

V(A). Planned Program (Summary)

Program # 9

1. Name of the Planned Program

Climate Change: Forest Management

Reporting on this Program

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
112	Watershed Protection and Management	10%		0%	
122	Management and Control of Forest and Range Fires	15%		0%	
123	Management and Sustainability of Forest Resources	40%		30%	
131	Alternative Uses of Land	10%		0%	
132	Weather and Climate	5%		0%	
211	Insects, Mites, and Other Arthropods Affecting Plants	0%		20%	
213	Weeds Affecting Plants	5%		20%	
215	Biological Control of Pests Affecting Plants	5%		30%	
216	Integrated Pest Management Systems	10%		0%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2013	Extension		Research	
	1862	1890	1862	1890
Plan	3.3	0.0	1.2	0.0
Actual Paid Professional	3.5	0.0	1.8	0.0
Actual Volunteer	0.0	0.0	0.0	0.0

2. Actual dollars expended in this Program (includes Carryover Funds from previous years)

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
90222	0	79746	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
90222	0	79746	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
74885	0	889900	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

As part of our investment in Climate Change and Sustainable Energy, a major effort for the Forest Management Team has been continuing participation in a regional NARA Biofuels project (led by Washington State University).

In 2013, programs delivered for loggers included a beginning LEAP course in Coeur d'Alene and LEAP updates in six other communities. Extension also is a contributing partner on the Idaho Pro Logger Steering Committee.

Programs for forest owners included the Forestry Shortcourse (in two communities) the Idaho Master Forest Stewards program. As part of the Idaho Forest Stewardship program, UI Extension provided a series of workshops, field days and other educational activities titled "Strengthening Forest Stewardship Skills" designed to strengthen forest owners' ability to improve forest health and growth. These included numerous workshops about using GPS technology, measuring trees, forest insects and diseases, root diseases, and other forest health topics. Significant emphasis was placed on Firewise (and other fire prevention programs), including numerous workshops and supervision of a new Firewise intern.

Panhandle forest owners can choose from over 140 forestry Extension publications available through local UI Extension offices. Extension videos on water quality, "selective" logging, and forest tax management, and can access archived Woodland Notes articles, a database of consulting foresters, links to relevant websites, and a variety of other useful information on the UI Extension Forestry Web site, maintained by Extension forestry staff on the UI Moscow campus.

UI Extension collaborated with most Idaho forest products companies that participate in the "Sustainable Forestry Initiative" (SFI), a national effort of the American Forest and Paper Association. Partially stimulated by SFI, a statewide logger education committee recently developed the Idaho "Pro-Logger" program, administered through the Associated Logging Contractors of Idaho (ALC). Among other standards, the Pro-Logger credential requires participation in LEAP and 16 credits of continuing education annually. With the increased emphasis on providing educational opportunities for loggers, Extension has worked to integrate logger education needs into other education programs as well.

The Forest Management Team delivered a variety of programs that are not unique to any particular audience. These included a variety of workshops and presentations about invasive species, using GPS, and fire prevention and recovery.

2. Brief description of the target audience

The primary audiences for this topic team are family forest owners, loggers and natural resource professionals. Expansion of audiences for 2013 will include outreach to fire and emergency professionals, landscape architects, Master Gardeners, teachers, and youth.

3. How was eXtension used?

eXtension was not used in this program

V(E). Planned Program (Outputs)

1. Standard output measures

2013	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	4904	153926	1110	2300

2. Number of Patent Applications Submitted (Standard Research Output)

Patent Applications Submitted

Year: 2013
 Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2013	Extension	Research	Total
Actual	2	6	8

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Number of workshops, field days, etc.

Year	Actual
2013	36

Output #2

Output Measure

- Number of participants in workshops, field days, etc.

Year	Actual
2013	1043

Output #3

Output Measure

- Number of articles in popular and trade press.

Year	Actual
2013	14

Output #4

Output Measure

- Number of web site "hits".

Year	Actual
2013	14784

Output #5

Output Measure

- Continuing Education hours for foresters, loggers, & other natural resource Professionals.

Year	Actual
2013	2203

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	O: Other scientists are aware of our research findings. I: Number of refereed scientific journal articles.
2	O: An increase in the number of trained graduate students prepared to enter the workforce. I: Number of M.S. and Ph.D. candidates relevant to this topic team.
3	Outcome (fire): Forest owners, managers, green industry professionals, and fire and emergency services personnel will be knowledgeable about and adopt best management practices that increase the health and safety of their forests and decrease catastrophic risk from wildfire in wildland and urban/interface areas. Indicator: Numbers of stakeholders indicating they will adopt recommended practices
4	Outcome (biomass): Sustainable, economically viable ecosystems that are compatible with current environmental and social issues will benefit Idaho landowners and small business entrepreneurs by the increased utilization of forest biomass. Indicator: Numbers of stakeholders indicating they will adopt recommended practices that increase biomass utilization leading to increased value of biomass harvested.
5	Outcome (forest health): Knowledge about insect and disease outbreaks and awareness of the effects of climate change on forest ecosystems increases use of recommended best management practices that benefit Idaho forests by increasing the quality and/or quantity of timber, wildlife habitat, and air and water and air quality. Indicator: Numbers of participants that have indicated they will adopt recommended practices
6	Foresters and other natural resource professionals have knowledge consistent with current scientific understanding and emerging technologies.; Number of natural resource professionals demonstrating increase in knowledge related to specific forest science and technology topics.
7	Loggers operate using recommended forest management practices (e.g., monitor for insect, disease, or animal damage).; Numbers of LEAP Update participants indicating they will adopt specific improved forest management practices.
8	Loggers possess credentials required by forest industry to conduct business.; Number of loggers who complete continuing education requirements.

Outcome #1

1. Outcome Measures

O: Other scientists are aware of our research findings. I: Number of refereed scientific journal articles.

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	2

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

A changing set of factors is influencing Idaho's forests at a scale that some argue is unprecedented in the modern era. Much of the Western United States has experienced drought for the past 10 years. Changing climate has increased mean summer and winter temperatures above those in recorded history. Invasive exotic species have altered the species composition of landscapes. These are just a few of the factors altering forest susceptibility to insects and pathogens. For example, insects and pathogens alter fire regimes, and with increased temperature and drought, they facilitate an increase in the number, size and severity of forest fires.

What has been done

Characterization of the role of biotic and abiotic factors in predisposing trees to bark beetle attack and subsequent mortality have been examined. In Idaho, we are continuing to examine tree community regeneration following mountain pine beetle and white pine blister rust infestations/infections in higher elevation whitebark pine stands. Forest managers who are interested in maintaining whitebark pine are being kept apprised of regeneration of this pine species along with potential changes in forest composition through a combination of tree mortality and up-slope range expansion by other tree species present on the sites (primarily lodgepole pine, spruce, subalpine fir and Douglas-fir).

Results

We completed analysis on examining the use of systemic insecticides to manage ponderosa pine cone beetle (and other insect pests) in conifer seed orchards. Spring and fall bole injections of two systemic insecticides are providing effective as a management tool against not only the ponderosa pine cone beetle, but also fir coneworm. The results of the injection project resulted in two refereed publications.

4. Associated Knowledge Areas

KA Code	Knowledge Area
123	Management and Sustainability of Forest Resources
131	Alternative Uses of Land

Outcome #2

1. Outcome Measures

O: An increase in the number of trained graduate students prepared to enter the workforce. I: Number of M.S. and Ph.D. candidates relevant to this topic team.

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	1

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Bur chervil has been found in every plant community that comprises the Palouse Prairie suggesting a serious threat to one of the most threatened systems in North America. The purpose of this project is to gain insight into the biology and management of bur chervil.

What has been done

Several studies were completed including a demography study of bur chervil conducted across several plant community types within canyon grassland systems in Northern Idaho.

Results

The demography of bur chervil has been incorporated into learning objectives for an undergraduate and graduate course on Invasive Plant Biology. Plant demography is an important concept to communicate to students and our work on bur chervil provides a local sophisticated example for the use of plant demography to address management goals. John Wallace complete his Ph.D. on plant demography of bur chervil and the modeling of source and sink dynamics.

4. Associated Knowledge Areas

KA Code	Knowledge Area
123	Management and Sustainability of Forest Resources

- 211 Insects, Mites, and Other Arthropods Affecting Plants
- 213 Weeds Affecting Plants
- 215 Biological Control of Pests Affecting Plants

Outcome #3

1. Outcome Measures

Outcome (fire): Forest owners, managers, green industry professionals, and fire and emergency services personnel will be knowledgeable about and adopt best management practices that increase the health and safety of their forests and decrease catastrophic risk from wildfire in wildland and urban/interface areas. Indicator: Numbers of stakeholders indicating they will adopt recommended practices

Not Reporting on this Outcome Measure

Outcome #4

1. Outcome Measures

Outcome (biomass): Sustainable, economically viable ecosystems that are compatible with current environmental and social issues will benefit Idaho landowners and small business entrepreneurs by the increased utilization of forest biomass. Indicator: Numbers of stakeholders indicating they will adopt recommended practices that increase biomass utilization leading to increased value of biomass harvested.

Not Reporting on this Outcome Measure

Outcome #5

1. Outcome Measures

Outcome (forest health): Knowledge about insect and disease outbreaks and awareness of the effects of climate change on forest ecosystems increases use of recommended best management practices that benefit Idaho forests by increasing the quality and/or quantity of timber, wildlife habitat, and air and water and air quality. Indicator: Numbers of participants that have indicated they will adopt recommended practices

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
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2013

0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Forty-four percent of the Idaho Panhandle forests are held and managed by 46,993 family forest owners. Since 1987, the average annual timber harvest from these forests was valued at over \$100 million milled. With a better working knowledge of forest ecology, silviculture, and related forest management techniques, family forest owners can sustainably produce more wood and biomass and simultaneously improve forest health, water quality, wildlife habitat, and other forest values.

What has been done

As part of the Idaho Forest Stewardship program, UI Extension provides an annual series of workshops, field days and other educational activities designed to strengthen forest owners' ability to implement practices that improve forest health and growth (titled Strengthening Forest Stewardship Skills). We also train and manage 'Idaho Master Forest Stewards' - volunteers who get 70 hours of training to provide a variety of outreach efforts and undertake leadership activities.

Results

In 2013, 532 owners of over 103,000 family forest acres attended UI Extension workshops and other educational activities in the Idaho panhandle. Based on evaluation results: 207 will monitor for insect, disease, or animal damage; 163 will favor tree species that resist insects & disease; 153 will reduce unwanted vegetation; 118 will monitor/manage weedy non-native species; 84 will thin forest trees; 49 will plant forest tree seedlings 39 will put together a team of professional advisors for a family forest succession plan 38 will prepare a family forest succession plan 36 will complete a forest management plan; and 36 will apply pesticides more safely. The improved management practices family forest owners implement as a result of knowledge and skills gained in UI Extension programs will ultimately increase wood and biomass to fuel Idaho's economy, maintain water quality, reduce catastrophic fire risk, improve forest growth and health, and enhance biological diversity.

4. Associated Knowledge Areas

KA Code	Knowledge Area
112	Watershed Protection and Management
122	Management and Control of Forest and Range Fires
123	Management and Sustainability of Forest Resources
131	Alternative Uses of Land
132	Weather and Climate
213	Weeds Affecting Plants
215	Biological Control of Pests Affecting Plants
216	Integrated Pest Management Systems

Outcome #6

1. Outcome Measures

Foresters and other natural resource professionals have knowledge consistent with current scientific understanding and emerging technologies.; Number of natural resource professionals demonstrating increase in knowledge related to specific forest science and technology topics.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	189

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Foresters and other natural resource professionals must continually stay current with emerging scientific and technological developments to practice sustainable forestry. UI Extension is uniquely situated to provide local continuing education opportunities for field foresters. K-12 teachers must also stay updated and are continually looking for local opportunities to hone their skills. They also value research-based sources of forestry education to integrate into their classrooms.

What has been done

University of Idaho Extension and Washington State University Extension cooperate to hold an annual forum for consulting foresters, state-employed service foresters, and other natural resource professionals working with family forest owners. Other efforts involve adjusting programs developed for forest owners or other groups to simultaneously meet foresters' or teachers' needs as well (e.g. offering UI credit for the Forestry Short course).

Results

One hundred sixteen foresters and other natural resource professionals attended UI Extension forestry programs in the Idaho Panhandle in 2012-2013, for 764 contact hours. Participants in the 2013 Family Forester's Workshop, indicated percentage knowledge increases ranging from 12-67% on: using biomass to create jet fuel, forest carbon management/monitoring, planted tree seedling survival, soils and timber harvesting, forestry apps for smartphones, tablets; bull trout and cutthroat trout habitat, and family forest economics/policy. Three panhandle teachers took the Forestry Short course for credit in 2012-2013. Some teachers have used the short course to develop innovative high school forestry classes.

4. Associated Knowledge Areas

KA Code	Knowledge Area
112	Watershed Protection and Management
123	Management and Sustainability of Forest Resources
211	Insects, Mites, and Other Arthropods Affecting Plants
216	Integrated Pest Management Systems

Outcome #7

1. Outcome Measures

Loggers operate using recommended forest management practices (e.g., monitor for insect, disease, or animal damage).; Numbers of LEAP Update participants indicating they will adopt specific improved forest management practices.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	211

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Loggers are a critical link in forest management. Unfortunately, if communication between landowners, loggers, or foresters is inadequate, the resulting timber or biomass harvests may not meet expectations. To the extent forest certification programs require trained loggers, UI Extension logger training efforts are vital to helping Idaho forest product companies maintain or increase Idaho's share of global markets for certified wood products.

What has been done

Logger Education to Advance Professionalism ('LEAP') features over 20 hours of training designed to increase loggers' understanding and skills related to forest ecology, silviculture, and water quality. LEAP Update is an annual 2-day program where loggers learn about current forestry issues and meet Idaho Pro-Logger program annual credit requirements. Through these and other programs, UI Extension provided 1,436 continuing education hours for Panhandle loggers in 2012-2013.

Results

Nearly 1,000 loggers have attended the 42 Idaho Panhandle LEAP sessions offered since 1994. As a result of the three Idaho Panhandle LEAP Update sessions held in 2013: 145 loggers will recognize potential issues with bark beetles and tussock moth, 145 will recognize and respond to

stem decay issues, 118 will reduce transport of problem insects in firewood, 129 will apply silvicultural practices to lodgepole pine, 146 will protect forest soils during harvest operations, 133 will prepare for forest certification audits, 151 will protect water quality during harvest operations. As of 2013, 618 loggers are enrolled and 388 loggers are accredited in the Idaho Pro-Logger program. Through communication from these loggers, this knowledge will also reach landowners, who will ultimately increase wood and biomass to support Idaho's economy, while maintaining water quality, improving forest health, and enhancing biological diversity.

4. Associated Knowledge Areas

KA Code	Knowledge Area
112	Watershed Protection and Management
123	Management and Sustainability of Forest Resources
211	Insects, Mites, and Other Arthropods Affecting Plants

Outcome #8

1. Outcome Measures

Loggers possess credentials required by forest industry to conduct business.; Number of loggers who complete continuing education requirements.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	448

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Loggers are a critical link in forest management. Partially stimulated by SFI, the Idaho logger education committee developed the Idaho Pro-Logger program, administered through the Associated Logging Contractors of Idaho (ALC). The Idaho Pro-Logger credential requires LEAP and 12 credits of continuing education annually.

What has been done

Logger Education to Advance Professionalism ("LEAP") features over 20 hours of training designed to increase loggers' understanding and skills related to forest ecology, silviculture, and water quality. LEAP Update is an annual 2-day program where loggers learn about current forestry issues and meet Idaho Pro-Logger program annual credit requirements. Through these and other programs, UI Extension provided 1,436 continuing education hours for Panhandle

loggers in 2012-2013.

Results

As of 2013, 618 loggers are enrolled and 388 loggers are accredited in the Idaho Pro-Logger program. These loggers are qualified to conduct business and to sell forest products to mills in the State of Idaho.

4. Associated Knowledge Areas

KA Code	Knowledge Area
112	Watershed Protection and Management
123	Management and Sustainability of Forest Resources
211	Insects, Mites, and Other Arthropods Affecting Plants

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Natural Disasters (drought, weather extremes, etc.)
- Economy
- Public Policy changes
- Government Regulations
- Populations changes (immigration, new cultural groupings, etc.)

Brief Explanation

{No Data Entered}

V(I). Planned Program (Evaluation Studies)

Evaluation Results

One hundred sixteen foresters and other natural resource professionals attended UI Extension forestry programs in the Idaho Panhandle in 2013, for 764 contact hours. Participants in the 2013 Family Forester's Workshop indicated percentage knowledge increases ranging from 12-67% on: using biomass to create jet fuel, forest carbon management/monitoring, planted tree seedling survival, soils and timber harvesting, forestry apps for smartphones, tablets; bull trout and cutthroat trout habitat, and family forest economics/policy. Three panhandle teachers took the Forestry Shortcourse for credit in 2012-2013. Some teachers have used the shortcourse to develop innovative high school forestry classes.

Key Items of Evaluation