

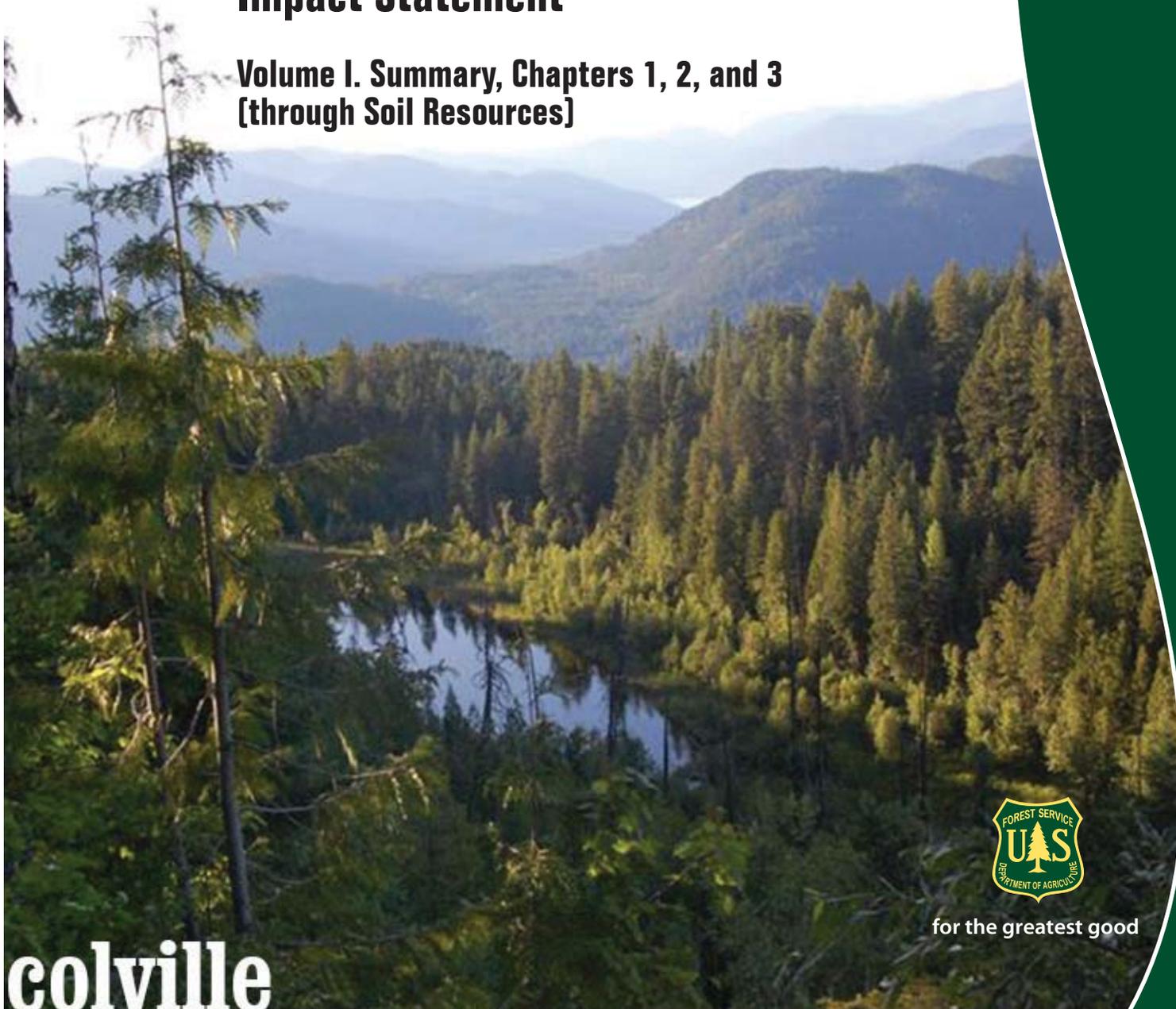


United States Department of Agriculture

# Proposed Revised Land Management Plan for Colville National Forest

## Draft Programmatic Environmental Impact Statement

Volume I. Summary, Chapters 1, 2, and 3  
(through Soil Resources)



for the greatest good

colville  
**NATIONAL FOREST**

January 2016

Cover Photo: First Thot Lake, Three Rivers Ranger District

In accordance with Federal civil rights law and U.S. Department of Agriculture (USDA) civil rights regulations and policies, the USDA, its Agencies, offices, and employees, and institutions participating in or administering USDA programs are prohibited from discriminating based on race, color, national origin, religion, sex, gender identity (including gender expression), sexual orientation, disability, age, marital status, family/parental status, income derived from a public assistance program, political beliefs, or reprisal or retaliation for prior civil rights activity, in any program or activity conducted or funded by USDA (not all bases apply to all programs). Remedies and complaint filing deadlines vary by program or incident.

Persons with disabilities who require alternative means of communication for program information (e.g., Braille, large print, audiotape, American Sign Language, etc.) should contact the responsible Agency or USDA's TARGET Center at (202) 720-2600 (voice and TTY) or contact USDA through the Federal Relay Service at (800) 877-8339. Additionally, program information may be made available in languages other than English.

To file a program discrimination complaint, complete the USDA Program Discrimination Complaint Form, AD-3027, found online at [http://www.ascr.usda.gov/complaint\\_filing\\_cust.html](http://www.ascr.usda.gov/complaint_filing_cust.html) and at any USDA office or write a letter addressed to USDA and provide in the letter all of the information requested in the form. To request a copy of the complaint form, call (866) 632-9992. Submit your completed form or letter to USDA by: (1) mail: U.S. Department of Agriculture, Office of the Assistant Secretary for Civil Rights, 1400 Independence Avenue, SW, Washington, D.C. 20250-9410; (2) fax: (202) 690-7442; or (3) email: [program.intake@usda.gov](mailto:program.intake@usda.gov).

USDA is an equal opportunity provider, employer and lender.

**Proposed Revised Land Management Plan  
for the Colville National Forest  
Draft Programmatic Environmental Impact Statement  
Stevens, Ferry, and Pend Oreille Counties of Washington State**

**Lead Agency:** USDA Forest Service

**Cooperating Agencies:** Confederated Tribes of the Colville Reservation  
Kalispel Tribe  
Spokane Tribe of Indians  
State of Washington  
Ferry County, Washington  
Pend Oreille County, Washington  
Stevens County, Washington

**Responsible Official:** Jim Peña, Regional Forester  
USDA Forest Service, Pacific Northwest Region  
1220 SW 3rd Avenue  
Portland, Oregon 97208

**For Information Contact:** Amy Dillon, Forest Plan Revision Team  
Colville National Forest  
Colville Supervisor's Office  
765 South Main  
Colville, Washington 99114  
(509) 684-7000

**Website:** <http://www.fs.usda.gov/main/colville/landmanagement/planning>

**Abstract:** This draft environmental impact statement (DEIS) documents the analysis of six alternatives (no action, proposed action, and alternatives P, R, B, and O) developed by the Forest Service for the programmatic management of approximately 1.1 million acres administered by the Colville National Forest. For ease of reference, the accompanying proposed revised land management plan (revised forest plan) reflects the preferred alternative. The alternatives are described in chapter 2. The no-action alternative would keep in place the management direction from the 1988 land and resource management plan (1988 forest plan), as amended. Alternative P is the preferred alternative.

The proposed action and alternatives P, R, B, and O address the following needs for action: (1) maintain or restore ecological conditions that contribute to the recovery and viability of terrestrial plant and wildlife species; (2) manage forest vegetation conditions to be more resilient to disturbances; (3) address climate change implications and vulnerabilities; (4) address changed social and economic conditions and preferences in light of ecosystem capacity; (5) accelerate improvement in watershed condition across the forest; and (6) integrate watershed and aquatic strategies across the forest.

Alternatives P, R, B, and O address new information and concerns that emerged during the implementation of the 1988 forest plan and comply with Federal laws, regulations, and policies. These alternatives also address significant issues (unresolved conflicts with the proposed action) that were identified from comments received during the scoping and public involvement period.

The Forest Service will use the “predecisional administrative review process,” also referred to as the “objection process” described in 36 CFR 219 Subpart B of the 2012 Planning Rule. This process gives an individual or entity an opportunity for an independent Forest Service review and resolution of issues before the approval of a plan revision; this subpart identifies who may file objections to a plan revision, the responsibilities of the participants in an objection, and the procedures that apply to the review of the objection. Generally, individuals and entities who have submitted substantive formal comments related to this plan revision during the opportunities for public comment for this decision may file an objection.

It is important that reviewers provide their comments at such times and in such a way that they are useful to the agency’s preparation of the final EIS and proposed revised forest plan. Therefore, comments should be provided before the close of the comment period and should clearly articulate the reviewer’s concerns and contentions. The submission of timely and specific comments can affect a reviewer’s ability to participate in subsequent administrative or judicial review. Comments received in response to this solicitation, including names and addresses of those who comment, will be part of the public record for this proposed action. Comments submitted anonymously will be accepted and considered; however, anonymous comments will not provide the respondent with standing to participate in subsequent administrative or judicial reviews. Comments on the DEIS should be specific and should address the adequacy of the statement and the merits of the alternatives discussed (40 CFR 1503.3)

**Send Comments to:** [colvilleplanrevision@fs.fed.us](mailto:colvilleplanrevision@fs.fed.us)

OR

Amy Dillon, Forest Plan Revision Team  
Colville National Forest  
Colville Supervisor’s Office  
765 South Main  
Colville, Washington 99114  
(509) 684-7280 FAX

**Date Comments Must Be Received:** Within 90 days following publication of the notice of availability of the DEIS in the Federal Register. The notice is expected to be published on or around February 5, 2016; however, it is the commenter’s responsibility to calculate the end of the 90-day period.

# 1 Summary

## 2 Proposed Action

3 The Colville National Forest (or the Forest) proposes to revise its 1988 land management plan (forest  
4 plan). The area affected by the proposal includes about 1.1 million acres of public land. The revised forest  
5 plan would allocate National Forest System (NFS) lands to 13 management areas (MAs) including:  
6 Focused Restoration, General Restoration, Backcountry, Backcountry Motorized, Wilderness-Designated,  
7 Wilderness-Recommended, Eligible and Suitable Wild and Scenic Rivers, Scenic Byways, Administrative  
8 Recreation Sites, and Riparian Management Areas. The proposed MAs represent different management  
9 themes with varying emphasis such as vegetation management, watershed restoration, motorized and non-  
10 motorized recreation, or special designations designed to sustain the social, economic, and ecological  
11 attributes of the Forest.

12 Allocation to a specific MA is not intended to mandate or direct the Forest Service to propose or  
13 implement any action; rather, the MAs provide direction on desired conditions and allowable activities  
14 and uses, as described in the revised forest plan, regarding:

- 15 • Timber harvest/timber production;
- 16 • Commercial and personal use of special forest products and firewood;
- 17 • Fire (planned and unplanned ignitions);
- 18 • Livestock grazing;
- 19 • Motorized use;
- 20 • Mechanized use;
- 21 • Over-snow motor vehicle use;
- 22 • Road construction and reconstruction; and
- 23 • Minerals (leasable and saleable mineral materials).

## 24 Purpose and Need

25 The purpose of the action is to revise the 1988 forest plan for the Colville National Forest. The revised  
26 forest plan would guide natural resource management activities on the Forest, and address changed  
27 conditions and direction that have occurred since the original forest plan (1988 forest plan), while meeting  
28 the objectives of Federal law, regulation, and policy. Specifically, the revised forest plan would provide  
29 management direction for forest resources both forestwide and specific to management areas.

30 Over the 25-year life of the forest plan, economic, social, and ecological conditions have changed. New  
31 laws, regulations, and policies are in place. Congressional direction, court decisions, conservation  
32 agreements, recovery plans, and scientific findings contribute to changed management conditions and  
33 support the need for revision. Endangered Species Act species listings have been updated, and new  
34 information based on monitoring and scientific research is available. Specific need for change topics  
35 include wildlife habitat, vegetative systems, climate change, social systems, and aquatic and riparian  
36 systems.

37 Due to these changed conditions and the age of the forest plan, the Colville National Forest began the  
38 process of revising its plan in 2003. The need for revision is based on legal requirements, changed

39 conditions, and the Analysis of the Management Situation (2015). Revision is also warranted because the  
40 forest plan is beyond the 10- to 15-year duration provided by the National Forest Management Act  
41 (NFMA) (16 U.S.C. 1606(e) (5) (A)).

## 42 Public Involvement

43 The Colville National Forest started forest plan revision in 2003, followed by public participation, which  
44 began in 2004 with community workshops about the need to change the existing forest plan. We held  
45 workshops in communities throughout northeastern Washington, with additional workshops on specific  
46 topics, including wilderness and recreation from 2005 to 2008. Meetings with representatives from local  
47 counties began in 2004, and are being held on a continuing basis throughout the forest plan revision  
48 process. Government-to-government consultation with tribal nations and staff-to-staff consultation with  
49 their resource specialists began early in the process and continues. State agencies are cooperating  
50 agencies. Federal agencies the Forest Service works closely with are the Department of Homeland  
51 Security and the U.S. Fish and Wildlife Service. A 2007 memorandum of agreement with the Washington  
52 State Association of Counties provides a framework for our work with the three local counties. Three  
53 federally recognized tribes have engaged at varied levels: the Colville Confederated Tribes (the Forest's  
54 largest neighbors), and the smaller Spokane and Kalispel Tribes. We held additional meetings with  
55 interest groups, user groups, State and Federal officials, tribal staff, and industry groups.

56 In June 2011, the Forest Service published a combined notice announcing that the proposed actions for  
57 the Colville and Okanogan-Wenatchee National Forests were available for public review and comment.  
58 Public meetings and outreach efforts continued through 2013, based on the information related to both  
59 forests.

60 The 90-day comment period per the 2011 notice drew 27,274 comment letters, of which 889 contained  
61 unique and substantially different comments. We received letters, emails, form letters, and public  
62 comment forms from tribes, individuals, organizations, agencies, businesses, and groups from 15 states in  
63 the United States and British Columbia, Canada; however, this does not include state affiliation for all of  
64 the form letters. We analyzed 3,250 comments from the 889 comment letters to identify the significant  
65 issues driving the alternatives.

66 After the comment period, the regional forester determined that the most effective process to reflect  
67 public input and resource needs was to separate the Colville and Okanogan-Wenatchee National Forests'  
68 plan revision effort. Moving forward from today, the DEIS reflects issues and alternatives specific to the  
69 Colville National Forest only. The Okanogan-Wenatchee National Forest is in the process of developing a  
70 proposed forest plan and completing a separate analysis specific to its resource needs and public input  
71 specific to that forest. All input, including public comments received to date, will continue to be part of  
72 each forest plan revision, as appropriate.

## 73 Significant Issues

74 Six significant issues led to the development of multiple programmatic strategies (or alternatives) for  
75 revising the plan. A summary of these alternatives as well as analysis of the environmental consequences  
76 they pose are the focus of this draft environmental impact statement (DEIS).

- 77 • Old forest (late-successional) management, and timber production
- 78 • Motorized recreation trails
- 79 • Access
- 80 • Recommended wilderness areas

- 81 • Wildlife
- 82 • Riparian and aquatic resource management

83 **Alternatives**

84 The six issues led the agency to develop six alternatives. Table 1 provides a short description of each  
 85 alternative.

86 **Table 1. Short description of alternatives considered in detail**

Alternative	Short Description
1988 Forest Plan – No-action alternative	<p>The “no-action alternative” reflects current management practices under the existing forest plan, as amended and implemented. It provides the basis for comparing the existing condition to the proposed action and the alternatives.</p> <p>If the decisionmaker were to choose to continue to implement the 1988 forest plan versus choosing a revised alternative, interim direction in the Inland Native Fish Strategy for the Intermountain, Northern, and Pacific Northwest Regions (INFISH) and the Management Direction Establishing Riparian, Ecosystem and Wildlife Standards for Timber Sales (Eastside Screens) would be considered final direction for the Colville National Forest (i.e., would no longer be considered interim).</p> <p>Continuing with the current forest plan would provide an annual predicted wood sale quantity (PWSQ) volume of 41 MMBF with an estimated wage contribution of \$19,335,000.</p> <p>There is no recommended wilderness in the 1988 forest plan.</p>
Proposed Action	<p>The June 2011 proposed action addresses the need for change. It applies landscape ecology concepts to provide for ecological resilience to disturbances, including the effects of climate change and incorporates new science related to the recovery of terrestrial and aquatic threatened and endangered species.</p> <p>The overarching emphasis of this alternative would be to apply active vegetation management in a dynamic landscape approach to increase vegetation resilience and move the landscape toward desired conditions. Silvicultural prescriptions such as variable density thinning and free selection would promote structural and landscape complexity on 71 percent of the forest. Planned and unplanned ignitions would be used as management tools across the Forest, but would be emphasized on 30 percent of the Forest.</p> <p>The proposed action would provide an annual predicted wood sale quantity (PWSQ) volume of 62 MMBF with an estimated wage contribution of \$31,224,000.</p> <p>The proposed action would recommend 101,390 acres of additional wilderness and would provide backcountry recreation management emphasis on 14 percent of the Forest.</p> <p>The proposed action adopts the Aquatic and Riparian Conservation Strategy (ARCS), replacing INFISH with a long-term strategy that uses best science and aligns species and water quality recovery plans.</p>
Alternative P	<p>The overall vegetation management approach, outputs in alternative P, and backcountry recreation management would be similar to the proposed action.</p> <p>Alternative P would create the Kettle Crest Special Interest Area (approximately 82,800 acres). This management area allocation would recognize and protect outstanding recreation opportunities in a semi-primitive setting while allowing continued motorized and mechanized recreation opportunities.</p> <p>In response to comments on the proposed action, alternative P would recommend 68,300 acres of wilderness.</p> <p>Like the proposed action, alternative P would adopt ARCS. However, it would also expand the key watershed network, and increase riparian protection through additional plan components (ARCS-modified).</p>

Alternative	Short Description
Alternative R	<p>Alternative R would emphasize a large-scale reserve approach for late-successional forest structure, emphasizing a passive management approach to reach desired conditions. Silvicultural prescriptions such as shelterwood with reserves and variable density thinning would be used on 22 percent of the Forest, in consideration of the 21-inch upper diameter limit on cutting live trees. Planned and unplanned ignitions would be used as management tools across the Forest, but would be emphasized on 75 percent of the Forest.</p> <p>Alternative R would provide an annual predicted wood sale quantity (PWSQ) volume of 14 MMBF with an estimated wage contribution of \$6,692,000.</p> <p>Alternative R would recommend 207,800 acres of additional wilderness.</p> <p>Alternative R would take the same aquatic strategy approach as alternative P through ARCS-modified.</p>
Alternative B	<p>The intent of alternative B is to address the concerns of multiple constituencies in one alternative by balancing land allocations between areas emphasizing active management (timber management zones) (43 percent), emphasizing a mix of active and passive management (Restoration Areas) (31 percent), and emphasizing passive management (recommended and designated wilderness) (23 percent).</p> <p>Alternative B would retain the Eastside Screens, 21-inch upper diameter limit for cutting live trees, and the large-scale reserve approach for late-successional forest structure. It would include additional plan components limit mechanical restoration treatments (timber harvest) in late-successional structure to dry plant association groups only.</p> <p>Alternative B would provide an annual predicted wood sale quantity (PWSQ) volume of 37 MMBF with an estimated wage contribution of \$17,428,000.</p> <p>This alternative would recommend 220,330 acres of additional wilderness and would emphasize non-motorized recreation opportunities.</p> <p>Alternative B would retain and integrate the INFISH, continuing riparian area management similar to the no-action alternative.</p> <p>Where plan components were not identified by the collaborative group, the 1988 Colville Forest Plan (no-action alternative) would provide plan direction (remain unchanged).</p>
Alternative O	<p>Similar to alternative B, the intent of alternative O is to balance land allocations between areas emphasizing active management (Responsible Management Areas) (39 percent), emphasizing a mix of active and passive management (Restoration Areas) (34 percent), and emphasizing passive management (backcountry and recommended/designated wilderness) (25 percent).</p> <p>Alternative O would create the Kettle Crest Special Interest Area. This management area allocation would recognize and protect outstanding recreation opportunities in a semi-primitive setting while allowing continued motorized and mechanized recreation opportunities.</p> <p>Similar to alternative B, alternative O would retain the Eastside Screens, 21-inch upper diameter limit for cutting live trees, and the large-scale reserve approach for late-successional forest structure. It would include additional plan components to limit mechanical restoration treatments (timber harvest) to a one-time entry.</p> <p>This alternative would recommend fewer acres of additional wilderness (15,950 acres) than alternative B, and would instead emphasize backcountry recreation opportunities (21 percent).</p> <p>Alternative O would provide an annual predicted wood sale quantity (PWSQ) volume of 38 MMBF with an estimated wage contribution of \$17,465,000.</p> <p>Where the collaborative group did not identify plan components, the proposed action would provide plan direction. This includes the proposed action's approach to adopt ARCS.</p>

87 All alternatives represent, to varying degrees, the principles of multiple-use, and ecological and economic  
 88 sustainability. The alternatives provide basic protection of forest resources and comply fully with  
 89 applicable laws, regulations, and policies. In addition, all the alternatives would:

- 90 • Meet the purpose and need for change or address one or more significant issues;
- 91 • Conserve soil and water resources and not allow significant or permanent impairment of the  
 92 productivity of the land;
- 93 • Provide protections for riparian areas;
- 94 • Maintain air quality that meets or exceeds applicable Federal, State, and/or local standards or  
 95 regulations;
- 96 • Include measures for preventing the destruction or adverse modification of critical habitat for  
 97 threatened and endangered species;
- 98 • Protect heritage resources;
- 99 • Recognize the unique status of American Indian tribes and their rights retained by trust and  
 100 executive order with the United States, including consultation requirements;
- 101 • Provide sustained multiple uses, products, and services in an environmentally acceptable manner  
 102 (including leasable and locatable minerals, timber, livestock forage, and recreation opportunities);
- 103 • Retain existing designated areas (e.g., wilderness areas, scenic byways, national scenic trails);  
 104 and
- 105 • Retain all existing permitted activities and facilities.<sup>1</sup>

106 The following would not change among alternatives:

- 107 • **Developed Recreation Sites** – Existing developed recreation sites would be retained in all  
 108 alternatives, and no developed recreation sites would be removed or created. Allocation of  
 109 administrative recreation sites would remain constant for all action alternatives.
- 110 • **Eligible Wild and Scenic Rivers** – The two rivers identified as eligible for inclusion in the Wild  
 111 and Scenic River System for the 1988 forest plan (8 miles) are carried forward in this revision effort  
 112 and would not vary by alternative.
- 113 • **Designated Wilderness** – The Salmo-Priest Wilderness Designation would remain constant for all  
 114 alternatives.
- 115 • **Research Natural Areas (RNAs)** – Allocations of RNAs would remain constant for all  
 116 alternatives.

## 117 **Comparison of Alternatives**

118 Chapter 3 presents a detailed description of the effects of the alternatives. Table 2 provides a summary of  
 119 effects by revision topic.

---

<sup>1</sup> All permits will be reviewed for compliance with the revised forest plan. Any permit found to be out of compliance will be brought into compliance as soon as practicable using a variety of tools, including modifications or amendments to the permit.

Table 2. Comparison of some plan revision key indicators

Resource and Indicator	No-action	Proposed Action	Alt. P	Alt. R	Alt. B	Alt. O
<b>Vegetation</b>						
Uses a Fixed Reserves, connectivity corridors and Diameter Limit Management Approach for Managing Late-successional Reserves and Old Forest Habitat Versus Dynamic Landscape Management Approach	Fixed Reserves, connectivity corridors and Diameter Limit	Dynamic Landscape	Dynamic Landscape	Fixed Reserves and Diameter Limit	Fixed Reserves, connectivity corridors and Diameter Limit	Fixed Reserves, connectivity corridors and Diameter Limit
<b>Timber Production<sup>2</sup></b>						
Acres/Percentage Suitable for Timber Production	535,725 48%	653,242 59%	656,628 60%	129,420 12%	384,485 35%	347,535 32%
Acres/Percent Harvest Allowed for Other Resource Objectives	323,025 29%	205,508 19%	202,122 18%	729,330 66%	474,265 43%	511,215 46%
Predicted Wood Sale Quantity <sup>3</sup> MMBF CCF	41 82,800	62 125,900	62 125,400	14 28,900	37 77,000	38 77,000
<b>Roads</b>						
Percent of Forest Suitable for Roads	83%	73%	75%	75%	74%	74%
<b>Recommended Wilderness</b>						
Acres/Percent Recommended for Wilderness	0	101,390 9%	68,300 6%	207,800 19%	220,330 20%	15,950 1%
Designation of Kettle Crest Special Interest Area	No	No	Yes	No	No	Yes
<b>Recreation</b>						
Percent Forestwide Where Roads, Trails, and Areas may be Designated for Motor Vehicle Use	89%	79%	80%	76%	75%	78%
<b>Wildlife</b>						
Old Forest Management Plan Direction Contribution to Viability	Low	Moderate	High	High	Low	Low
<b>Riparian Habitat</b>						
Number of Subwatersheds with Improved Trend	7	12	15	15	15	7

<sup>2</sup> All outputs present in annual measurements

<sup>3</sup> Predicted wood sale quantity includes both commercial and non-commercial (e.g., firewood) wood products sold, on average, per year.

## Table of Contents

### **Volume I: Summary, Chapters 1, 2, and 3 (through Soil Resources)**

Summary .....	iii
Proposed Action .....	iii
Purpose and Need .....	iii
Public Involvement.....	iv
Significant Issues.....	iv
Alternatives .....	v
Chapter 1. Purpose of and Need for Action .....	1
Background .....	1
Development of the Proposed Action.....	2
Planning Area .....	3
Need for Change.....	5
Decision Framework .....	7
Public Involvement.....	14
Chapter 2. Alternatives, Including the Proposed Action.....	29
Introduction .....	29
Development of Alternatives.....	29
Alternatives Considered in Detail .....	30
Alternatives Considered but Eliminated from Detailed Study .....	58
Comparison of Alternatives.....	61
Chapter 3. Affected Environment and Environmental Consequences .....	65
Introduction .....	65
Terrestrial and Aquatic Conditions and Resiliency.....	71
Forest Vegetation .....	71
Botany .....	100
Climate .....	115
Fire.....	126
Invasive Plants.....	149
Fisheries.....	162
Hydrology.....	261
Soil.....	351

### **Volume II: Chapter 3 (Wildlife through Tribal Resources), Chapter 4, Literature Cited, Glossary, Appendices, and Index**

Wildlife .....	377
Social and Economic Conditions.....	491
Economic Resources .....	491
Heritage Resources .....	505
Livestock Grazing .....	518
Minerals and Geologic Resources.....	545
Recreation .....	555
Scenery.....	610
Social Resources .....	642
Tribal Resources .....	676
Chapter 4. Consultation and Coordination .....	685
Literature Cited.....	691
Acronyms .....	739

Glossary .....	743
Appendix A. Public Involvement Summary .....	771
Appendix B. Coordination with Other Public Planning Efforts .....	781
Appendix C. Cumulative Effects .....	823
Appendix D. Relevant Laws, Regulations, Policies, and Agreements .....	833
Index .....	851

### Volume I. List of Tables

Table 1. Short description of alternatives considered in detail .....	v
Table 2. Comparison of some plan revision key indicators .....	viii
Table 3. Short description of alternatives considered in detail .....	30
Table 4. Desired condition for forest structure (percent) .....	34
Table 5. Colville National Forest eligible wild and scenic rivers by segment and classification .....	36
Table 6. Proposed management area (MA) descriptions and percentages of total forest by alternative ....	38
Table 7. Riparian habitat conservation area (RHCA) width .....	45
Table 8. Riparian management area width.....	48
Table 9. Alternative R recommended wilderness .....	54
Table 10. Alternative B recommended wilderness .....	56
Table 11. Comparison of some plan revision key indicators .....	61
Table 12. Structure class definitions based on canopy cover and diameter .....	72
Table 13. Average annual treatment acres modeled by vegetation type and alternative .....	73
Table 14. Vegetation types, Landfire biophysical settings, plant association groups, and approximate total acres .....	74
Table 15. Approximate total current acres in each structure class and vegetation type.....	75
Table 16. Current structure class percentage by vegetation type.....	76
Table 17. Historical range of variability percentages by vegetation type for each structure class compared to current conditions .....	76
Table 18. Modeled forest structure levels at 20 years compared to HRV for all vegetation types and alternatives .....	82
Table 19. Modeled forest structure levels at 50 years compared to HRV for all vegetation types and alternatives .....	83
Table 20. Modeled forest structure levels at 100 years compared to HRV for all vegetation types and alternatives .....	84
Table 21. Total acres of suitable forest land by alternative .....	85
Table 22. Average annual volumes (million board feet (mmbf)) by alternative for the first decade.....	86
Table 23. No-action alternative modeling results (percentage) .....	88
Table 24. Proposed action alternative modeling results (percentage).....	90
Table 25. Alternative R modeling results (percentage) .....	92
Table 26. Alternative P modeling results (percentage).....	94
Table 27. Alternative B modeling results (percentage) .....	96
Table 28. Alternative O modeling results (percentage) .....	99
Table 29. Sensitive plant habitat groups, number of species within each habitat and number of occurrences (sites).....	100
Table 30. Species summary of viability outcomes by alternatives .....	102
Table 31. Resource vulnerabilities on the Colville National Forest .....	124
Table 32. Historic versus current fire return interval.....	127
Table 33. Fire regime groups by vegetation type for the Colville National Forest.....	130
Table 34. Current conditions by vegetation type .....	131

Table 35. Twenty-year predicted average fire regime condition class percent departure by forest type and alternative ..... 135

Table 36. Wildland-urban interface acres unsuitable for mechanical treatment ..... 136

Table 37. No-action alternative predicted departure by vegetation type ..... 136

Table 38. Proposed action alternative predicted departure by vegetation type ..... 138

Table 39. Alternative R predicted departure by vegetation type ..... 141

Table 40. Alternative P predicted departure by vegetation type ..... 143

Table 41. Alternative B predicted departure by vegetation type ..... 145

Table 42. Alternative O predicted departure by vegetation type ..... 147

Table 43. Prediction of Colville National Forest acres of invasive plant infestation ..... 154

Table 44. Index values for soil-disturbing actions that favor invasion by invasive plants for each alternative of the Forest Plan Revision ..... 155

Table 45. Lakes and reservoirs occupied by invasive aquatic species ..... 165

Table 46. Major subbasin hydrologic unit code (HUC) and size ..... 166

Table 47. Summary of listed species, species of concern, and species of interest ..... 175

Table 48. Habitat associations (spawning and rearing) for species-at-risk. .... 176

Table 49. Road attributes categories ..... 182

Table 50. Erosion risk categories ..... 183

Table 51. Final erosion risk categories ..... 183

Table 52. Erosion and sedimentation risk categories ..... 183

Table 53. Total possible score by attribute ..... 185

Table 54. Final aquatic habitat condition rating ..... 185

Table 55. Kettle Interior Redband Subbasin AEC scores ..... 189

Table 56. Kettle Subbasin WSCT AEC scores ..... 189

Table 57. Sanpoil Subbasin WSCT AEC scores ..... 190

Table 58. Sanpoil Subbasin Interior Redband AEC scores ..... 190

Table 59. Pend Oreille Subbasin Bull Trout AEC scores ..... 190

Table 60. Pend Oreille Subbasin WSCT AEC scores ..... 191

Table 61. Colville Subbasin WSCT AEC scores ..... 191

Table 62. Colville Subbasin Interior Redband AEC scores ..... 191

Table 63. Lake Roosevelt Subbasin Interior Redband AEC scores ..... 192

Table 64. Lake Roosevelt Subbasin WSCT AEC scores ..... 192

Table 65. Issues and key indicators for the aquatic habitat and species environmental consequences ..... 196

Table 66. MIS/focal species viability scores ..... 208

Table 67. Management areas that share the same direction across all action alternatives ..... 210

Table 68. No-action management areas by subbasin (acres) ..... 210

Table 69. Riparian habitat conservation area width ..... 213

Table 70. Forest Service contribution to viability (the higher the score the greater the Forest Service Contribution) ..... 214

Table 71. Riparian habitat conservation area width ..... 216

Table 72. INFISH priority and alternative B key watersheds ..... 217

Table 73. Proposed action management area acres by subbasin pertinent to aquatics discussion ..... 220

Table 74. Riparian widths for the proposed action, R, P, and O alternatives ..... 226

Table 75. Proposed action key watersheds ..... 228

Table 76. Proposed action — objectives and projected improvements in key watersheds that are active priorities for restoration ..... 230

Table 77. Alternative R management area acres by subbasin pertinent to aquatics discussion ..... 233

Table 78. Alternatives R, P, O - objectives and projected improvements in key watersheds that are active priorities for restoration ..... 239

Table 79. Key watersheds for alternatives R, P, and O ..... 240

Table 80. Alternative P management area acres by subbasin pertinent to aquatics discussion ..... 243

Table 81. Alternative B management area acres by subbasin pertinent to aquatics discussion..... 247

Table 82. Alternative O management area acres by subbasin pertinent to aquatics discussion..... 251

Table 83. Hydrologic stream classification for the Colville National Forest (Reidy Lierman et al. 2012)  
..... 263

Table 84. Classification, naming conventions, and average size of hydrologic units in the hydrologic unit  
code system..... 265

Table 85. Region, subregions, and basins on the Colville National Forest..... 265

Table 86. Subbasins within the Colville National Forest administrative boundary ..... 265

Table 87. Watersheds within the Colville National Forest administrative boundary ..... 266

Table 88. Results of the watershed condition framework summarized by number of subwatersheds within  
each condition class ..... 269

Table 89. Existing riparian habitat conservation areas (RHCA) acreage on the Colville National Forest  
within the administrative boundary..... 272

Table 90. Riparian and wetland acreage for the Colville National Forest (National Wetlands Inventory)  
..... 273

Table 91. Soil water flow category acreage across the Colville National Forest administrative forest and  
number of springs and seeps within each soil water flow category ..... 274

Table 92. Affects to hydrologic processes from timber harvest, die-off from insect and disease outbreaks,  
and wildland fire (Adams et al. 2012)..... 275

Table 93. Historical range of variability percentage by vegetation type for five structure classes compared  
to current conditions. Values below HRV are shaded in black, values above HRV are shaded in gray  
(Day 2015). ..... 278

Table 94. Miles of road on the Colville National Forest..... 281

Table 95. Subwatersheds categorized by road density and riparian road density ..... 282

Table 96. Number of crossings and relative risk of sediment delivery..... 282

Table 97. INFISH priority watersheds on the Colville National Forest designated at the subwatershed  
scale ..... 284

Table 98. Differences in RHCA widths for INFISH priority and non-priority watersheds ..... 284

Table 99. Focus 5th field watersheds on the Colville National Forest ..... 285

Table 100. Priority watersheds on the Colville National Forest ..... 285

Table 101. Summary of existing priority and focus watersheds ..... 286

Table 102. Crosswalk between subbasins and WRIAs on the Colville National Forest administrative  
forest ..... 287

Table 103. Water quality standards for waters of the Colville National Forest (WAC 173-201A-200) .. 289

Table 104. Miles of stream by pollutant by subbasin on the Colville National Forest under an approved  
TMDL and WQIP, and miles of stream on the current 303d list not specifically covered under at  
TMDL and WQIP (WADoE 2014(a)) ..... 291

Table 105. Certificated water rights and points of diversion in the name of the Colville National Forest\*  
by purpose of use and volume..... 294

Table 106. Certificated water rights within the Colville National Forest administrative boundary in the  
name of others..... 295

Table 107. Dams on the Colville National Forest..... 295

Table 108. Riparian habitat conservation areas width and acreages on the Colville National Forest in no-  
action and alternative B ..... 301

Table 109. INFISH priority watersheds (designated at the subwatershed scale)..... 302

Table 110. Existing management areas and authorization of road building and timber production by  
management area ..... 304

Table 111. Vegetation and structure type within HRV modeled after 100 years of management under the  
no-action alternative..... 305

Table 112. RMA widths and total acreage for the proposed action and alternatives R, P, and O ..... 307

Table 113. Key watersheds in the proposed action..... 309

Table 114. Objectives for key watersheds that are a priority for restoration.....311

Table 115. Existing road density by 5th field watershed for the focused and general restoration management areas under the proposed action .....313

Table 116. Proposed action management areas and activities authorized in each management area that can affect the hydrologic resource .....315

Table 117. Vegetation and structure type within HRV modeled after 100 years of management under the proposed action.....315

Table 118. Key watersheds (subwatershed scale) for alternatives R, P, and O.....319

Table 119. Key watersheds that are priorities for restoration and projected restoration activities based on key watershed objectives that will be completed through the life of alternative R.....321

Table 120. Existing road density by 5th field watershed for the general restoration and late forest structure management areas in alternative R.....324

Table 121. Alternative R management areas and activities authorized in each management area that can affect the hydrologic resource .....326

Table 122. Vegetation and structure type within HRV modeled after 100 years of management under alternative R .....326

Table 123. Comparison of grazing plan components that are different between alternative R and other alternatives (not under INFISH) .....327

Table 124. Existing road density by 5th field watershed for the focused and general restoration management areas in alternative P .....330

Table 125. Alternative P management areas and activities authorized in each management area that can affect the hydrologic resource .....331

Table 126. Alternative B management areas and activities authorized in each management area that can affect the hydrologic resource .....334

Table 127. Vegetation and structure type within HRV modeled after 100 years of management under alternative B .....335

Table 128. Alternative O management areas and activities authorized in each management area that can affect the hydrologic resource .....338

Table 129. Vegetation and structure type within HRV modeled after 100 years of management under alternative O .....338

Table 130. Comparison of key indicators between alternatives .....341

Table 131. Adjudications and surface water limitations for WRIAs on the Colville National Forest .....344

Table 132. Number of applications, claims, certificates, and permits for WRIAs within the Colville National Forest .....346

Table 133. SWE classification and acres of Colville National Forest within each category (Kramer and Snook 2014) .....347

Table 134. Percent change in mean summer flow (cfs) from historic data and perennial stream mileage within each category under the 2040 and 2080 warming scenarios .....347

Table 135. Projected vulnerability of roads within 300 feet of perennial streams for 2040 and 2080 categorized by percent increase in bankfull flows from VIC data .....348

Table 136. Soil orders on the Colville National Forest .....353

Table 137. Droughty soil index for the Colville National Forest .....356

Table 138. Map unit hydric ratings on the Colville National Forest .....356

Table 139. Geologic tree nutrition values for the Colville National Forest .....359

Table 140. Soil carbon densities from research.....360

Table 141. Surface erosion risk .....360

Table 142. Deep-seated landslide risk.....362

Table 143. Shallow rapid landslide risk .....362

Table 144. Area extent of site productivity ratings for Old Forest Management areas by alternative (acres) .....366

Table 145. Area extent of silty ash-cap soils that are sensitive to motorized recreation trails due to bearing strength under higher soil moisture conditions by alternative ..... 369

Table 146. Area extent of soils having different sensitivities to soil displacement by equipment operations due to presence or absence of ash-cap and ash-cap depth by alternative..... 369

Table 147. Area extent of water-storing soils that are sensitive to motorized recreation trails due to soil disturbances that could negatively affect the soil hydrologic function by alternative ..... 370

Table 148. Area extent of soils having different levels of drought stress within riparian and aquatic resource management areas ..... 370

Table 149. Area extent of water-storing soils within riparian and aquatic resource management areas .. 370

### **Volume I. List of Figures**

Figure 1. Colville National Forest vicinity map ..... 4

Figure 2. Hierarchy of management direction for all national forests ..... 9

Figure 3. INFISH Priority Watersheds for no action and alternative B..... 46

Figure 4. Key watershed network under the proposed action ..... 49

Figure 5. Key watershed network under alternatives P, R, and O ..... 52

Figure 6. Approximate current total acres for each vegetation type ..... 75

Figure 7. Total insect and disease activity 1980 to 2013 (acres) ..... 77

Figure 8. Total fire acres on the Colville National Forest 1970 to 2013..... 77

Figure 9. Total forest ecosystem carbon stocks and uncertainty estimates (95 percent confidence level)122

Figure 10. Carbon stock flux and uncertainty estimates (95 percent confidence level) ..... 123