banvel® Herbicide, Material Safety Data Sheet, Product No.: E07141, October 1, 1999

EPRI, Determination of the Effectiveness of Herbicide Buffer Zones in Protecting Water Quality, EPRI Final Report TR-113160, 1999

Extension Toxicology Network, Pesticide Information Profile, Dicamba, http://ace.orst.edu/info/extoxnet/pips/ghindex.html

Extension Toxicology Network, Toxicology Information Briefs: Bioaccumulation, Revised 1993, http://ace.orst.edu/info/extoxnet/tibs/bioaccum.htm

Novartis Crop Protection, Inc., Vanquish® Herbicide, Specimen Product Label, NCP 884A-L1B 0798, 1998

Novartis Crop Protection, Inc., Vanquish® Herbicide, Material Safety Data Sheet, A-10182 A, February 9, 1999

Spray Drift Task Force, A Summary of Ground Application Studies, 1997 http://www.agdrift.com/publications/Body.htm

USDA Forest Service, Pesticide Fact Sheet, Dicamba, November 1995 http://www.infoventures.com/e-hlth/pestcide/pest-fac.html

Dichlobenil

Cornell University, Pesticide Active Ingredient Fact Sheet, Dichlobenil, February 20, 1985 http://pmep.cce.cornell.edu/profiles/index.html

EPRI, Determination of the Effectiveness of Herbicide Buffer Zones in Protecting Water Quality, EPRI Final Report TR-113160, 1999

Extension Toxicology Network, Toxicology Information Briefs: Bioaccumulation, Revised 1993, http://ace.orst.edu/info/extoxnet/tibs/bioaccum.htm

PBI/Gordon Corporation, Barrier® Ornamental Landscaping Herbicide, Product Information Sheet TOPRODINFO/5M/1197, 1997

PBI/Gordon Corporation, Barrier® Ornamental Landscaping Herbicide, Material Safety Data Sheet No. 512-6, Version 9, November 29, 1993

Spray Drift Task Force, A Summary of Ground Application Studies, 1997
http://www.agdrift.com/publications/Body.htm

Uniroyal Chemical Company, Inc., Casoron® 4G, Specimen Product Label, 1995

Uniroyal Chemical Company, Inc., Casoron® 4G, Material Safety Data Sheet, MSDS No. A308002, October 1, 1998

USDA Forest Service, Pesticide Fact Sheet, Dichlobenil, November 1995 http://www.fs.fed.us/foresthealth/pesticide/index.html

USEPA, Office of Pesticide Programs, Reregistration Eligibility Decision, Dichlobenil, EPA-738-R-98-003, October 1998
http://www.epa.gov/oppsrrd1/REDs/

USEPA, Office of Pesticide Programs, R.E.D. Facts, Dichlobenil, EPA-738-F-98-005, October 1998
http://www.epa.gov/oppsrrd1/REDs/

Diuron

Du Pont Agricultural Products, Karmex® DF Herbicide, Specimen Product Label, H-63004, July 12, 1996

Du Pont Agricultural Products, Karmex® DF Herbicide, Material Safety Data Sheet M0000185, November 21, 1996

EPRI, Determination of the Effectiveness of Herbicide Buffer Zones in Protecting Water Quality, EPRI Final Report TR-113160, 1999

Extension Toxicology Network, Pesticide Information Profile, Diuron, 1996 http://ace.orst.edu/info/extoxnet/pips/ghindex.html

Extension Toxicology Network, Toxicology Information Briefs: Bioaccumulation, Revised 1993,
http://ace.orst.edu/info/extoxnet/tibs/bioaccum.htm

Griffin, Karmex® DF Herbicide, Specimen Product Label, GCN 101298, 1998

Griffin, Karmex® DF Herbicide, Material Safety Data Sheet, July 20, 1998

Spray Drift Task Force, A Summary of Ground Application Studies, 1997 http://www.agdrift.com/publications/Body.htm

Fosamine ammonium

Du Pont Agricultural Products, Krenite® S Brush Control Agent, Specimen Product Label, H-63354, December 9, 1997

Du Pont Agricultural Products, Krenite® S Brush Control Agent, Material Safety Data Sheet M0000022, March 7, 1997

Du Pont Agricultural Products, Krenite® UT Brush Control Agent, Specimen Product Label, H-63353, December 9, 1997

Du Pont Agricultural Products, Krenite® UT Brush Control Agent, Material Safety Data Sheet M0000096, March 7, 1997

EPRI, Determination of the Effectiveness of Herbicide Buffer Zones in Protecting Water Quality, EPRI Final Report TR-113160, 1999

Extension Toxicology Network, Toxicology Information Briefs: Bioaccumulation, Revised 1993, http://ace.orst.edu/info/extoxnet/tibs/bioaccum.htm

Spray Drift Task Force, A Summary of Ground Application Studies, 1997 http://www.agdrift.com/publications/Body.htm

USEPA, Office of Pesticide Programs, Reregistration Eligibility Decision, Fosamine ammonium, EPA-738-R-95-004, January 1995, http://www.epa.gov/oppsrrd1/REDs/

USEPA, Office of Pesticide Programs, R.E.D. Facts, Fosamine ammonium, EPA-738-F-95-005, January 1995, http://www.epa.gov/oppsrrd1/REDs/

Glyphosate

CHEMINOVA AGRO A/S, GLYFOS® Herbicide, Specimen Product Label, 1998

CHEMINOVA AGRO A/S, GLYFOS® Herbicide, Material Safety Data Sheet, KEM/September 1999

Dow AgroSciences, Glypro® Specialty Herbicide, Specimen Product Label, D02-077-002, August 10, 1999

Dow AgroSciences, Glypro® Specialty Herbicide, Material Safety Data Sheet, 006694, January 12, 2000

Dow AgroSciences, Glypro® Plus Herbicide, Specimen Product Label, D02-095-001, October 13, 1999

Dow AgroSciences, Glypro® Plus Herbicide, Material Safety Data Sheet, 006692, January 12, 2000

Dow AgroSciences, Glyphomax® Herbicide, Specimen Product Label, D02-088-001, November 15, 1999

Dow AgroSciences, Glyphomax® Herbicide, Material Safety Data Sheet, 006693, January 12, 2000

EPRI, Determination of the Effectiveness of Herbicide Buffer Zones in Protecting Water Quality, EPRI Final Report TR-113160, 1999

Extension Toxicology Network, Pesticide Information Profile, Glyphosate, June 1996
http://ace.orst.edu/info/extoxnet/pips/ghindex.html

Extension Toxicology Network, Toxicology Information Briefs: Bioaccumulation, Revised 1993,
http://ace.orst.edu/info/extoxnet/tibs/bioaccum.htm

Monsanto Company, Accord® Herbicide, Specimen Product Label, 1998-1 21002V6-5/CG, 1998

Monsanto Company, Accord® Herbicide, Material Safety Data Sheet, MSDS Number: S00011151, April 26, 1999

Monsanto Company, Accord Site Prep™ Herbicide, Specimen Product Label, 1999-1 21166W1-1/CG, 1999

Monsanto Company, Accord Site Prep™ Herbicide, Material Safety Data Sheet, MSDS Number: S00013288, January 5, 2000

Monsanto Company, Honcho® Herbicide, Specimen Product Label, 1997-1 21152V1-3/CG, 1997

Monsanto Company, Honcho® Herbicide, Material Safety Data Sheet, MSDS Number: S00013040, November 1997

Monsanto Company, Rodeo® Emerged Aquatic Weed and Brush Herbicide, Specimen Product Label, 1998-1 21061W3-1/CG, 1998

Monsanto Company, Rodeo® Emerged Aquatic Weed and Brush Herbicide, Material Safety Data Sheet, MSDS Number: S00010153, January 1998

Monsanto Company, Roundup ULTRA® Herbicide, Specimen Product Label, 1999-1 21137X5-2/CG, 1999

Monsanto Company, Roundup ULTRA® Herbicide, Material Safety Data Sheet, MSDS Number: S00012770, May 26, 1999

Schuette, Jeff, Carissa, Environmental Fate of Glyphosate, California Department of Pesticide Registration, Revised November 1998

Spray Drift Task Force, A Summary of Ground Application Studies, 1997 http://www.agdrift.com/publications/Body.htm

USDA Forest Service, Pesticide Fact Sheet, Glyphosate, November 1995 http://www.fs.fed.us/foresthealth/pesticide/index.html

USEPA, Office of Pesticide Programs, Reregistration Eligibility Decision, Glyphosate, EPA-738-R-93-015, September 1993
http://www.epa.gov/oppsrrd1/REDs/

USEPA, Office of Pesticide Programs, R.E.D. Facts, Glyphosate, EPA-738-F-93-011, October 1998
http://www.epa.gov/oppsrrd1/REDs/

Halosulfuron-Methyl

EPRI, Determination of the Effectiveness of Herbicide Buffer Zones in Protecting Water Quality, EPRI Final Report TR-113160, 1999

Extension Toxicology Network, Toxicology Information Briefs: Bioaccumulation, Revised 1993, http://ace.orst.edu/info/extoxnet/tibs/bioaccum.htm

Monsanto, Manage® Herbicide, Specimen Product Label, 39002W6-2/CG, January 2000.

Monsanto, Manage® Herbicide Material Safety Data Sheet No. S00012679, May 26,1999

Oregon State University, et al., Pacific Northwest Weed Control Handbook, 1998

Spray Drift Task Force, A Summary of Ground Application Studies, 1997 http://www.agdrift.com/publications/Body.htm

USEPA, Notice, Monsanto Company; Pesticide Tolerance Petitions Filing, 63FR29401, May 29, 1998

Imazapyr

American Cyanamid Company, Arsenal© Herbicide, Specimen Product Label, PE-11004, December 1999

American Cyanamid Company, Arsenal© Herbicide, Material Safety Data Sheet, AG09107-5, January 5, 1999

American Cyanamid Company, Arsenal© Applicators Concentrate Herbicide, Specimen Product Label, PE-11072, February 1999

American Cyanamid Company, Arsenal© Applicators Concentrate Herbicide, Material Safety Data Sheet, AG091021-6, June 2, 1997

American Cyanamid Company, Arsenal© Railroad Herbicide, Specimen Product Label, PE-11251, December 1999

American Cyanamid Company, Arsenal© Railroad Herbicide, Material Safety Data Sheet, AG09105-4, June 2, 1997

American Cyanamid Company, Chopper© Herbicide, Specimen Product Label, PE-19000, February 2000

American Cyanamid Company, Chopper© Herbicide, Material Safety Data Sheet, AG09198-4, April 20, 1999

EPRI, Determination of the Effectiveness of Herbicide Buffer Zones in Protecting Water Quality, EPRI Final Report TR-113160, 1999

Extension Toxicology Network, Pesticide Information Profile, Imazapyr, 1996 http://ace.orst.edu/info/extoxnet/pips/ghindex.html

Extension Toxicology Network, Toxicology Information Briefs: Bioaccumulation, Revised 1993, http://ace.orst.edu/info/extoxnet/tibs/bioaccum.htm

Spray Drift Task Force, A Summary of Ground Application Studies, 1997 http://www.agdrift.com/publications/Body.htm

USDA Forest Service, Pesticide Fact Sheet, Imazapyr, November 1995 http://www.fs.fed.us/foresthealth/pesticide/index.html

Isoxaben

Dow AgroSciences, Gallery 75® Dry Flowable (DF) Product Label, EPA RN 62719-145, Label Code D02-081-008, October 1993, Revised January 1, 1998.

Dow AgroSciences, Gallery 75® DF Material Safety Data Sheet No. 003994, October 6, 1998.

DowElanco (Dow AgroSciences), Isoxaben Technology Transfer Resource Guide, January 1997.

EPRI, Determination of the Effectiveness of Herbicide Buffer Zones in Protecting Water Quality, EPRI Final Report TR-113160, 1999

Extension Toxicology Network, Toxicology Information Briefs: Bioaccumulation, Revised 1993, http://ace.orst.edu/info/extoxnet/tibs/bioaccum.htm

New York State, Department of Environmental Conservation, Letter to DowElanco (now Dow AgroSciences) Denying Applications to Register…Gallery 75® Dry Flowable…, with reasons, dated February 11, 1994.

Oregon State University, et al., Pacific Northwest Weed Control Handbook, 1998.

Spray Drift Task Force, A Summary of Ground Application Studies, 1997 http://www.agdrift.com/publications/Body.htm

Thomson, W.T., Agricultural Chemicals, Book II Herbicides, 1989.

Weed Science Society of America, Herbicide Handbook, 6th Edition, 1989.

Mefluidide

California Environmental Protection Agency, Depart of Pesticide Regulation, Summary of Toxicology Data, Mefluidide, Revised November 21, 1994

Cornell University, Pesticide Active Ingredient Fact Sheet, Mefluidide, (http://pmep.cce.cornell.edu/profil…ate/benefin/herb-prof-mefluidide.html), March 17, 1998

EPRI, Determination of the Effectiveness of Herbicide Buffer Zones in Protecting Water Quality, EPRI Final Report TR-113160, 1999

Extension Toxicology Network, Toxicology Information Briefs: Bioaccumulation, Revised 1993, http://ace.orst.edu/info/extoxnet/tibs/bioaccum.htm

PBI/Gordon Corporation, Embark® (Lite) Turf and Ornamental Growth Regulator, Pesticide Product Label, 1998

PBI/Gordon Corporation, Embark® (Lite) Turf and Ornamental Growth Regulator, Material Safety Data Sheet 685-6, Version 003, September 17, 1996

PBI/Gordon Corporation, Embark® 2-3 Plant Growth Regulator, Pesticide Product Label, June 29, 1995

Spray Drift Task Force, A Summary of Ground Application Studies, 1997 http://www.agdrift.com/publications/Body.htm

Thomson, W.T., Agricultural Chemicals, Book II Herbicides, 1989

Weed Science Society of America, Herbicide Handbook, 6th Edition, 1989

Metsulfuron-Methyl

Du Pont Agricultural Products, Escort®, Oust®, Telar® Herbicides, Product Information Bulletin, H-66607, June 1996

Du Pont Agricultural Products, Noxious/Selective Weed Control, Escort® and Telar® Herbicides, Product Information Bulletin, H-87254, January 2000

Du Pont Agricultural Products, Escort® DF Herbicide, Specimen Product Label, H-63665, February 2, 1999

Du Pont Agricultural Products, Escort® DF Herbicide, Material Safety Data Sheet M0000027, December 19, 1997

EPRI, Determination of the Effectiveness of Herbicide Buffer Zones in Protecting Water Quality, EPRI Final Report TR-113160, 1999

Extension Toxicology Network, Pesticide Information Profile, Metsulfuron-Methyl, Revised October 1996
http://ace.orst.edu/info/extoxnet/pips/ghindex.html

Extension Toxicology Network, Toxicology Information Briefs: Bioaccumulation, Revised 1993,
http://ace.orst.edu/info/extoxnet/tibs/bioaccum.htm

Spray Drift Task Force, A Summary of Ground Application Studies, 1997
http://www.agdrift.com/publications/Body.htm

USDA Forest Service, Pesticide Fact Sheet, Metsulfuron methyl, November 1995

http://www.infoventures.com/e-hlth/pestcide/pest-fac.html

Oryzalin

Dow AgroSciences, Surflan® A.S. Herbicide, Specimen Product Label, Label Code: D02-045-015, February 22, 1999

Dow AgroSciences, Surflan® A.S. Herbicide, Material Safety Data Sheet, MSDS: 003738, January 1, 1998

Dow AgroSciences, Surflan® A.S. Specialty Herbicide, Specimen Product Label, Label Code: D02-083-012, February 22, 1999

Dow AgroSciences, Surflan® A.S. Specialty Herbicide, Material Safety Data Sheet, MSDS: 003738, January 1, 1998

EPRI, Determination of the Effectiveness of Herbicide Buffer Zones in Protecting Water Quality, EPRI Final Report TR-113160, 1999

Extension Toxicology Network, Pesticide Information Profile, Oryzalin, June 1996
http://ace.orst.edu/info/extoxnet/pips/ghindex.html

Extension Toxicology Network, Toxicology Information Briefs: Bioaccumulation, Revised 1993,
http://ace.orst.edu/info/extoxnet/tibs/bioaccum.htm

Spray Drift Task Force, A Summary of Ground Application Studies, 1997
http://www.agdrift.com/publications/Body.htm

USEPA, Office of Pesticide Programs, Reregistration Eligibility Decision, Oryzalin, EPA-738-R-94-016, September 1994
http://www.epa.gov/oppsrrd1/REDs/

USEPA, Office of Pesticide Programs, R.E.D. Facts, Oryzalin, EPA-738-F-94-012, September 1994 http://www.epa.gov/oppsrrd1/REDs/

Paclobutrazol

Cornell University, Pesticide Management Program, Chemical Fact Sheet No. 62: Paclobutrazol, August 14, 1985

http://pmep.cce.cornell.edu/profiles/index.html

Dow AgroSciences, Profile® 2SC Specialty Growth Regulator, Specimen Product Label, Label Code: D02-117-007, January 1, 1998

Dow AgroSciences, Profile® 2SC Specialty Growth Regulator, Material Safety Data Sheet, MSDS: 004433, January 1, 1998

EPRI, Determination of the Effectiveness of Herbicide Buffer Zones in Protecting Water Quality, EPRI Final Report TR-113160, 1999

Extension Toxicology Network, Toxicology Information Briefs: Bioaccumulation, Revised 1993, http://ace.orst.edu/info/extoxnet/tibs/bioaccum.htm

Spray Drift Task Force, A Summary of Ground Application Studies, 1997 http://www.agdrift.com/publications/Body.htm

Picloram

Dow AgroSciences, Tordon® 22K Specialty Herbicide, Specimen Product Label, Label Code: D02-111-008, February 22, 1999

Dow AgroSciences, Tordon® 22K Specialty Herbicide, Material Safety Data Sheet, MSDS: 000380, October 6, 1998

EPRI, Determination of the Effectiveness of Herbicide Buffer Zones in Protecting Water Quality, EPRI Final Report TR-113160, 1999

Extension Toxicology Network, Pesticide Information Profile, Picloram, June 1996

http://ace.orst.edu/info/extoxnet/pips/ghindex.html

Extension Toxicology Network, Toxicology Information Briefs: Bioaccumulation, Revised 1993, http://ace.orst.edu/info/extoxnet/tibs/bioaccum.htm

Spray Drift Task Force, A Summary of Ground Application Studies, 1997 http://www.agdrift.com/publications/Body.htm

USDA Forest Service, Pesticide Fact Sheet, Picloram, November 1995

http://www.fs.fed.us/foresthealth/pesticide/index.html

USEPA, Office of Pesticide Programs, Reregistration Eligibility Decision, Picloram, EPA-738-R-95-019, August 1995

http://www.epa.gov/oppsrrd1/REDs/

USEPA, Office of Pesticide Programs, R.E.D. Facts, Picloram, EPA-738-F-95-018, August 1995

http://www.epa.gov/oppsrrd1/REDs/

Sulfometuron-Methyl

Du Pont Agricultural Products, Escort®, Oust®, Telar® Herbicides, Product Information Bulletin, H-66607, June 1996

Du Pont Agricultural Products, Oust® Herbicide, Specimen Product Label, H-63401, March 27, 1998

Du Pont Agricultural Products, Oust® Herbicide, Specimen Special Local Need 24© Labeling, H-63740, July 2, 1999

Du Pont Agricultural Products, Oust® Herbicide, Material Safety Data Sheet M0000028, May 13, 1998

EPRI, Determination of the Effectiveness of Herbicide Buffer Zones in Protecting Water Quality, EPRI Final Report TR-113160, 1999

Extension Toxicology Network, Pesticide Information Profile, Sulfometuron-methyl, Revised June 1996
http://ace.orst.edu/info/extoxnet/pips/ghindex.html

Extension Toxicology Network, Toxicology Information Briefs: Bioaccumulation, Revised 1993,
http://ace.orst.edu/info/extoxnet/tibs/bioaccum.htm

Spray Drift Task Force, A Summary of Ground Application Studies, 1997
http://www.agdrift.com/publications/Body.htm

USDA Forest Service, Pesticide Fact Sheet, Metsulfuron methyl, November 1995

http://www.fs.fed.us/foresthealth/pesticide/index.html

Tebuthiuron

Dow AgroSciences, Tordon® 22K Specialty Herbicide, Specimen Product Label, Label Code: D02-111-008, February 22, 1999

Dow AgroSciences, Tordon® 22K Specialty Herbicide, Material Safety Data Sheet, MSDS: 000380, October 6, 1998

EPRI, Determination of the Effectiveness of Herbicide Buffer Zones in Protecting Water Quality, EPRI Final Report TR-113160, 1999

Extension Toxicology Network, Pesticide Information Profile, Tebuthiuron, June 1996

http://ace.orst.edu/info/extoxnet/pips/ghindex.html

Extension Toxicology Network, Toxicology Information Briefs: Bioaccumulation, Revised 1993, http://ace.orst.edu/info/extoxnet/tibs/bioaccum.htm

Spray Drift Task Force, A Summary of Ground Application Studies, 1997 http://www.agdrift.com/publications/Body.htm

USDA Forest Service, Pesticide Fact Sheet, Tebuthiuron, November 1995

http://www.fs.fed.us/foresthealth/pesticide/index.html

USEPA, Office of Pesticide Programs, Reregistration Eligibility Decision, Tebuthiuron, EPA-738-R-95-019, August 1995 http://www.epa.gov/oppsrrd1/REDs/

USEPA, Office of Pesticide Programs, R.E.D. Facts, Tebuthiuron, EPA-738-F-95-018, August 1995

http://www.epa.gov/oppsrrd1/REDs/

Triclopyr

Dow AgroSciences, Forestry Garlon® 4 Specialty Herbicide, Specimen Product Label, Label Code: D02-100-003, January 1, 1998

Dow AgroSciences, Forestry Garlon® 4 Specialty Herbicide, Material Safety Data Sheet, MSDS: 004788, September 9, 1999

Dow AgroSciences, Garlon® 3A Specialty Herbicide, Specimen Product Label, Label Code: D02-101-025, January 1, 1998

Dow AgroSciences, Garlon® 3A Specialty Herbicide, Material Safety Data Sheet, MSDS: 004422, September 9, 1999

Dow AgroSciences, Garlon® 4 Specialty Herbicide, Specimen Product Label, Label Code: D02-102-023, January 1, 1998

Dow AgroSciences, Garlon® 4 Specialty Herbicide, Material Safety Data Sheet, MSDS: 004788, September 9, 1999

Dow AgroSciences, Pathfinder® II Specialty Herbicide, Specimen Product Label, Label Code: D02-104-007, November 22, 1999

Dow AgroSciences, Pathfinder® II Specialty Herbicide, Material Safety Data Sheet, MSDS: 004778, December 9, 1999

EPRI, Determination of the Effectiveness of Herbicide Buffer Zones in Protecting Water Quality, EPRI Final Report TR-113160, 1999

Extension Toxicology Network, Pesticide Information Profile, Triclopyr, June 1996

http://ace.orst.edu/info/extoxnet/pips/ghindex.html

Extension Toxicology Network, Toxicology Information Briefs: Bioaccumulation, Revised 1993, http://ace.orst.edu/info/extoxnet/tibs/bioaccum.htm

Spray Drift Task Force, A Summary of Ground Application Studies, 1997 http://www.agdrift.com/publications/Body.htm

USDA Forest Service, Pesticide Fact Sheet, Triclopyr, November 1995 http://www.fs.fed.us/foresthealth/pesticide/index.html

USEPA, Office of Pesticide Programs, Reregistration Eligibility Decision, Triclopyr, EPA-738-R-98-011, October 1998 http://www.epa.gov/oppsrrd1/REDs/

USEPA, Office of Pesticide Programs, R.E.D. Facts, Triclopyr, EPA-738-F-98-007, October 1998

http://www.epa.gov/oppsrrd1/REDs/

Trinexapac-Ethyl

EPRI, Determination of the Effectiveness of Herbicide Buffer Zones in Protecting Water Quality, EPRI Final Report TR-113160, 1999

Extension Toxicology Network, Toxicology Information Briefs: Bioaccumulation, Revised 1993, http://ace.orst.edu/info/extoxnet/tibs/bioaccum.htm

International Chemical Safety Cards, trinexapac-ethyl, ICSC: 1268, (http://www.vetmed.ucdavis.edu/msds).

Novartis, Primo Liquid® Product Label, EPA RN 100-729, 1997.

Novartis, Primo Liquid® Material Safety Data Sheet, August 10, 1998.

Novartis, Primo WSB® Product Label, EPA RN 100-752, 1998.

Novartis, Primo WSB® Material Safety Data Sheet, August 10, 1998.

Spray Drift Task Force, A Summary of Ground Application Studies, 1997 http://www.agdrift.com/publications/Body.htm

US EPA, [trinexapac-ethyl], TSCA Test Submission Data Base, September 1997.

Mixtures

Dow AgroSciences, Confront® Specialty Herbicide, Specimen Product Label, Label Code: D02-080-011, January 1, 1998

Dow AgroSciences, Confront® Specialty Herbicide, Material Safety Data Sheet, MSDS: 003599, January 1, 1998

Dow AgroSciences, Crossbow® Specialty Herbicide, Specimen Product Label, Label Code: D02-032-007, January 1, 1998

Dow AgroSciences, Crossbow® Specialty Herbicide, Material Safety Data Sheet, MSDS: 001715, January 1, 1998

Dow AgroSciences, Grazon® P+D Specialty Herbicide, Specimen Product Label, Label Code: 123-32-006N, January 1, 1998

Dow AgroSciences, Grazon® P+D Specialty Herbicide, Material Safety Data Sheet, MSDS: 000381, January 1, 1998

Dow AgroSciences, Snapshot® 2.5 TG Specialty Herbicide, Specimen Product Label, Label Code: D02-082-012, January 1, 1998

Dow AgroSciences, Snapshot® 2.5 TG Specialty Herbicide, Material Safety Data Sheet, MSDS: 004019, January 1, 1998

Dow AgroSciences, Tordon® 101 Mixture Specialty Herbicide, Specimen Product Label, Label Code: D02-110-021, January 1, 1998

Dow AgroSciences, Tordon® 101 Mixture Specialty Herbicide, Material Safety Data Sheet, MSDS: 000381, January 1, 1998

Dow AgroSciences, Tordon® RTU Specialty Herbicide, Specimen Product Label, Label Code: D02-046-007, February 4, 1999

Dow AgroSciences, Tordon® RTU Specialty Herbicide, Material Safety Data Sheet, MSDS: 000387, January 1, 1998

Du Pont Agricultural Products, Finesse® Herbicide, Specimen Product Label, H-63081, 1997

Du Pont Agricultural Products, Finesse® Herbicide, Material Safety Data Sheet DU003070, December 7, 1993

Du Pont Agricultural Products, Krovar® I DG Herbicide, Specimen Product Label, H-63061, 1996

Du Pont Agricultural Products, Krovar® I DG Herbicide, Material Safety Data Sheet DU005711, October 11, 1996

Du Pont Agricultural Products, Krovar® II DF Herbicide, Specimen Product Label, H-59348, 1995

Du Pont Agricultural Products, Krovar® II DF Herbicide, Material Safety Data Sheet DU005710, October 11, 1996

Helena Chemical Company, XL® 2G Specialty Herbicide, Specimen Product Label, 1998

Helena Chemical Company, XL® 2G Specialty Herbicide, Material Safety Data Sheet, 1998

Monsanto Company, Landmaster® BW Herbicide, Specimen Product Label, 1997-1 21033V3-4/CG, 1997

Monsanto Company, Landmaster® BW Herbicide, Material Safety Data Sheet, MSDS Number: M00008463, March 1995

Micro Flo Company, Banvel® + 2,4-D Herbicide, Specimen Product Label, 1998

Micro Flo Company, Banvel® + 2,4-D Herbicide, Material Safety Data Sheet, December 8, 1998

Platte Chemical Company, Clean Crop™ Weed Blast® Residual Weed Control, Specimen Product Label, 1998

Platte Chemical Company, Clean Crop™ Weed Blast® Residual Weed Control, Material Safety Data Sheet, January 13, 1994

This page intentionally left blank.