

Pacific Northwest Region

Colville National Forest

Fiscal Year 2014 Forest Plan Monitoring and Evaluation Report



Salmo-Priest Wilderness

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765 S. Main

Colville, WA 99114

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for the greatest good

A message from the Forest Supervisor

I am pleased to present this report documenting the Colville National Forest's monitoring efforts for Fiscal Year 2014. Each year the Forest monitors important components of individual programs, projects, and best management practices to ensure that efforts to manage and restore our national forest lands are successful, and identify where improvements can be made. This report is not a comprehensive list of the monitoring completed, but is a snapshot of our accomplishments. Please contact Holly Hutchinson, Forest Environmental Coordinator, at 509-684-7201 with questions regarding this report.

Thank you,



Rodney D. Smoldon
Forest Supervisor



Date

Colville National Forest Forest Plan Monitoring and Evaluation Report Fiscal Year 2014

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Introduction

The purpose of this report is to provide the results of monitoring the implementation of the 1988 Colville National Forest Land and Resource Management Plan (Forest Plan) during Fiscal Year 2014 (FY '14) (October 1, 2013—September 30, 2014) to the Forest Supervisor, the Regional Forester, and the public.

This report focuses on the monitoring and evaluation process described in Chapter V of the Forest Plan and as updated through Forest Plan amendment and Forest Service direction. It is not intended to be a complete overview of the many accomplishments and activities on the Colville National Forest during this time period.

Summary information for individual monitoring items is located on pages 5 through 12. Some items listed individually in the Forest Plan are grouped together in this report as resource impacts are intertwined.

Acronyms used in this document:

BCME = British Columbia Ministry of Environ.	BMP = Best Management Practices
BMU = Bear Management Unit	FY = Fiscal Year
IDFG = Idaho Fish and Game	IPNF = Idaho Panhandle National Forest
NEPA = National Environmental Policy Act	OHV = Off Highway Vehicle
USFWS = US Fish and Wildlife Service	WDFW = Washington Dept. of Fish and Wildlife

Monitoring Item

The following monitoring items were reviewed as part of existing condition review and effects analysis for projects reviewed under NEPA direction and incorporated into monitoring conducted in combination with other resources during FY '14. Therefore, these resource areas do not have separate discussions in this report.

- Visual Quality
- Soil
- Facilities/Roads
- Cultural Resources
- Minerals

Review of NEPA documents and monitoring conducted by other resource specialists shows that each of the resource areas listed above are meeting standards and guidelines located in the Forest Plan.

General

Project compliance with National Environmental Policy Act (NEPA)

The following information pertains to documents signed and administratively reviewed during FY '14. There were a total of nine NEPA decisions on the Colville National Forest (Colville NF) in FY '14. These decisions did not amend the Forest Plan (total of zero Forest Plan amendments in FY' 14).

Decisions are listed by category in below in Tables 1 and 2. Two objections were filed in FY '14 on Colville NF NEPA decisions, and all decisions were upheld. There was no ongoing litigation or litigation filed in FY '14.

Table 1. Decision Memos, FY '14.

Decision Memos	
Resource Area	Number
Recreation	1
Research and Development	1
Special Forest Products	1
Special Uses	3
Vegetation Management	1
Total	7

Table 2. Decision Notices, FY '14.

Decision Notices	
Resource Area	Number
Recreation Management	1
Fish Habitat/Water Quality Enhancement	1
Total	2

Specific resource monitoring results are displayed under the monitoring items on the following pages.

Fisheries, Water, and Riparian Resources

Monitor habitat capability and productivity for fish species; water quality; management of riparian resources such as wetlands and floodplains

In FY '14, the Colville NF monitored Best Management Practices (BMPs) on 14 Forest projects as part of the USFS National BMP Program¹. Monitoring was conducted to evaluate the implementation and effectiveness of BMPs applied to Colville projects and activities (see Appendix A).

Monitoring described in this report was conducted using protocols developed under the USFS National BMP Program. Specific sites monitored on the Colville NF were selected based on Regional Office guidance and criteria provided in the National BMP Program.

Colville NF sites monitored in 2014 included the following categories. Projects were located in ten separate subwatersheds across three ranger districts on the Forest.

- Water Uses
- Road Management (Active and Completed Road and/or Waterbody Crossing Construction or Reconstruction)
- Rangeland Management
- Vegetation Management (Ground-based Skidding and Harvesting)
- Recreation Management (Trail Construction, Re-routing, and Soil Disturbance Maintenance)
- Fire Management (Use of Prescribed Fire)
- Chemical Uses

Implementation of BMPs: Implementation ratings summarize the percentage of required BMPs from project NEPA documents that were actually implemented on the ground at the site monitored.

¹ <http://www.fs.fed.us/biology/watershed/BMP.html>

Implementation Ratings for 2014²

- | | |
|---|---|
| • Chemical Use (3 sites) | No BMPs |
| • Active Road/Crossing Reconst (1 site) | Fully Implemented |
| • Completed Road/Crossing Reconst (1 site) | Fully Implemented |
| • Use of Prescribed Fire (1 site) | Fully Implemented |
| • Grazing Management (1 site) | Marginally Implemented |
| • Ground-based Harvesting (2 sites) | Mostly Implemented |
| • Recreation/Trails (1 site) | No BMPs |
| • Spring Source Facility Water Uses (4 sites) | Fully Implemented: 3
Marginally Implemented: 1 |



Figure 1. Landing on Kettle Face timber sale.

² For FY '14 ratings were developed by Forest hydrologists using the Region 6 Interim Scoring. National rule sets for rating BMP implementation are in development and can be found at http://www.fs.fed.us/biology/resources/pubs/watershed/FS-1070BMP_MonitoringSummaryReport2015_reduced.pdf. A "No BMP's" rating means that no BMP's were prescribed for a specific project component. Implementation ratings range from fully implemented, mostly implemented, marginally implemented and not implemented.

Effectiveness of BMPs: Effectiveness ratings indicate the level to which BMPs were effective at protecting water quality. In 2014, this rating was determined by addressing the questions of 1) was there unanticipated erosion or release of pollutants at the site monitored? And 2) did pollutant(s) reach the stream?

Effectiveness Ratings for 2014

- | | |
|---|-----------------|
| • Use of Prescribed Fire (1 site evaluated) | Fully Effective |
| • Recreation/Trail Construction (1 site evaluated) | NA |
| • Active Road Crossing Const/Reconst(1 site evaluated) | Fully Effective |
| • Completed Road Crossing Cont/Recont (1 site evaluated) | Fully Effective |
| • Spring Source Water Uses (1 site evaluated- see Figure 3) | Fully Effective |

Wildlife

Monitor habitat for Forest Plan Management Indicator Species, Threatened, Endangered and Sensitive Species

Grizzly Bear

The Colville NF monitored core habitat, open and total road densities, and populations in cooperation with the Idaho Panhandle National Forest (IPNF), Washington Department of Fish and Wildlife (WDFW), Idaho Department of Fish and Game (IDFG) and British Columbia Ministry of Environment (BCME) in FY '14. The Forest also partnered with IPNF and US Fish and Wildlife Service (USFWS) on hair snares (see Appendix C).

Woodland Caribou

Snow Patrols

During the winter of 2013/2014, Forest Protection Officers (FPOs) completed five weekend patrols on snowmobile in the forest's portion of the Selkirk Mountains Woodland Caribou Recovery Area. A biologist with the WDFW participated. The purpose of these patrols is to educate snowmobile riders about the special needs of wintering caribou, and to monitor for snowmobile use on closed roads and areas (see Appendix B).

Snowmobile riding on open roads is not a caribou management concern. Off-road riding on high ridges can bring snowmobiles into contact with wintering caribou. Animals may become stressed if they are approached too closely, causing them to run and deplete energy reserves. Consistent snowmobile use may cause caribou to abandon an entire ridge system.

As in recent years, a small number of illegal entries by snowmobile riders onto Molybdenite Ridge were detected via closed Forest Road 1936010. There were no other known incursions on high ridges in the forest's portion of the recovery area.



Figure 2. South Selkirk Mountains woodland caribou herd.

Caribou population status

In FY '14, biologists with the BCME captured 6 caribou of the South Selkirk Mountains herd and fitted them with GPS collars. The primary intent was to quickly respond to mortality signals from the collars, in order to determine the cause of death. The Colville NF contributed \$1,500 towards the purchase of one collar. BCME biologists counted 18 caribou left in the ecosystem. They also located one confirmed mortality due to wolf predation in the vicinity of Little Snowy Top Mountain, which was unexpected since it was thought that wolves would most likely spend the winter on low-elevation ungulate winter ranges, where prey density should be much higher.

Summary

In FY '14, the Colville NF initiated several projects to determine the effects of harvest activities on various wildlife species. These projects included partnering with Washington State University and Washington Department of Fish and Wildlife to monitor forage for white-tailed and mule deer; monitoring goshawk territories and post-fledging areas; and monitoring for moths, which are important food sources for several sensitive species. The Forest also conducted surveys for:

- Mammals: Wolverines and woodland caribou
- Insects: tawny edged and Peck's Skipper, Eastern tailed blue, and Western bumblebees
- Birds: goshawks, harlequin ducks, North American breeding birds, loon nesting and white-headed woodpeckers.
- Aspen

Additionally, the Colville NF accomplished wildlife habitat improvements on nearly 14,000 acres in FY '14. These habitat improvements are listed below in Table 3.

Table 3. Colville National Forest wildlife habitat improvement projects, FY '14.

Project	Acres
Installed bear-proof food storage lockers at campgrounds	550
Created cavities and snags to mitigate their loss in other areas	1,480
Fenced aspen, riparian areas, meadows, wetlands	1,950
Built and installed nest boxes for flammulated owls	260
Treated to control non-native plants	2,880
Improved habitat for migratory birds by harvest	1,980
Used prescribed fire and harvest to improve big game habitat	2,430
Replanted riparian areas	5
Closed roads to increase seclusion habitat for big game	990
Improved dusky (formerly blue) and spruce grouse habitat	200

Range

Monitoring of range improvements, utilization of forage, and conditions of riparian and range resources

Twenty-five allotments across the Forest were monitored for compliance with annual operating instructions. Items monitored included: utilization, compliance, maintenance of range improvements and BMP monitoring.

Forest and District range management specialists also monitored implementation of requirements that were designated in recent NEPA decisions including placement of water sources (e.g., troughs, see Figure 3), new fence, and installation of hardened crossings. Monitoring occurred between May and October of 2014.

All allotments met conditions as set forth in their respective grazing permit.



Figure 3. Green Springs water development/range improvement.

Timber and Forest Health

Monitor restocking of lands; timber yields; silvicultural practices; special forest product management; and insect & disease presence.

Restocking of Lands

To meet Forest targets and direction from the National Forest Management Act, the Colville National Forest accomplished 486 acres of planting and restocking across the east and west zones in FY '14.

Timber Yields

The Colville National Forest Table 4 shows timber and forest product yields for FY '14³.

Table 4. Timber yields for FY '14.

Firewood Permits Sold	2,049
Miscellaneous Permits Sold	548
Commercial Sales (>\$300 each)	5
Volume Sold (commercial sales MBF)	48,247
Volume Cut (commercial sales MBF)	40,497

³ Timber yields were derived from Forest Service reporting information at <http://www.fs.fed.us/forestmanagement/products/sold-harvest/index.shtml>.

Insect & Disease Monitoring

Presence of insect and disease populations were reviewed through aerial surveys, review of areas being analyzed for vegetation management, and review of areas under vegetation management contracts (see Appendix D).

Mountain pine beetle populations continue to expand on the west half of the Forest. Lodgepole pine is the primary host species, but a few thousand ponderosa pines, a few hundred western white pines and some whitebark pines have also been killed. The outbreak is most severe along the Kettle Crest, and extends west of the crest onto the Republic District. Western spruce budworm defoliation was reported for the third consecutive year on the west half of the forest. Other insect and disease populations are at endemic levels on the Forest.

The primary tree killer on the east half of the forest (Pend Oreille Valley) continues to be mountain pine beetle in lodgepole pine. Mortality due to mountain pine beetle increased in FY '14 compared to previous years. Defoliation by western spruce budworm was reported in all areas on the east half of the forest, with and also increased in FY '14.

Reported damage by bears or root disease increased substantially in FY '14 especially in the Chewelah/49 Degrees North area. Damage was reported on 3,800 acres, and an estimated 11,600 trees killed.

Wilderness, Wild and Scenic Corridors

There were no changes to acres or condition of existing Wilderness or Potential Wild and Scenic corridors.

Appendices

Appendix A. Colville National Forest BMP Monitoring FY 2014

Appendix B. 2014 Woodland Caribou Center of Excellence Accomplishments

Appendix C. Region 6 Wildlife Threatened and Endangered Species Program
Accomplishments Fiscal Year 2014- Colville National Forest

Appendix D. 2013 Insect and Disease Report

Colville National Forest BMP Monitoring -- FY2014

Executive Summary

Introduction

In fiscal year 2014, the Colville National Forest (Colville) monitored Best Management Practices (BMPs) on 14 Forest projects as part of the USFS National BMP Program (USDA 2012). Monitoring was conducted to evaluate the *implementation* and *effectiveness* of BMPs applied to Colville projects and activities. This report summarizes results of all BMP monitoring conducted on the Forest in FY2014.

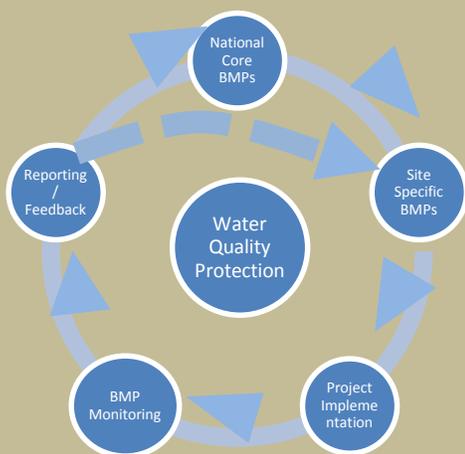
Monitoring Approach

Monitoring described in this report was conducted using protocols developed under the USFS National BMP Program.

Specific sites monitored on the Colville were selected based on Regional Office guidance and criteria provided in the National BMP Program.



Green Spring Water Development/Range Improvement



2014 Monitoring

Colville sites monitored in 2014 included the following categories:

- Water Uses
- Road Management (Active and Completed Road and/or Waterbody Crossing Construction or Reconstruction)
- Rangeland Management
- Vegetation Management (Ground-based Skidding and Harvesting)
- Recreation Management (Trail Construction, Re-routing, and Soil Disturbance Maintenance)
- Fire Management (Use of Prescribed Fire)
- Chemical Uses

Projects were located in ten separate subwatersheds across three ranger districts on the Forest.

2014 Results

1) Implementation of BMPs: Implementation ratings summarize the percentage of required BMPs from project NEPA documents that were actually implemented on the ground at the site monitored.

Implementation Ratings for 2014

- | | |
|--|---|
| • <i>Chemical Use (3 sites evaluated)</i> | <i>No BMPs</i> |
| • <i>Active Road/Crossing Reconst (1 site evaluated)</i> | <i>Fully Implemented</i> |
| • <i>Completed Road/Crossing Reconst (1 site evaluated)</i> | <i>Fully Implemented</i> |
| • <i>Use of Prescribed Fire (1 site evaluated)</i> | <i>Fully Implemented</i> |
| • <i>Grazing Management (1 site evaluated)</i> | <i>Marginally Implemented</i> |
| • <i>Ground-based Harvesting (2 sites evaluated)</i> | <i>Mostly Implemented</i> |
| • <i>Recreation/Trails (1 site evaluated)</i> | <i>No BMPs</i> |
| • <i>Spring Source Facility Water Uses (4 sites evaluated)</i> | <i>Fully Implemented 3</i>
<i>Marginally Implemented 1</i> |

2) Effectiveness of BMPs: Effectiveness ratings indicate the level to which BMPs were effective at protecting water quality. In 2014, this rating was determined by addressing the questions:

- Was there unanticipated erosion or release of pollutants at the site monitored?
- Did pollutant(s) reach the stream?

Effectiveness Ratings for 2014

- | | |
|---|------------------------|
| • <i>Use of Prescribed Fire (1 site evaluated)</i> | <i>Fully Effective</i> |
| • <i>Recreation/Trail Construction (1 site evaluated)</i> | <i>NA</i> |
| • <i>Active Road Crossing Const/Reconst(1 site evaluated)</i> | <i>Fully Effective</i> |
| • <i>Completed Road Crossing Cont/Recont (1 site evaluated)</i> | <i>Fully Effective</i> |
| • <i>Spring Source Water Uses (1 site evaluated)</i> | <i>Fully Effective</i> |

**National rulesets for rating BMP implementation and effectiveness are in development. For this year, ratings were developed by Forest hydrologists using the Region 6 Interim Scoring.*

3) Corrective Action Recommendations: 2 site-specific Corrective Actions were recommended as a result of BMP monitoring:

- Recreation Management: Add slash or other erosion control measure (e.i. wood straw) to exposed slopes and banks where runoff is resulting in erosion into the stream.
- Road Management: Additional armoring needed in ditch.

4) Adaptive Management Recommendations: No Adaptive Management recommendations were made.



Landing on Kettle Face Timber Sale

3) Corrective Action Recommendations: 2 site-specific Corrective Actions were recommended as a result of BMP monitoring:

- Recreation Management: Add slash or other erosion control measure (e.i. wood straw) to exposed slopes and banks where runoff is resulting in erosion into the stream.
- Road Management: Additional armoring needed in ditch.

4) Adaptive Management Recommendations: No Adaptive Management recommendations were made.

Colville National Forest

2014 Woodland Caribou Center of Excellence Accomplishments

SNOW PATROLS: During the winter of 2013 / 2014, Forest Protection Officers (FPOs) completed 5 weekend patrols on snowmobile in the forest's portion of the Selkirk Mountains Woodland Caribou Recovery Area. A biologist with the WA Dept. of Fish and Wildlife participated. The purpose of these patrols is to educate snowmobile riders about the special needs of wintering caribou, and to monitor for snowmobile use on closed roads and areas.

Snowmobile riding on open roads is not a caribou management concern. Off-road riding on high ridges can bring snowmobiles into contact with wintering caribou. Animals may become stressed if they are approached too closely, causing them to run and deplete energy reserves. Consistent snowmobile use may cause caribou to abandon an entire ridge system.

As in recent years, we detected a small number of illegal entries by snowmobile riders onto Molybdenite Ridge, via closed Forest Road 1936010. There were no other known incursions on high ridges in the forest's portion of the recovery area.

VISITOR CONTACT PATROLS: In Fiscal Year 2014, FPOs completed 20 weekend hunter contact patrols in the recovery areas for grizzly bears and caribou. One objective of these patrols is to inform hunters about proper species identification, so a threatened or endangered species is not mistaken for a game animal. We also provide information (including brochures) on caribou ecology and recovery efforts.



Figure 1: South Selkirk Mountains woodland caribou herd. Photo courtesy of Leo DeGroot.



Figure 2. Wolf tracks / beds on ridge system used by caribou. Photo courtesy of Leo DeGroot.

FIRE RETARDANT ASSESSMENT: The forest's east zone biologist completed a biological evaluation of the use of fire retardants to combat wildfires in designated critical habitat for caribou. This report will be folded into an update to the original biological assessment for retardant use on National Forest System lands. The update is necessary due to the subsequent designation of critical habitat for several listed species by the U.S. Fish and Wildlife Service.

CARIBOU POPULATION STATUS: This winter, biologists with the British Columbia Ministry of Environment (BC) captured 6 caribou of the South Selkirk Mountains herd and fitted them with GPS collars. The primary intent is to quickly respond to mortality signals from the collars, in order to determine the cause of death. The CNF contributed \$1,500 towards the purchase of one collar. BC biologists counted 18 caribou left in the ecosystem. They also located one confirmed mortality due to wolf predation in the vicinity of Little Snowy Top Mountain. This was a surprise, since it was thought that wolves would most likely spend the winter on low-elevation ungulate winter ranges, where prey density should be much higher.

Contacts: Mike Borysewicz – 509-446-7532 or
Amy Dillon – 509-684-7211



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Colville National Forest

2014 WL/TES Program Accomplishments

Wildlife Habitat Improvement on nearly 14,000 acres:

Project	Acres
• Installed bear-proof food storage lockers at campgrounds	550
• Created cavities and snags to mitigate their loss	1,480
• Fenced aspen, riparian areas, meadows, wetlands	1,950
• Built and installed nest boxes for flammulated owls	260
• Treated to control non-native plants	2,880
• Improved habitat for migratory birds by harvest	1,980
• Used Rx fire and harvest to improve big game habitat	2,430
• Replanted riparian areas	5
• Closed roads to increase seclusion habitat for big game	990
• Improved dusky (formerly blue) and spruce grouse habitat	200

Monitoring Habitats and Populations:

1. Initiated projects to determine effects of harvest activities on:

- Forage for white-tailed and mule deer with WSU and WDFW.
- Goshawk territories and post-fledging areas.
- Moths, which provide food for several sensitive species.

2. Conducted surveys for:

Mammals: wolverines (with WDFW and Selkirk Conservation Alliance), woodland caribou/winter recreation.

Insects: tawny-edged and Peck's Skipper, Eastern tailed blue, Western bumblebees.

Birds: goshawks, harlequin ducks, North American breeding birds, loon nesting, white-headed woodpeckers.

Aspen via aerial surveys.

3. Monitored for:

- Grizzly bear core habitat/open and total road densities.
- Closed road effectiveness.
- Effects of timber harvest and firewood policy on snags with Student Conservation Association.

4. Supported efforts to monitor for:

- Wolf/livestock interactions (WSU, WDFW).
- Caribou mortality (WDFW, IDFG, FWS, BC Min. of Envir., IPNF).
- Grizzly bear populations and habitat use (WDFW, IDFG, FWS, BC Ministry of Environment, IPNF).
- Grizzly bears using hair snares (IPNF, USFWS).
- Common loon wintering areas (Biodiversity Research Inst.).
- Mollusks (IDFG 's Multispecies Baseline Initiative).

Information and Education:

- Presented 14 Nature Watch programs with over 900 participants (topics from grizzly bears to pollinators).
- Developed website on pollinators in NE WA with Slow Foods.
- Created pamphlet on pollinator conservation for NE WA.
- Initiated citizen science project on bumblebees found in NE WA.
- Wrote article on effects of "mudding" on the environment.
- Developed food storage requirements for activities in grizzly habitat.

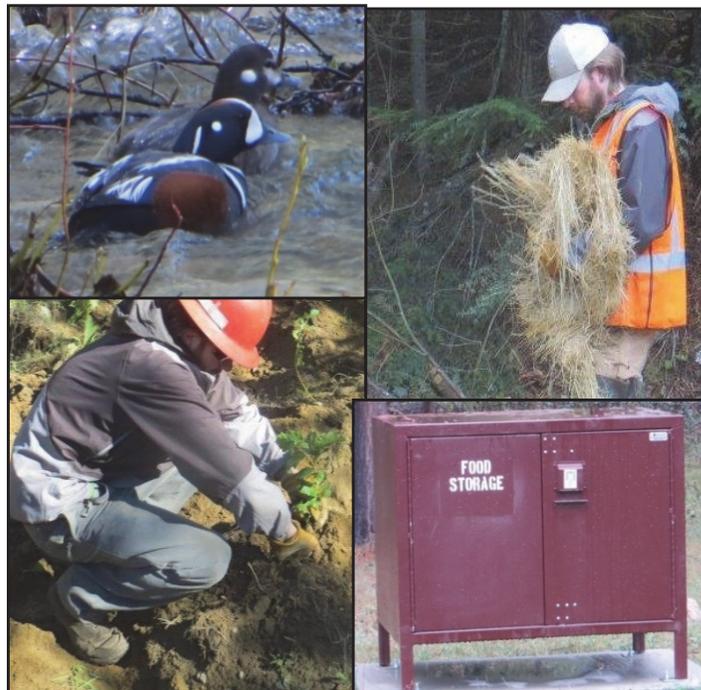


Figure 1. Harlequin ducks, replanting, and food storage lockers

2014 Accomplishments

Acres	Code	Activity
597	BDBD	Brush disposal/Fuels treatments
2057	CFLN	Collaborative Landscape Restoration
295	CWFS	Riparian planting
418	CWKV	KV wildlife improvements
3211	NFWW	Invasive weeds treatments
3606	NFWF	Wildlife improvements
10	SRS2	Title II
2755	SSCC	Stewardship contracting
484	WFHF	Fuels treatments
535	NFXN	Partnerships (includes NFXN)

Indispensable Partners/Cooperators:

Washington State University, Washington Dept. of Fish and Wildlife, Idaho Fish and Game, US Fish and Wildlife Service, British Columbia Ministry of the Environment, Biodiversity Research Institute, Slow Foods Upper Columbia Chapter, Boy Scouts of America Chewelah, Seattle City Lights, Rocky Mountain Elk Foundation, Selkirk Conservation Alliance, Student Conservation Association, various individuals.

Contact: Chris Loggers, 509-738-7727



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Appendix D. 2013 Insect and Disease Report



United States
Department of
Agriculture

Forest
Service

Wenatchee
Forest Insect &
Disease Service
Center

Forestry Sciences Lab
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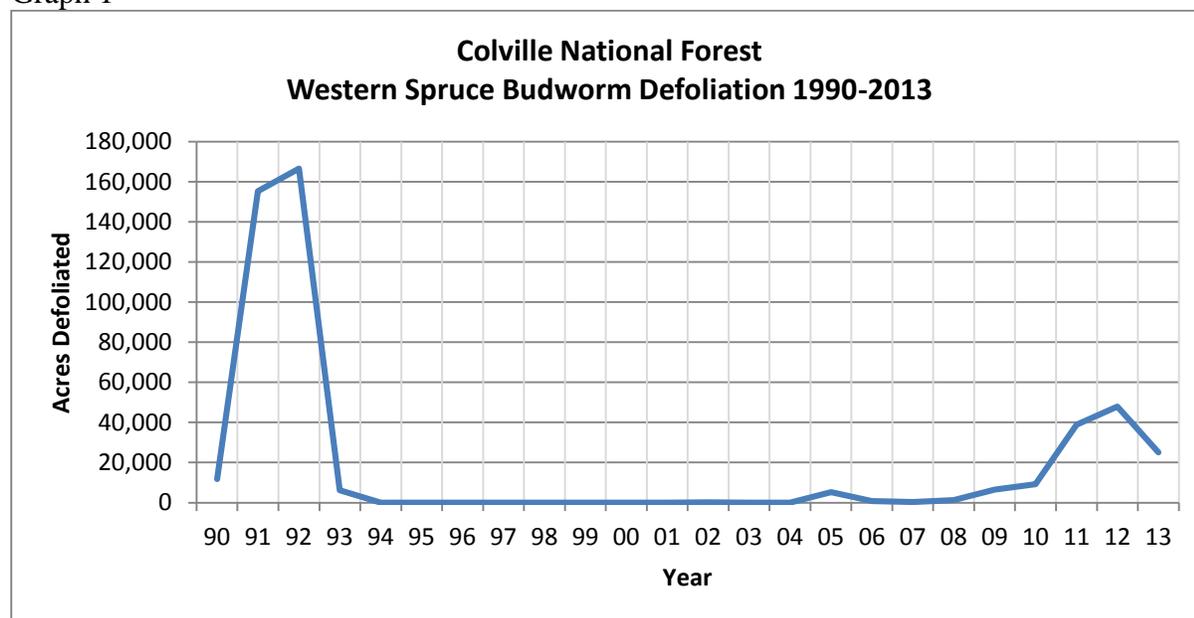
March 27, 2014

Analysis of 2013 Aerial Survey Data Western Spruce Budworm, Douglas-fir Beetle and Pine Beetle Activity Colville National Forest

The Colville National Forest covers an area of 1,389,073 acres. About 2% of this land, or 31,439 acres, is Congressionally-designated wilderness. The Wenatchee Forest Insect and Disease Service Center has analyzed data produced by the 2013 aerial survey in order to provide Forest managers with an overview of the impacts of defoliation and bark beetle activity. Aerial survey can give valuable information regarding the activity of damaging agents at the time of the flight. This report describes the extent of those insects which are causing the most rapid changes in forest structure.

Defoliation by **western spruce budworm** has been reported every year since 2008 (Graph 1). Western spruce budworm is a moth that feeds on conifer needles during its larval (caterpillar) stage. The caterpillars prefer to feed on grand fir and Douglas-fir, but will also feed on spruce, subalpine fir and western larch. Generally only the new foliage is consumed. Three consecutive years of heavy defoliation can kill trees outright. Trees that are not killed become susceptible to bark beetle attacks. Western spruce budworm outbreaks last from seven to ten years or more. Defoliation on the neighboring Tonasket District of the Okanogan-Wenatchee National Forest has been reported for the last seven years.

Graph 1

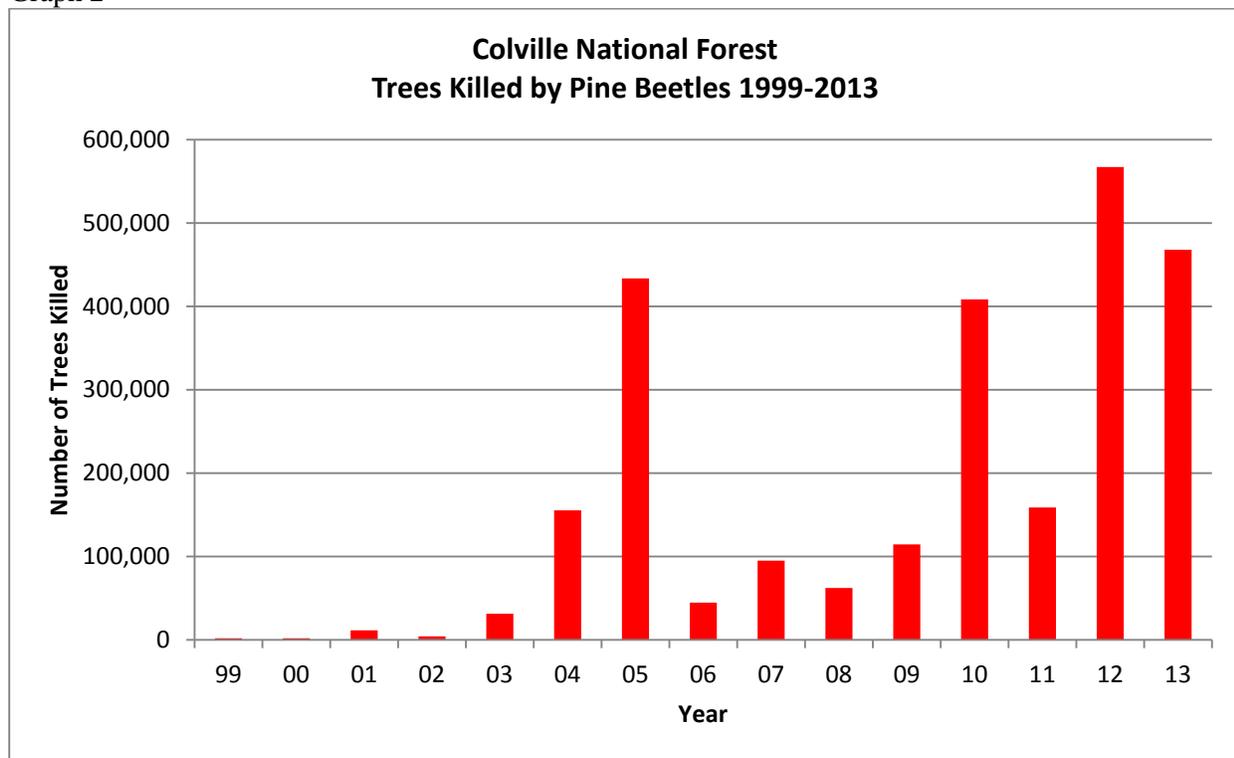


Outbreaks of western spruce budworm are cyclic, as shown in Graph 1. While populations of this insect inevitably rise and fall, certain forest conditions tend to favor outbreaks. Outbreaks are sustained when there are extensive areas of dense, multi-storied host. Open stands with a mix of host and non-host species are less likely to experience outbreaks, and sustain less damage during outbreak periods.

Since 2009, a total of 96,572 acres were defoliated to some extent by western spruce budworm, with the most extensive defoliation occurring on the Republic District. In 2013 there were 8,744 acres of defoliation mapped on the Republic District, 6,655 acres on the Three Rivers District, and 9,600 acres on the Pend Oreille Valley Districts.

Mountain pine beetle populations have been active on the Forest since about 2003. In 2013 aerial survey mapped about 28,000 acres of damage. An estimated 487,850 pines were killed (Graph 2). The most extensive damage was reported on the Three Rivers District.

Graph 2



Mountain pine beetles can attack and kill many species of pines, but are most closely associated with lodgepole pine. Lodgepole pine stands that are older than 80 years, with an average dbh of eight inches or greater are highly likely to experience outbreaks. Additional risk factors are basal area over 120 square feet per acre, and low elevation.

When a mountain pine beetle outbreak occurs in a lodgepole pine stand, the beetles preferentially attack the largest diameter trees. Over the course of an outbreak, 85% or more of the large diameter trees will be killed, and progressively smaller proportions of the small diameter trees (Cole and Amman 1980).

Densely-stocked young ponderosa pine stands are also likely to experience outbreaks. Thinning can reduce the proportion of a stand that will be killed by beetles, but stocking must be reduced enough to be

effective. A light thinning in small diameter stands may just hasten the development of 8-inch diameter trees without keeping densities below a beetle susceptibility threshold (Cochran and Barrett 1998).

This summary is not intended for use in specific project planning. Managers should be aware that some insect or disease conditions are difficult to detect during aerial survey and may not appear on aerial survey maps. Dwarf mistletoe is generally not detected, and light defoliation may not be visible from the air. Wenatchee Forest Insect and Disease Service Center personnel are available to assist with insect or disease identification, management recommendations and project assistance upon request.

Connie Mehmel
Forest Entomologist

References

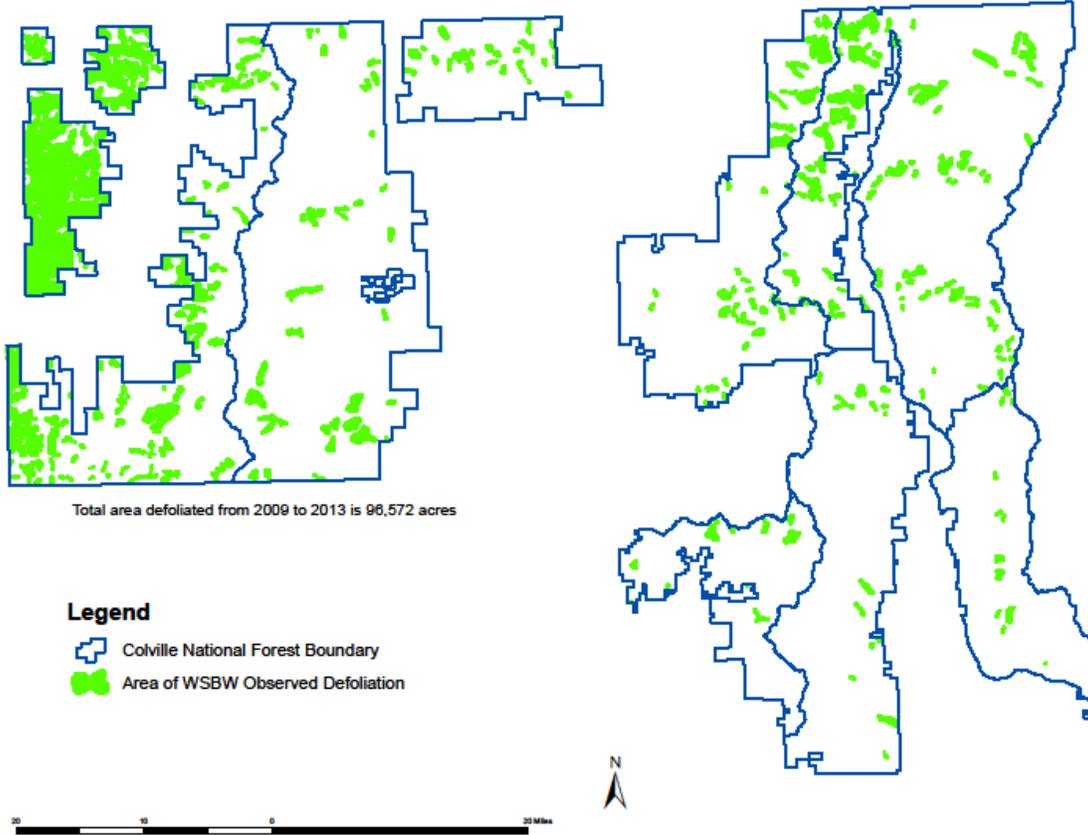
Cochran, P.H. and Barrett, J.W. 1998. Thirty-five-year growth of thinned and unthinned ponderosa pine in the Methow Valley of northern Washington. Res. Pap. PNW-RP-502. USDA For. Serv. PNW Research Stn. Portland OR. 24 p.

Cole, W.E. and Amman, G.D. 1980. Mountain pine beetle dynamics in lodgepole pine forests Part 1: Course of an infestation. USDA For. Serv. Gen. Tech. Rep. INT-89. Intermt. For. and Range Exp. Stn. Ogden UT 84401. 56 p.

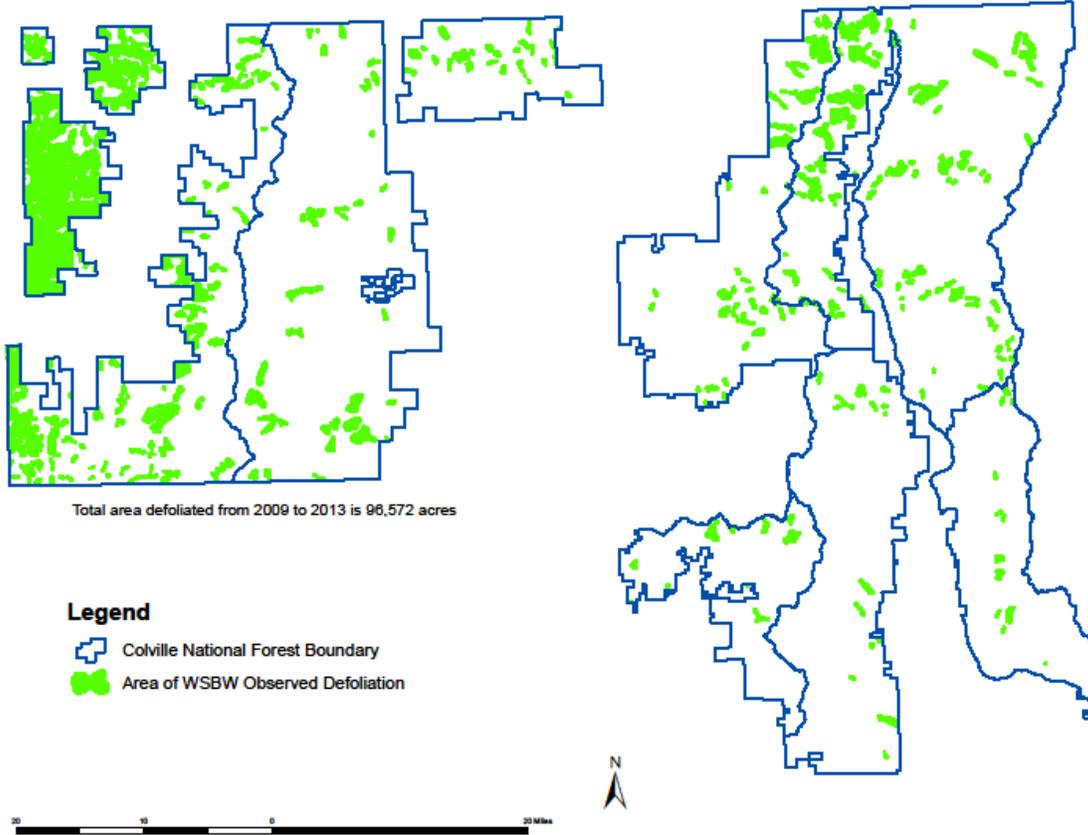
Maps Attached: Western Spruce Budworm Defoliation 2009-2013
Western Spruce Budworm Defoliation 2013 only
Mountain Pine Beetle Mortality 2009-2013
Mountain Pine Beetle Mortality 2013 only

Copies to: Laura Jo West, Forest Supervisor
Cathleen Ward, Natural Resources Staff
Jon Day, Forest Silviculturist
Mark Loewen, Forest Plan Silviculturist
Franklin Pemberton, Public Affairs Officer
Tom DeSpain, Geneticist

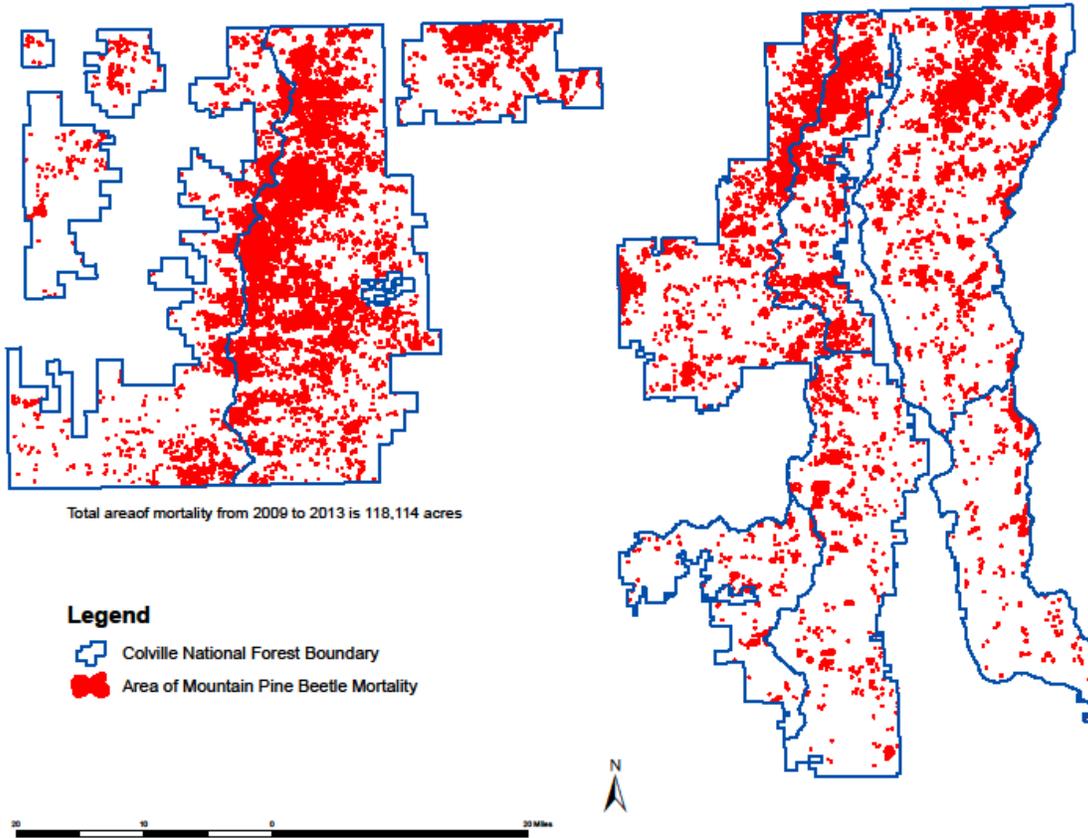
Aerial Survey Observed Western Spruce Budworm Defoliation from 2009 to 2013



Aerial Survey Observed Western Spruce Budworm Defoliation from 2009 to 2013



Aerial Survey Observed Mountain Pine Beetle Mortality from 2009 to 2013



Aerial Survey Observed Mountain Pine Beetle Mortality in 2013

