

FINAL REPORT



Northeast Washington Forestry Coalition Monitoring Project

Ferry & Stevens County Stewardship Project Monitoring & Adaptive Management

NO. NFS 05-DG-1106210012 Modification No. 2

Start Date: 3/21/2005

End Date: 12/31/2008

Burnt Valley Stewardship Project

Barnaby/Bangs Mountain Stewardship Project

December, 2008

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SUMMARY

The Northeast Washington Forestry Coalition (NEWFC), with funding from a Title II grant, conducted third party monitoring on two stewardship projects on the Colville National Forest (CNF), Sept 2007 - Dec 2008; Burnt Valley WUI in Stevens County, and Barnaby/Bangs WUI in Ferry County.

NEWFC developed a monitoring protocol collaborating with Colville National Forest staff, and soliciting input from the Stevens County and Ferry County Conservation Districts. NEWFC Board approved Protocol 4-22-2008. (Appendix A)

A third-party consultant, Williamson Consulting, submitted a plan of work, and was hired to do the field work over the summer. Field plot measurements were completed by 9-30-2008. Dick Dunton, NEWFC Monitoring Project Coordinator, worked with the field staff to develop plot measurement protocol, and review data.

Field tours were conducted Oct 7, 2008 on the Burnt Valley WUI project; and Oct 8, 2008 on the Bangs Mtn. WUI project. NEWFC members, Colville National Forest staff, and interested public participated in the review and discussions.

Burnt Valley Conclusions: This had been the first project NEWFC and CNF had collaborated on, from the beginning. The agreed upon prescription were diameter limits by species. Field plot data confirmed the diameter limits by species were followed. The commercial thinning, pre-commercial thinning, and follow up mechanical treatments, with some prescribed burning, did reduce ground and ladder fuels, increased crown spacing, and reduced the wildfire threat to adjacent private property and homes. The diameter limits rules were somewhat difficult to deal with forest health and crown closures issues, leaving areas with high basal area, and inter tree competition. (See Appendix B)

Bangs Mtn. Conclusions: Lessons from Burnt Valley resulted in NEWFC and CNF collaboration using a commercial thinning target basal area of 80, where greater than 80 BA existed prior to operations. Natural openings, smaller diameters, and forest health issues

precluded some units of averaging the target BA to begin with. Field plot data showed 11 units (49%), were within 10% (72 BA), or greater of the target. Units BA plot data varied from 0 to 220. The field tour visited units with post operation average BAs of 52, 85, and 38. Consensus was all three units met the objectives of fuels reduction, reduce crown closure, reduced crown bulk density, reduced forest health risk; and spacing (BA) was acceptable for these stands. Clumping was a desirable objective, Marking Rules directing implementation. Plot data described 8 units as clumpy, and the field tour showed some visual success. There were no created openings noted, however natural openings in some units were noted. (See appendix C)

Adaptive Management: NEWFC developed the "Interim Guidance for Thinning Overstocked Stands" dated May 19, 2008, (post Bangs Mtn. collaboration), with target Post-Treatment Stand Density Index (SDI). This SDI table, for the Dry Ponderosa Pine and Dry Douglas Fir, Plant Association Groups (PAG), has been reviewed in light of the Bangs Mtn WUI results. Overall, post harvest SDI data is lower than the target SDI thinning targets. NEWFC is subsequently reviewing/modifying the Post-Treatment SDI Table.

Future Monitoring Needs:

1. A major focus of this monitoring project was prescription compliance. Did the CNF accomplish what they said they would do? Which they did! Future monitoring needs to continue effectiveness monitoring, with more emphasis on quantifying fire behavior effects.
2. Determine post-harvest Crown Bulk Density (CBD) as a measure of wildfire susceptibility. Future collaboration will focus on BA, SDI and CBD relationships. Monitoring process should include CBD calculations, with personnel being trained and accessing FVS/FFE program.
3. This monitoring protocol may be more appropriate for regeneration harvests, in identifying openings.
4. Sampling density needs to reflect unit size. Select representative sample units for project, not necessarily the total project

TABLE OF CONTENTS

SUMMARY

VICINITY MAP

Section 1 INTRODUCTION

Section 2 PURPOSE

Section 3 PROCESS

Section 4 BURNT VALLEY PROJECT -
Scope and purpose
Report

Section 5 BANGS MOUNTAIN/BARNABY PROJECT -
Scope and purpose
Report

Section 6 CONCLUSIONS

Section 7 RECOMMENDATIONS

APPENDIX A: Monitoring/Collaboration Protocol

APPENDIX B: Burnt Valley Plot Summary
Burnt Valley Plot Table

APPENDIX C: Bangs Mtn. Plot Summary
Bangs Mtn. Plot Table

APPENDIX D: Field Plot Card

APPENDIX E: Bangs Mtn. Silvicultural Prescription Card and
Marking Guide

APPENDIX F: Bangs Mtn. Pre-Post Data

APPENDIX G: Burnt Valley Stand Tables

APPENDIX H: Bangs Mtn. Stand Tables

APPENDIX I: Bangs Mtn. Tree Heights and Crown Ratios

Section 1 INTRODUCTION

The Northeast Washington Forestry Coalition (NEWFC), with funding from a Title II grant, conducted third party monitoring on two stewardship projects on the Colville National Forest (CNF), Sept 2007 - Dec 2008; Burnt Valley WUI in Stevens County, and Barnaby/Bangs WUI in Ferry County.

NEWFC developed a monitoring protocol collaborating with Colville National Forest staff, and soliciting input from the Stevens County and Ferry County Conservation Districts. NEWFC Board approved Protocol 4-22-2008. (Appendix A)

A third-party consultant, Williamson Consulting, submitted a plan of work, and was hired to do the field work over the summer. Field plot measurements were completed by 9-30-2008. Dick Dunton, NEWFC Monitoring Project Coordinator, worked with the field staff to develop plot measurement protocol, and review data.

This Title II grant-funded project will accomplish four objectives:

- I. Develop monitoring protocol for Colville National Forest Stewardship projects.
- II. Monitor two completed Stewardship projects in both Ferry and Stevens Counties.
- III. Collaborate with National Forest staff to design future projects and to improve these projects based on what was learned during the monitoring process.
- IV. Provide education/information by organizing tours of these projects for the public and interested groups.

Section 2 PURPOSE

I. The monitoring protocol will be developed through collaboration between NEWFC, Colville National Forest, Ferry Conservation District and Stevens County Conservation Districts. The grant proposal time line states September and October 2007 for accomplishing this task. These dates were reviewed and revised during the Oct. 23, 2007 NEWFC meeting. The monitoring protocol will identify the quantifiable and measurable items needed to:

- Determine if the Stewardship projects reduced the fire risk to communities;
- Provided jobs and raw materials for local industry;
- Supported the county fire plan;
- Verify the successes; and
- Identify areas, issues, opportunities for improving future Stewardship projects.

More specifically, the protocol will:

- Provide an unbiased, documented third-party data collection that will inspire confidence in the collaborative process
- Compare National Forest pre-project prescriptions and data to field collected data
- Map and identify plot locations within project units with GPS and GIS
- Identify species and number of trees remaining in various size classes

II. NEWFC will hire a third-party consultant to collect field data for the Bangs and Burnt Valley WUI projects. The Consultant will complete field data collection no later than September 1, 2008 and will allow a minimum of 3.5 months for data analysis.

III. The third-party consultant will participate in collaborative data analysis for both projects. The consultant will provide monthly written progress reports to the NEWFC and a comprehensive Final Report. NEWFC Monitoring/Collaboration Title II Grant ends December 31, 2008.

Information on the Bangs WUI project in Ferry County and the Burnt Valley WUI project in Stevens County will be used for adaptive management in future projects on the Colville National Forest such as the Malo East Lake project and or the Pierre Summit Project.

IV. The NEWFC Education and Outreach Committee will develop an outreach plan that will include:

- a power-point presentation
- photos
- maps
- news releases
- tours for the public, special interest groups, local, state, and national elected officials, and additional groups interested in the collaborative process.

Section 3 PROCESS

Plots were spaced around the units with a 4-chain by 5-chain grid, (4 chains between plots and 5 chains between lines) this allowed a plot to be taken for every two acres. The lines of the grid were arranged either north and south or east and west. A ribbon was placed at plot center on a broken twig or stick in the ground. At eye level near the plot center a ribbon was hung that identified which plot, line, and unit the plot center represented, the date that the plot was created, and the initials of cruiser or cruisers that created the plot. Ribbons that identified line, unit, cruiser and date were also hung at the beginning and end of each line so the plots could be more easily found again later.

At each plot the corresponding plant association group was identified, and a marker was taken with a hand held GPS unit to know the latitude and longitude of the plot center. Four pictures were taken at every twentieth plot, one north, south, east, and west. There was at least one picture plot per unit, and no more than 1 picture plot per 20 plots on the larger units.

At plot center a 1/20th acre fixed radius plot with a 26.3-foot radius was taken to attain the tree count for trees 1" in diameter at breast height (dbh) and larger. For each tree in the tree count; species, diameter at breast height, total height, and percent live crown ratio was recorded. Tree heights and crown ratio estimates were not recorded on the Burnt Valley project because a PNW study was in place to sample for pre and post treatment conditions.

A 1/100th acre fixed plot was also taken at plot center to determine the number of seedlings per acre. These being trees less than 1" dbh.

Basal area per acre was determined at each plot, using a variable radius plot with a 20 basal area factor, taken at each plot center. The average basal area on each plot is equal to the number of trees considered "in" on the plot multiplied by a factor of 20.

Stand density index was determined at each plot using a stand density index table. The stand density index table uses trees per acre and the average stand diameter. These two values were both taken from the 1/20th acre fixed radius plot. Trees per acre is equal to the number of trees on the plot multiplied by 20, and the average stand diameter is the average of the diameters of the trees on the plot.

Observations were made regarding the plant association group present on the plot, and the treatment that was implemented, or deviations from the prescription (trees harvested that are greater than 22" DBH, or, openings greater than 1 acre).

A sample plot card is presented as Appendix D.

Section 4 BURNT VALLEY PROJECT - **Scope and purpose**

The Burnt Valley Wildland Urban Interface Project

The purpose of this proposed project is to carry out fuels reduction treatments within the Burnt Valley Wildland Urban Interface (WUI) project area using mechanical fuel treatment (778 acres), prescribed fire (1,531 acres), and, in some cases, a combination of both.

Treatments will be designed to:

- Reduce the risk of undesirable impacts of wildland fire to public and private lands within the project area.
- Provide safety for firefighters undertaking wildland fire suppression operations in the wildland urban interface.

Fuels reduction treatments will decrease the intensity of surface fire behavior and minimize the potential for high-intensity crown fires by:

- Reducing surface forest fuel loading.
- Reducing ladder fuels
- Reducing the number of trees with inter-locking crowns that contribute to crown-fire initiation and crown-fire spread.
- Maintaining forest stand conditions that favor fire-resistant tree species in short interval and mixed severity fire regimes.

The need for this project results from a high level of growth in the wildland urban interface that is placing more citizens and property at risk, and there is also an increasing ecosystem health problem across the landscape. Because of fire suppression and past logging techniques, tree stands around the interface have become overstocked and susceptible to stand-replacement wildfires.

Burnt Valley was chosen as a high priority area because:

- It was identified through a collaborative process with the Colville Forestry Coalition.
- It fit the Colville National Forest and Forest Service Washington Office definition for WUI.
- The project is funded through the implementation phase.
- The Colville National Forest Leadership Team identified it as a high priority project.
- Treatment areas are in a Condition Class 2 or 3.

(NOTE: See Decision Memo Burnt Valley WUI, Annex A)

Report

Northeast Washington Forestry Coalition Monitoring Project Burnt Valley Stewardship Project

533 acres of the Burnt Valley timber sale were monitored. 252 plots were taken. Each plot consists of a GPS point, DBH size and number of trees per acre, basal area, stand density index, observations of plant association group, and the treatment that was implemented (fire) or deviations from the prescription (trees harvested that are greater than 22" DBH, or, openings greater than 1 acre). See Burnt Valley maps 1 and 2.

There was little mortality from burning in the units that were burned. Most of the mortality caused by fire was in the regeneration and saplings, and in trees that were too close to a large slash pile.

No stumps from apparently oversized trees were observed. No created openings that were larger than one acre were observed.

The average Basal Area (BA) and average Stand Density Index (SDI) was quite consistent, however there was some variation in the spacing or trees per acre (TPA), meaning the average size of the trees in each stand was variable. This appears to be largely due to whether the treatment applied was a commercial or pre-commercial thinning (the two pre-commercially thinned units have substantially more trees per acre).

There was often more than one plant association group (PAG) found in a unit. In this case the best plant association group, or combination of plant association groups were chosen that best describe the unit.

Summary information is presented as Appendices B and G.

Section 5 BANGS MOUNTAIN/BARNABY PROJECT - **Scope and Purpose**

The Barnaby Thinning Project (Barnaby)

The purpose of the **Barnaby** project is to improve stand health by managing tree density and species composition. Need for action in this area results from overstocked stands of natural vegetation prompted by increased bark beetle activity successfully attacking and killing forest trees in the area. Silvicultural objectives are accomplished by low-impact, commercial thinning of live trees on up to 70 acres.

The Bangs Wildland Urban Interface (Bangs WUI)

The purpose of **Bangs WUI** is to reduce the risk of wildland fire to public and private lands adjacent to the project area, and to provide safety for firefighters undertaking wildland fire suppression operations. The need for action in this area results from a high level of vegetation growth in the area. The area is also a popular recreational area for both dispersed recreation and developed recreation at Lake Ellen campground and the Bangs Mountain scenic drive. Because of fire suppression and past logging techniques the fuel loadings and vegetative growth have increased and the risk for fire to burn uncontrollably through the forest is high. Because of the forest fuel characteristics, high recreational use and proximity to private land and homes the Bangs area is placing more citizens and property at risk of wildland fires.

All fuels reduction treatments focus primarily on three key objectives:

- Decrease the amount of dead and down material on the ground;
- Increase crown base height by decreasing ladder fuels;
- Reduce crown bulk density within the canopy.

(NOTE: See Decision Memo Bangs WUI/Barnaby, Annex B)

Report

Northeast Washington Forestry Coalition Monitoring Project
Bangs Mountain Stewardship Project

810 acres of the Bangs Mtn. timber sale were monitored. 404 plots were taken. See Bangs Mountain maps 1 and 2.

Burning has not yet been implemented on this project and so there was no mortality due to fire. However some dead trees and snags were found, the causes of these deaths are unknown or vary from plot to plot. No stumps from apparently oversized trees were observed. No created openings that were larger than one acre were observed.

The average Basal Area (BA) and average Stand Density Index (SDI) were reflective of one another (high basal areas usually meant high stand density index), but there was some variation in the spacing or trees per acre (TPA), meaning the average size of the trees in each stand was variable. Also this is an indication of whether the treatment applied was a commercial or pre-commercial thinning.

There was often more than one plant association group (PAG) found in a unit. In this case the best plant association group, or combination of plant association groups were chosen that best describe the unit.

Summary information is presented as Appendices C, H and I.

Section 6 CONCLUSIONS

The Monitoring/Collaboration objectives as defined in the approved Protocol were accomplished as follows:

1. The monitoring protocols were developed collaboratively by NEWFC and USFS personnel, over several meetings, reviewing five drafts. The final draft was reviewed and brief to the Stevens County and Ferry County Conservation Districts Board of Supervisors.
2. Two CNF Stewardship projects were monitored: Burnt Valley in Stevens county, and Barnaby/Bangs Mtn. in Ferry county.
3. Collaboration with the CNF staff and NEWFC has continued with Malo East Lake, and Summit-Pierre projects, using lessons learned from these monitored projects.
4. Two tours, one on each project, were organized. Additional tours will be held as public interest indicates.

Additionally, the monitoring did quantify:

- These Stewardship Projects did reduce the risk to communities by reducing fuel loading, ladder fuels, and crown fire potential, as measured by BA reduction and limited CBD calculation.
- Vaagen Brother Lumber purchased both of these projects timber. Logging contractors were hired to log, haul, and accomplished the fuels reduction work. Forestry labor firms also were used in the fuel reduction work. In total approximately 1418 loads of material were removed from these projects. This provided many months of employment for 30 people as well as providing a substantial amount of material to support local industrial infrastructure. Bangs Mtn. project also had bio-fuels removed and delivered to the Avista Kettle Falls generation facility.
- These Stewardship Project areas were identified in each respective County's Community Wildfire Protection Plan as Wildland Urban Interface needing fuels reduction.

The tour attending consensus was both projects were successful in meeting objectives:

- Meeting collaboration prescriptions.
- Fuels reduction - high likely hood of controlling ground fire
- Reduced crown closure - low probability of sustained crown fire
- Reduced Crown Bulk Density - low probability of sustained crown fire
- Reduced forest health risk - adequate spacing for tree vigor

Section 7 RECOMMENDATIONS

1. Future third party monitoring needs to go beyond prescription compliance, diameter limits and target BA; and look more in depth at effectiveness. We started this to some degree by comparing NEWFC's target SDIs and post harvest SDIs. A better understanding of CBDs is needed to determine on the ground applications, necessary to adequately modify fire behavior. The indicators from reduced BA, SDI, and CBD needs to be quantified, in order to determine if there is adequate reduction of wildfire risk and condition class.

2. Subsequent projects proposals are including current condition CBD calculations, with proposed CBD target levels. Future monitoring needs to quantify the actual CBD change by running the field data through FVS/FFE. We relied on the CNF staff for the few post-harvest CBDs, for this monitoring project. We need to have monitoring personnel trained and able to access the FVS/FFE program, in order to adequately evaluate this element.

3. The monitoring protocol addresses the measures necessary to identify and map openings, size, and locations. This would be more applicable with a regeneration harvest prescription. Neither Burnt Valley nor Bangs Mtn. had a regeneration prescription, nor created opening.

4. Sampling Density (1 plot per 2 acres) was designed to sample, and identify openings across the entire project. Sampling density needs to reflect unit size. Cost constraints might it more efficient to select representative sample units for the project, not necessarily the total project.