

V(A). Planned Program (Summary)

Program # 5

1. Name of the Planned Program

Economic Development with Emphasis in Rural Areas

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			2%	
122	Management and Control of Forest and Range Fires			6%	
401	Structures, Facilities, and General Purpose Farm Supplies			6%	
601	Economics of Agricultural Production and Farm Management			7%	
605	Natural Resource and Environmental Economics			2%	
607	Consumer Economics			5%	
608	Community Resource Planning and Development			65%	
803	Sociological and Technological Change Affecting Individuals, Families, and Communities			5%	
903	Communication, Education, and Information Delivery			2%	
	Total			100%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2013	Extension		Research	
	1862	1890	1862	1890
Plan	0.0	0.0	1.0	0.0
Actual Paid Professional	0.0	0.0	2.0	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
0	0	90543	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
0	0	126680	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
0	0	0	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

Addressing the Rural Development Concerns of the Rural West

Alternative Energy: A cost-budget simulation model for geothermal and solar has been developed using stochastic feasibility analyses of clean energy projects, providing results more unique for the Nevada topology, and interaction of public lands. The first set of simulations are now completed for Nevada's White Pine County and delivered to Western Rural Development Center's director to formulate new plans to disseminate results and procedures.

Passive Income Trends - Removing Cattle from Public Lands: Simulation models (GAMS) were developed to predict "Net Income Flows" for rural Nevada ranchers under different wildfire scenarios, as well as cattle herd reductions to accommodate Sage Grouse habitat.

Rural private landowners Wildfire Risk Management

NAES researchers conducted a survey of over 2,000 households, developed a dataset of spatially explicit defensible space along the wildland-urban interface across 35 communities in Nevada, produced a second dataset based upon survey responses, and created quantitative economic model for evaluating risk that is spatially dependent utility that estimates the likelihood of defensible space investment given these differences in wildfire risk as well as the levels of neighboring defensible space investments.

Exploring the Economic Outcomes of Transitioning from Desirable to Undesirable Ecological States on Nevada Rangelands

Last year's activities included the development of an economic simulation model based on dynamics from ecological state and transition models to estimate the expected value of wildfire suppression costs as sagebrush/Pinyon -Juniper woodland ecosystems evolve over time with and without fuels treatments. This allows the difference to be used as an estimate of the net returns from fuels treatments. Investigators continued to develop this model, working with scientists at the Center for Ecological Restoration at Northern Arizona University for application to fuels treatments versus restoration for Ponderosa Pine. Plus, the NAES team collaborated with systems ecologists to investigate how the use of quantifiable systems approaches to model how management effort can alter the trajectory of ecosystems. This enables the coordination with an integrated market and non-market approach to generate estimates of the value of these changes to society.

Lake Tahoe Regional Economic Evaluation

An investigation team has just begun the first of its kind ecosystem "non-market" evaluation of the Lake Tahoe Basin. Initial steps have been taken to form a consensus on both input and acceptance by the

seven governing bodies of the region. A preliminary survey has been developed based upon regional inputs to keep the Tahoe basin health.

Evaluating the Economic Impact of University Run Meat Plant

A community meeting discussed the future of the University's meat plant with University personnel, livestock producers, representatives of government agencies, chefs, retailers, restaurateurs, and consumers. UNR economists developed a feasibility assessment of the meat plant under continued University ownership, private ownership, and cooperative ownership, along with an impact assessment UNR's meat plant had on the region. Two surveys were developed to ascertain demands for regional meat CSA or meat buying clubs, and consumer preferences for direct marketing enterprises. A financial statements survey was conducted to help regional livestock producers better understand the cost and technical characteristics associated with running small-scale meat plants.

2. Brief description of the target audience

Local ranchers & producers, educators, community leaders, State & Federal decision/policy makers and development agencies.

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	70	0	0	0

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	0	3	0

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Peer reviewed scientific journal articles, publications on economic development , presentations at scientific meetings, presentations at stakeholder, Native American, health care organizations, agency and local government meetings.

Year	Actual
2013	0

Output #2

Output Measure

- Newsletters Produced
Not reporting on this Output for this Annual Report

Output #3

Output Measure

- Web Sites Created or Updated

Year	Actual
2013	1

Output #4

Output Measure

- Number of Graduate Students or Post-Doctorates Trained

Year	Actual
2013	3

Output #5

Output Measure

- Leveraged Research Projects

Year	Actual
2013	114529

Output #6

Output Measure

- Manuals and other printed instructional materials produced
Not reporting on this Output for this Annual Report

Output #7

Output Measure

- Number of Undergraduate Students Involved in Research

Year	Actual
2013	2

Output #8

Output Measure

- Workshops, Demonstrations, and Presentations

Year	Actual
2013	14

Output #9

Output Measure

- Abstracts, Books, Book Chapter(s), Proceedings, Research Reports, and Technical Publications

Year	Actual
2013	1

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Peer reviewed scientific journal articles, publications on economic development, presentations at scientific meetings, presentations at stakeholder, Native American, health care, agency and local government meetings,
2	Economic Impacts of Developing Clean Energy on Western Rural Areas
3	Motivation For Private Landowner Investment To Reduce Risk And Costs Of Rangeland Wildfires In Nevada
4	Establishing The Economic Efficiency Of Pre-Fire Fuel Treatments

Outcome #1

1. Outcome Measures

Peer reviewed scientific journal articles, publications on economic development, presentations at scientific meetings, presentations at stakeholder, Native American, health care, agency and local government meetings,

Not Reporting on this Outcome Measure

Outcome #2

1. Outcome Measures

Economic Impacts of Developing Clean Energy on Western Rural Areas

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

With increasing fuel prices and the desire for energy independence, clean or green energy as an energy source has become a target for national and regional economic development. However deriving the costs of these new clean energy sources and technologies and accompanying economic impacts have been somewhat ignored.

There are national models (JEDI) which can use to derive direct expenditures for various clean energy sources and then estimate regional economic, employment, and employment impacts. However, the JEDI model is limited and has not been used for all sources of clean energy and does not avail itself to changes due to unique local conditions. For Nevada the JEDI model is quite limited and does not cover geothermal sources. Developing Nevada cost-budget models for geothermal and solar would provide budget model results more unique for the Nevada topology, interaction of public lands, and more precise input-output models.

What has been done

A Monte Carlo simulation model procedure was developed that can be employed for stochastic feasibility analysis of cost-budgets for geothermal and solar clean energy projects. The NAES's

team from the University Center for Economic Development completed a feasibility analysis for five hypothetical clean energy projects in White Pine County, Nevada.

Results

Nevada's White Pine County was the subject of the first clean energy simulations. All pertinent information garnered for this project's financial analysis have been passed on the White Pine's county commissioners. The results of these clean energy studies has provided educational background to White Pine County decision makers as to financial considerations for actual clean energy projects in solar photovoltaic and wind powered systems. These results were also shared with Utah State's Western Rural Development Center for use in other western states.

4. Associated Knowledge Areas

KA Code	Knowledge Area
608	Community Resource Planning and Development
903	Communication, Education, and Information Delivery

Outcome #3

1. Outcome Measures

Motivation For Private Landowner Investment To Reduce Risk And Costs Of Rangeland Wildfires In Nevada

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Evidence suggests that private sector under-investment in reducing wildfire risk and cost leads to excess wildfire suppression costs. These costs fall on public firefighting agencies and the general tax base that supports them. The excess cost for already limited agency resources causes a drain or "crowding out" of programs and activities that would otherwise manage rangelands for wildfire resilience. Research shows that greater levels of private effort can reduce wildfire risk and costs of fire suppression. This project investigated what motivates private property owners to take fire-safe actions in Nevada.

What has been done

First, the team analyzed how a homeowner's decision to invest in defensible space is influenced by the predominant vegetation in their community. Second, the team used the between and within community variation in homeowner wildfire risk to analyze whether homeowners' investments in defensible space reflect an understanding of how their wildfire risk is determined by factors such as community firefighting resources and the biophysical determinants of wildfire hazard in the vicinity of their property. Third, the team examined the importance of risk externalities in defensible space investment by analyzing how homeowner investment in defensible space is influenced by neighbors' investments in defensible space. Finally, for communities where risk externalities are present, the team investigated whether differences in predominant vegetation cause defensible space investments to be an increased benefit in certain communities and decreased benefit in others.

Results

This is the first study that we are aware of that analyzes how homeowner incentives to invest in defensible space and, by extension, the appropriate policy to encourage homeowner investment in defensible space differs between communities depending on predominant vegetation type.

Our results suggest that wildland fire policy to promote defensible space should focus on financial and regulatory barriers to investment in defensible space, rather than on educational programs, and that tipping policies to encourage early adopters to invest in defensible space may be appropriate in communities where the majority of homeowners have not invested in defensible space and whose predominant vegetation suggests the presence of strategic complementarities.

Analyzing homeowner incentives to invest in defensible space in the presence of wildfire risk allows policy makers to draw conclusions that are applicable to other natural disasters, such as earthquakes, extreme temperatures, floods, landslides, and windstorms (tornados, hurricanes, etc.), where individuals can make investments to mitigate material damage from the disaster.

4. Associated Knowledge Areas

KA Code	Knowledge Area
122	Management and Control of Forest and Range Fires
601	Economics of Agricultural Production and Farm Management
605	Natural Resource and Environmental Economics
608	Community Resource Planning and Development

Outcome #4

1. Outcome Measures

Establishing The Economic Efficiency Of Pre-Fire Fuel Treatments

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Wildfire suppression costs in the United States have increased steadily over the last decades with related annual expenditures by the U.S. Forest Service and Bureau of Land Management exceeding a billion dollars in four out of the seven years leading up to 2006. This steady increase in wildfire suppression costs is believed to be due in part to a century of U.S. federal wildfire policy that has emphasized wildfire suppression and post-fire vegetation rehabilitation over pre-fire fuel management treatments.

Pre-fire fuel management treatment is recognized as an important tool to reduce the frequency of severe wildfires, and thus the expected costs of damages and wildfire suppression, and to maintain ecosystem health. Public agency efforts and expenditures, however, continue to emphasize wildfire suppression and post-fire rehabilitation over pre-fire fuel treatment. The continued focus on wildfire suppression and rehabilitation may be partly explained by the lack of empirical work establishing the economic efficiency of pre-fire fuel treatments

What has been done

The research team developed a simulation model to evaluate the economic efficiency of fuel treatments and apply it to two sagebrush rangeland ecosystems in the Great Basin of the western United States. This was specially designed to simulate long-run wildfire suppression costs with and without fuel treatment. The team then analyzed the economic efficiency of fuel treatment for Wyoming Sagebrush Steppe and Mountain Big Sagebrush ecosystems in the Great Basin.

Results

This project has produced an analytical tool that can be applied to evaluating the economic efficiency of fuel treatment in many ecological settings. To our knowledge, this project provides the first estimates of the economic efficiency of fuel treatment for rangeland ecosystems and, in particular, rangelands that have been affected by invasive plants.

At this point, rangeland managers across the west are being advised that fuel treatment is economically efficient only when the ecosystems are in relatively good ecological health, on the basis of wildfire suppression costs savings. The UNR team is also advocating that shorter wildfire-return intervals, improved treatment success rates, and uncertainty about the location of thresholds between ecological states influence the economic efficiency of fuel treatments.

As the state-and-transition model framework becomes increasingly adopted as protocol for data collection and analytical structure by U.S. government agencies such as the USDA Natural Resources Conservation Service, we expect that the simulation model developed at UNR, which numerically implements state-and-transition model concepts, is going to be of increasing practical value.

4. Associated Knowledge Areas

KA Code	Knowledge Area
122	Management and Control of Forest and Range Fires
605	Natural Resource and Environmental Economics
608	Community Resource Planning and Development

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Natural Disasters (drought, weather extremes, etc.)
- Economy
- Appropriations changes
- Public Policy changes
- Government Regulations
- Competing Programmatic Challenges

Brief Explanation

{No Data Entered}

V(I). Planned Program (Evaluation Studies)

Evaluation Results

Nevada's research projects have an evaluative element that is required by state and federal-level funding sources that provides documentation related to project assumptions, goals and outcomes. This information is used to determine the overall success of research initiatives; their contribution to providing practical, real-world solutions and resources to address challenges and problems; and whether continuation funding and/or new dollars are appropriate and necessary as funds are available.

- Economic impacts of developing clean energy in White Pine County, Nevada.
- Wildland fire policy to promote defensible space should focus on financial and regulatory barriers to investment in defensible space.
- State and transition models are helping rangeland managers across the west make better economical decisions on when to invest in restoration and when not to.
- Leveraged over \$114,000 in extramural funding.

Key Items of Evaluation

As the state-and-transition model framework becomes increasingly adopted as protocol for data collection and analytical structure by U.S. government agencies such as the USDA NRCS, the simulation model developed at UNR is going to be of increasing practical value.