

Table of Contents

Volume 1

| | |
|---|----------|
| Notice | iv |
| Abstract | iv |
| Acronyms / Abbreviations | v |
| Summary | xix |
| Introduction | xix |
| What Action is Proposed? | xx |
| Why is the Action Needed? | xxi |
| What Would it Mean Not to Meet the Need? | xxi |
| Are There Other Alternatives that Would Meet the Need? | xxii |
| What Factors Will be Used in Making the Decision Between Alternatives? | xxii |
| What are the Effects of the Alternatives? | xxiii |
| Can Any of the Adverse Effects be Mitigated? | xxviii |
| What Monitoring is Necessary? | xxviii |
| Which Alternative is Preferred? | xxix |
| Chapter 1 - Purpose and Need | 3 |
| Introduction | 3 |
| Background | 4 |
| The <i>Need</i> | 6 |
| Proposed Action | 7 |
| Alternatives to the Proposed Action | 8 |
| The Purposes | 8 |
| Decision to be Made | 12 |
| Scoping | 12 |
| Public Review of the Draft EIS | 13 |
| Consultation | 13 |
| Related Plans and Analyses | 14 |
| 2007 National PEIS | 15 |
| Resource Management Plans | 15 |
| Existing and Future Project-Level Planning | 16 |
| Non-BLM Actions Potentially Affecting the Use of Herbicides on BLM Lands in Oregon | 17 |
| 2004 Court-Ordered Buffer Around Salmon and the Settlement Agreement to Complete Consultation on 37 Pesticides | 17 |
| Potential Consultation Lawsuit Regarding 394 Pesticides | 17 |
| Petition to Cancel all Registrations of 2,4-D | 18 |
| Sulfometuron Methyl Reregistration Eligibility Decision (RED) | 18 |
| Oregon Priority Persistent Pollutant (P3) List | 20 |
| Oregon Department of Environmental Quality Toxics Reduction Strategy | 20 |
| EPA Endocrine Disruptor Screening Program (EDSP) | 20 |
| Rulemaking to Require Disclosure of All Pesticide Ingredients | 21 |
| Pending EPA Action to Address Pesticide Drift | 21 |
| Conflicts and Consistency with Other Plans | 21 |

| | |
|--|----|
| Chapter 2 - The Alternatives | 27 |
| Introduction | 27 |
| The Reference Analysis | 27 |
| Elements Common to All Alternatives | 28 |
| Applicable Lands | 28 |
| Legal and Policy Requirements | 28 |
| Standard Operating Procedures | 28 |
| Mitigation Measures Adopted by the Record of Decision for the PEIS | 28 |
| Conservation Measures for Federally Listed Species | 29 |
| The Alternatives | 29 |
| The No Action Alternative | 30 |
| Alternative 2 (No Action) – Use 4 Herbicides to Treat Noxious Weeds Only | 30 |
| The Action Alternatives | 30 |
| Alternative 3 – Use 12 (W) or 13 (E) Herbicides to Treat Invasive Weeds and Control Pests and Diseases | 30 |
| Alternative 4 (Proposed Action) – Use 13 (W) or 16 (E) Herbicides to Treat Invasive Weeds plus Limited Additional Uses | 31 |
| Alternative 5 – Use 18 Herbicides to Treat Invasive Weeds and Meet Other Vegetation Management Objectives | 32 |
| Alternatives Eliminated From Detailed Study | 34 |
| No Use of Acetolactate Synthase (ALS)-inhibiting Herbicides | 34 |
| No Aerial Application of Herbicides | 34 |
| Reduce Management Activities Implicated in Weed Spread | 35 |
| Use Vinegar, Salt, and other Household Products | 35 |
| Increase the Use of Non-Herbicide Methods | 36 |
| Reconsider Other BLM Management Practices that Encourage the Spread of Invasive Plants, such as OHV Use or Policies on the use of Weed Free Feed | 36 |
| Increase Funding to Pay for Additional Non-Herbicide Control Treatments | 36 |
| Consider the Use of Different Herbicides Other than the 18 Being Considered | 37 |
| Use the Same Herbicides as the Forest Service | 37 |
| Permit the Use of All EPA Tested and Approved Herbicides | 37 |
| Permit the Use of Herbicides for the Full Range of BLM Management Responsibilities Including Livestock Forage and Timber Production | 38 |
| Comparison of Alternatives | 38 |
| The Reference Analysis and Alternatives | 38 |
| Estimated Annual Treatment Acres Under Each Alternative (Table 2-4) | 40 |
| Comparison of the Effects of the Alternatives (Table 2-5) | 41 |
| Response of the Alternatives to the Purposes (Table 2-6) | 41 |
| The Preferred Alternative | 50 |
| Potential Mitigation | 50 |
| Introduction | 50 |
| Potential Mitigation | 51 |
| Chapter 3 - Background and Assumptions for Effects Analysis | 57 |
| Introduction | 57 |
| Background for Effects Analysis | 57 |
| The 18 Herbicides | 58 |

| | |
|---|------------|
| Assumptions and Information about Treatment Acres | 65 |
| Integrated Vegetation Management | 65 |
| Herbicide Treatment Methods | 70 |
| Non-Herbicide Treatment Methods | 73 |
| Treatment Acres, Gross Acres and Net Acres, and Pounds of Herbicides to be Applied | 77 |
| Assumptions about Herbicide Treatments | 81 |
| Risk | 85 |
| EPA Labels | 85 |
| Risk Assessments | 86 |
| Drift | 88 |
| High, Moderate, and Low Risk in BLM and Forest Service Risk Assessments | 89 |
| Uncertainty in the Risk Assessment Process | 91 |
| Use of the Individual Risk Assessment Tools During Implementation | 92 |
| Toxicity Comparison with Household Products | 92 |
| Methodology for Assessing Effects | 92 |
| Standard Operating Procedures, PEIS Mitigation Measures, Risk, and the Potential for Adverse Effects | 93 |
| Chapter 4 - Affected Environment and Environmental Consequences | 113 |
| Incomplete and Unavailable Information | 113 |
| Accidental Spill or Misapplication | 116 |
| Cumulative Impacts | 117 |
| Changes in Herbicide Use on Adjacent Non-BLM Lands Resulting From the BLM Alternatives | 118 |
| Cumulative Effects of Insect Spraying | 118 |
| Oregon Department of Agriculture’s Pesticide Use Reporting System | 118 |
| Forest Service’s Invasive Plant Program | 120 |
| Previous Herbicide Use | 120 |
| Environmental Setting | 120 |
| Current Climate | 120 |
| Biomes | 123 |
| Sagebrush Steppe Biome | 125 |
| Eastern Forest Biome | 126 |
| East Side Riparian Biome | 126 |
| Siskiyou Biome | 127 |
| Western Forest Biome | 129 |
| Willamette Valley Biome | 130 |
| Noxious Weeds and Other Invasive Plants | 131 |
| Affected Environment | 131 |
| Traits of Invasive Plants | 131 |
| Mechanisms of Invasion | 132 |
| Weed Infestations in Oregon | 133 |
| Environmental Consequences | 134 |
| Noxious Weed Spread Rate by Alternative | 135 |
| Native and Other Non-Invasive Vegetation | 139 |
| Affected Environment | 139 |

| | |
|---|-----|
| Susceptibility of Plant Communities to Damage from Invasive Plants | 141 |
| Endangered, Threatened, and other Special Status Plant Species | 142 |
| Environmental Consequences | 144 |
| Effects Common to All Alternatives | 144 |
| Effects by Alternative | 151 |
| Endangered, Threatened, and other Special Status Plant Species | 155 |
| Pests and Diseases (Sudden Oak Death) | 156 |
| Affected Environment | 156 |
| Sudden Oak Death Characteristics and Dispersal Strategy | 157 |
| Regulations and Control | 158 |
| Treatment History in Oregon | 158 |
| Environmental Consequences | 159 |
| Effects Common to All Alternatives | 159 |
| Effects (to Vegetation) by Alternative | 161 |
| Air Quality | 163 |
| Affected Environment | 163 |
| Environmental Consequences | 165 |
| Effects Common to All Alternatives | 166 |
| Effects by Alternative | 168 |
| Climate Trends, Projections, and Implications | 169 |
| Observed Climate Trends | 169 |
| Climate Change Projections | 169 |
| Implications of Climate Change on Invasive Plants | 171 |
| Effects of the Alternatives on Climate Change: Greenhouse Gas Emissions and Carbon Storage | 172 |
| Soil Resources | 174 |
| Affected Environment | 174 |
| Environmental Consequences | 178 |
| Effects Common to All Alternatives | 178 |
| Effects by Alternative | 185 |
| Cumulative Effects | 188 |
| Water Resources | 188 |
| Affected Environment | 188 |
| Flows | 189 |
| Water Quality | 189 |
| Environmental Consequences | 194 |
| Effects of Herbicides on Water Resources | 194 |
| Routes for Off-Site Movement of Herbicides | 198 |
| Effect of Invasive Plants on Water Resources | 202 |
| Effects by Alternative | 203 |
| Cumulative Effects | 207 |
| Wetlands and Riparian Areas | 208 |
| Affected Environment | 208 |
| Environmental Consequences | 210 |
| Effects Common to All Alternatives | 211 |
| Effects by Alternative | 214 |

| | |
|---|-----|
| Fish | 216 |
| Affected Environment | 216 |
| Fish and Their Habitat | 217 |
| Setting - Aquatic Systems | 218 |
| Environmental Consequences | 220 |
| Effects Common to All Alternatives | 220 |
| Effects by Alternative – Non-Special Status Fish | 232 |
| Effects by Alternative – Special Status Fish | 235 |
| Cumulative Effects | 238 |
| Wildlife Resources | 241 |
| Affected Environment | 241 |
| Wildlife Considerations by Biome | 243 |
| Environmental Consequences | 245 |
| Effects Common to All Alternatives | 246 |
| Effects by Alternative | 254 |
| Cumulative Effects | 257 |
| Livestock | 258 |
| Affected Environment | 258 |
| Environmental Consequences | 259 |
| Effects Common to All Alternatives | 260 |
| Effects by Alternative | 264 |
| Cumulative Effects | 267 |
| Wild Horses and Burros | 268 |
| Affected Environment | 268 |
| Environmental Consequences | 268 |
| Effects Commons to All Alternatives | 269 |
| Effects by Alternative | 270 |
| Cumulative Effects | 273 |
| Fire and Fuels | 273 |
| Affected Environment | 273 |
| Environmental Consequences | 276 |
| Effects Common to All Alternatives | 276 |
| Effects by Alternative | 277 |
| Timber | 278 |
| Affected Environment | 278 |
| Existing Timber Volume Production | 279 |
| Invasive Plants on Timberlands | 280 |
| Environmental Consequences | 280 |
| Effects Common to All Alternatives | 280 |
| Effects by Alternative | 282 |
| Paleontological and Cultural Resources | 283 |
| Affected Environment | 283 |
| Paleontological Resources | 283 |
| Cultural Resources | 283 |
| Traditional and Cultural Uses (American Indian Interests) | 284 |

| | |
|---|-----|
| Environmental Consequences | 285 |
| Effects Common to All Alternatives | 285 |
| Effects by Alternative | 286 |
| Cumulative Effects | 290 |
| Visual Resources | 292 |
| Affected Environment | 292 |
| Environmental Consequences | 292 |
| Effects Common to All Alternatives | 293 |
| Effects by Alternative | 295 |
| Wilderness and Other Special Areas | 298 |
| Affected Environment | 298 |
| Wilderness and Wilderness Study Areas | 298 |
| Wild, Scenic, and Recreational Rivers | 299 |
| National Monuments | 299 |
| National Scenic and Historic Trails | 299 |
| Areas of Critical Environmental Concern, Research Natural Areas, and Outstanding Natural Areas | 300 |
| Environmental Consequences | 300 |
| Effects Common to All Alternatives | 301 |
| Effects by Alternative | 301 |
| Recreation/Interpretive Sites | 304 |
| Affected Environment | 304 |
| Recreation Management Categories | 304 |
| Environmental Consequences | 305 |
| Effects Common to All Alternatives | 305 |
| Effects by Alternative | 306 |
| Administrative Sites, Roads, and Rights-of-Way | 311 |
| Affected Environment | 311 |
| Government Facilities and Roads | 312 |
| Rights-of-Way | 313 |
| Environmental Consequences | 315 |
| Effects by Alternative | 315 |
| Social and Economic Values | 318 |
| Affected Environment | 318 |
| Analysis Area | 319 |
| Population and Demographic Change | 319 |
| Economic Specialization | 320 |
| Perceptions, Values, and Concerns | 321 |
| Environmental Consequences | 321 |
| Concerns Raised During Oregon Scoping | 322 |
| Effects Common to All Alternatives | 323 |
| Effects by Alternative | 324 |
| Cumulative Effects | 327 |
| Environmental Justice | 328 |
| Affected Environment | 328 |
| Population and Demographic Change | 328 |

| | |
|--|------------|
| Environmental Consequences | 330 |
| Effects Common to All Alternatives | 331 |
| Effects by Alternative | 332 |
| Cumulative Effects | 334 |
| Implementation Costs | 338 |
| Treated Acres and Effectively Treated Acres, by Alternative | 338 |
| Costs by Treatment Method | 339 |
| Total Cost and Cost per Effectively Treated Acre by Alternative | 340 |
| Effects by Alternative | 341 |
| Non-Quantified and Cumulative Effects | 342 |
| Human Health and Safety | 343 |
| Affected Environment | 343 |
| Background Health Risks | 343 |
| Risks from Diseases | 343 |
| Risks from Cancer | 344 |
| Injury Risk from Using Herbicides and Non-Herbicide Treatments | 344 |
| Environmental Consequences | 345 |
| Methodology for Assessing Effects | 346 |
| Effects Common to All Alternatives | 347 |
| Effects by Alternative | 355 |
| Critical Elements of the Human Environment | 359 |
| Other Environmental Consequences | 360 |
| Adverse Effects Which Cannot Be Avoided | 361 |
| Relationship Between Short-Term Uses of the Human Environment and Maintenance of Long-term Productivity | 362 |
| Irreversible or Irretrievable Impacts | 362 |
| Glossary | 363 |
| References | 391 |
| List of Preparers | 421 |
| Distribution List | 427 |
| Index | 445 |

Tables

| | |
|---|-------|
| Table S-1. Estimated Annual Treatment Acres with Herbicide and Non-Herbicide Methods, West (W) and East (E) of the Cascades (FEIS:77-78) | xxiii |
| Table S-2. Projected Annual Noxious Weed Spread and Acreage Change for Each Alternative (FEIS:137-138) | xxiv |
| Table S-3. Selected Parameters for Each Alternative Relevant to the Effects Comparison (FEIS:77-78, 80, 138) | xxv |
| Table S-4. Herbicides Available Under Each Alternative (FEIS:59-61) | xxix |
| Table 2-1. Herbicide Treatments by Alternative and Treatment Objective | 29 |
| Table 2-2. Herbicides Available Under Each Alternative | 33 |
| Table 2-3. Comparison of the Features of the Alternatives | 39 |
| Table 2-4. Estimated Annual Treatment Acres Under Each Alternative | 40 |
| Table 2-5. Comparison of the Effects of the Alternatives | 42 |

| | |
|--|-----|
| Table 2-6. Response of the Alternatives to the <i>Purposes</i> | 47 |
| Table 3-1. Herbicide Information | 59 |
| Table 3-2. Herbicide Application Methods on BLM Lands in Oregon | 71 |
| Table 3-3. Estimated Annual Treatment Acres West/East of the Cascades for Each Alternative. | 77 |
| Table 3-4. Estimated Annual Pounds of Herbicides that Would be Applied at Typical and Maximum application Rates East/West of the Cascades for Each Alternative.. | 80 |
| Table 3-5. 2006-2008 Oregon BLM Pesticide Use Reports Summary. | 81 |
| Table 3-6. Ground and Aerial Herbicide Application | 82 |
| Table 3-7. Estimated Annual Herbicide Treatment Acres under Alternatives 3, 4, and 5 | 84 |
| Table 3-8. Estimated Change in Native Vegetation Annual Treatment Acres. | 85 |
| Table 3-9. Herbicide Label Categories | 86 |
| Table 3-10. Human Health and Ecological Risk Assessment Sources | 88 |
| Table 3-11. Comparison of oral LD ₅₀ values for commonly used herbicides and consumer goods. | 92 |
| Table 3-12. BLM-Evaluated Herbicide Risk Categories for Vegetation. | 94 |
| Table 3-13. FS-Evaluated Herbicide Risk Categories for Vegetation | 95 |
| Table 3-14. BLM-Evaluated Herbicide Risk Categories for Wildlife, Fish, and Aquatic Species | 96 |
| Table 3-15. FS-Evaluated Herbicide Risk Categories for Wildlife, Fish, and Aquatic Species | 98 |
| Table 3-16. BLM-Evaluated Herbicide Risk Categories for Workers | 100 |
| Table 3-17. BLM-Evaluated Herbicide Risk Categories for the Public | 101 |
| Table 3-18. FS-Evaluated Herbicide Risk Categories for Workers. | 102 |
| Table 3-19. FS-Evaluated Herbicide Risk Categories for the Public | 103 |
| Table 3-20. BLM 1991-Evaluated Herbicide High Risk Scenarios for Workers | 104 |
| Table 3-21. BLM 1991-Evaluated Herbicide High Risk Scenarios for the Public | 104 |
| Table 4-1. 2008 Oregon-Wide Use of the 18 Herbicides Analyzed in this EIS and Comparison with BLM Proposed Action (Alternative 4) | 119 |
| Table 4-2. BLM Lands by Biome | 123 |
| Table 4-3. Projected Annual Acres of Effective Noxious Weed Control by Alternative. | 137 |
| Table 4-4. Projected Annual Noxious Weed Spread Rates and Acreage Changes for Each Alternative | 138 |
| Table 4-5. Potential Vegetation Types. | 141 |
| Table 4-6. Projected Noxious Weed Spread Rates and 15-Year Infested Acres for Each Alternative | 149 |
| Table 4-7. Estimated Change in Native Vegetation Annual Treatment Acres by Treatment Method under Alternative 4 (Proposed Action) When Compared to Alternative 2 (No Action). | 154 |
| Table 4-8. Sudden Oak Death in Oregon Forests | 159 |
| Table 4-9. Primary and Secondary National Ambient Air Quality Standards (NAAQS) | 163 |
| Table 4-10. Non-Attainment and Air Quality Maintenance Areas in Oregon | 164 |
| Table 4-11. Mandatory Class I Areas in Oregon and Nearby in Adjoining States | 165 |
| Table 4-12. Emissions from Vegetation Treatments | 167 |
| Table 4-13. Soil Order Properties and Extent on BLM Lands | 177 |
| Table 4-14. Selected Characteristics that Affect the Fate of Herbicides in Soils | 181 |
| Table 4-15. Miles of BLM Streams on ODEQ 303(d) List | 190 |
| Table 4-16. Maximum Herbicide Concentration Allowed in Potable Water | 192 |
| Table 4-17. Herbicide Persistence in Water | 199 |
| Table 4-18. Drift Distance Versus Drop Diameter (NDSU 1993). | 200 |
| Table 4-19. Glyphosate Concentration in Washington Streams 1 Hour and 24 Hours After Injection | 201 |

| | |
|---|------|
| Table 4-20. Herbicide Half-Life in Anaerobic Soils | .211 |
| Table 4-21. Federally Recognized American Indian Tribes with Interests in Oregon | .284 |
| Table 4-22. Vegetation Treatment Methods Contributing to Ground Disturbance | .287 |
| Table 4-23. Estimated Annual Treatment Acres by Alternative | .294 |
| Table 4-24. Approximate Acres of Noxious Weeds Currently Treated Annually in Special Areas | .302 |
| Table 4-25. Approximate Acres of Other (non-noxious) Invasive Vegetation Currently Treated Annually in Special Areas | 302 |
| Table 4-26. Approximate Annual Acres of Vegetation Currently Treated Within Developed Recreation Sites and Hiking Trails by Treatment Method | .306 |
| Table 4-27. Population Living Below the Poverty Level | .330 |
| Table 4-28. Racial and Ethnic Change Compared to the Total Population Change in Oregon, by County (1990 to 2000) . . . | .335 |
| Table 4-29. Racial and Ethnic Share of 2000 Population | .336 |
| Table 4-30. Population Living Below the Poverty Level in Oregon, by County, Race, and Ethnicity | .337 |
| Table 4-31. Estimated Annual Acres of Noxious/Invasive Weed Treatment by Alternative | .339 |
| Table 4-32. Average Direct Cost of Treatment by Treatment Method, per Acre, East and West of the Cascades | .340 |
| Table 4-33. Annual Cost of Noxious Weed/Invasive Plant Treatment per Alternative | .340 |
| Table 4-34. Annual Cost for Rights-of-Way/Administrative Sites/Recreation Sites Treatments. | .342 |
| Table 4-35. Leading Causes of Death by Percentage | .344 |
| Table 4-36. Estimated Annual Acres of Treatments with Risk to Worker and Public Human Health by Alternative | .356 |

Figures

| | |
|---|------|
| Figure 1-1. Lands Administered by the Bureau of Land Management in Oregon | .5 |
| Figure 1-2. Average Annual Precipitation 1961-1990 | .19 |
| Figure 3-1. Basis for Risk Assessments | .91 |
| Figure 4-1. Oregon Biomes | .124 |
| Figure 4-2. Relationship between Area Occupied by Invasive Species and Time. | .132 |
| Figure 4-3. Potential Vegetation Types | .143 |
| Figure 4-4. Soil Orders | .175 |
| Figure 4-5. Wind Erosion Risk Groups 1 and 2 | .180 |
| Figure 4-6. Source Water Protection. | .191 |
| Figure 4-7. Invasive Annual Upland Grasses East of the Cascades | .275 |
| Figure 4-8. Population change for Oregon and counties east and west of the Cascades (Source: US Department of Commerce 2005) | .320 |

Volume 2

Appendices

| | |
|---|------|
| Table of Contents | .449 |
| Appendix 1 – The PEIS | .455 |
| Appendix 2 - Standard Operating Procedures and Mitigation Measures from the PEIS. | .457 |
| Appendix 3 – Monitoring. | .469 |
| Appendix 4 – Protocol for Identifying, Evaluating, and Using New Herbicides | .477 |

Appendix 5 – Federally Listed and other Special Status Species483
Appendix 6 – Summary of Existing District Resource Management Plan Direction for Noxious Weeds555
Appendix 7 – Additional Information about Noxious Weeds and Other Invasive Plants585
Appendix 8 – Human Health and Ecological Risk Assessments.605
Appendix 9 – Additional Information About the 18 Herbicides609
Appendix 10 - Response to Public Comments on the September 2009 Draft EIS649
Appendix 11 - Comment Letters from Federal, State, and Local Government Agencies on the 2009 Draft EIS765
Appendix 12 - 2,4-D783
Appendix 13 - EPA Pesticide Registration and Reregistration and BLM/FS Risk Assessment Processes799