2008 Oregon State University Research Annual Report of Accomplishments and Results

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I. Report Overview

1. Executive Summary

In this annual report, the Oregon Agricultural Experiment Station (OAES) will summarize outputs and outcomes from its 34 Planned Programs. The research and extension activities of these programs can be grouped into six focus areas, which are closely aligned with the Strategic Goals of the Oregon State University College of Agricultural Sciences: Biobased Products; Ecosystem Services; Food, Nutrition and Health; Water and Watersheds; Sustainable Agriculture and Food Systems; and Rural Communities. The following are highlights from four of these focus areas.

Biobased Products

OAES faculty from the Department of Biological and Ecological Engineering are making strides in biological production of bioproducts, biofuels and hydrogen from sunlight, and agricultural and cellulosic feedstocks. Hong Liu's laboratory made a discovery of a novel hydrogen-producing pathway, which is an important step on the path to 24-hour production of hydrogen. This process would be an alternative way to produce biodiesel. This team has applied for three different patents and has leveraged Hatch funding into additional federal and private funding. Results from this program have been highly publicized in local and national press. In addition, resource economists have looked at the role of governmental support of biotechnology research and resultant innovation rates in academia and private industry.

Ecosystem Services

The first thrust of this focus area is understanding ecosystem processes. In particular, researchers are interested in the affect of human management on the natural environment. Various groups are investigating how disease and invasive species spread and the result on native habitats and agricultural cropping systems; grazing management and the riparian restoration techniques; soil ecosystem response to management changes. Results inform policy makers and lead to better land use decision and regulations.

The second thrust of this focus area is conservation, restoration and management of fish and wildlife populations. Investigators are exploring various methods to assess ocean fish stocks, for example using satellite transponders for tracking whale migration, and to develop user-friendly tools for fisheries managers. The results from this program lead to better informed decision-making related to marine reserves, coastal communities, economic uses of ocean space and ocean management.

Food, Nutrition and Health

OAES faculty from the Colleges of Agricultural Sciences, Health and Human Sciences and Veterinary Medicine are working toward improved animal and human health. Investigators are establishing dietary strategies for disease resistance and healthy lifestyles; ensuring foods consumed by people are free from foodborne illnesses; understanding the fate of agricultural chemicals in the environment and the affect of improved animal health on human health. Gita Cherian in the Department of Animal Sciences manipulates the diet of maternal hens to enhance Omega-3 fatty acids in chicken eggs. The consumption of Omega-3 fatty acids in the American diet does not meet the requirement of these nutrients. Increasing the concentration of these acids in poultry foods is a possible way for humans to increase their intake. Results from this study will enhance human health and bring increased economic returns to the U.S. poultry industry.

Sustainable Agriculture and Food Systems

This focus area contains a large percentage of the planned programs and includes research and extension activities on agricultural education, animal production systems, crop management, plant biology and genetics, agricultural economics and food science and technology. A team of researchers from the Department of Crop and Soil Sciences have spent considerable amount of time working with grower groups and private industry partners to develop wheat varieties. In the past year, four new varieties have been released; all have been tested under a wide array of environmental and management practices and were chosen for their superior yield potentials and resistance to disease. Oregon State University licensed wheat varieties have returned millions of dollars to the university in seed royalties over the last few years, and are, in fact, among the top dollar generating intellectual properties at OSU. The funds are used to augment wheat research and associated activities.

Total Actual Amount of professional FTEs/SYs for this State

Year:2008	Extension		Research	
	1862	1890	1862	1890
Plan	43.4	0.0	160.6	0.0
Actual	0.0	0.0	503.0	0.0

II. Merit Review Process

1. The Merit Review Process that was Employed for this year

- Internal University Panel

2. Brief Explanation

Faculty were reviewed by internal peer panels, composed of academic department heads, county staff chairs and/or branch station superintendents for split appointment faculty, and senior faculty. Review criteria were developed and approved at departmental level and reviewed by the relevant Associate Dean for that unit.

Faculty may also have been given a mid-tenure review or a post-tenure review, depending upon their status.

III. Stakeholder Input

1. Actions taken to seek stakeholder input that encouraged their participation

- Use of media to announce public meetings and listening sessions
- Targeted invitation to traditional stakeholder groups
- Targeted invitation to non-traditional stakeholder groups
- Targeted invitation to traditional stakeholder individuals
- Targeted invitation to non-traditional stakeholder individuals
- Targeted invitation to selected individuals from general public
- Survey of traditional stakeholder groups
- Survey of traditional stakeholder individuals
- Survey of the general public
- Survey specifically with non-traditional groups
- Survey specifically with non-traditional individuals
- Survey of selected individuals from the general public

Brief Explanation

In this project period, in addition to the normal departmental advisory council meetings and station field days, a number of additional tactics were used to interact with and gather feedback from stakeholders. The deans spent several days visiting the various ecoregions within the state to meet stakeholders, either at formally arranged meetings and informal venues such as restaurants, farmer's markets, and town halls. The station also arranged a multiday tour of the state for important members of the university's administrative, media and legislative units. Station superintendants and county extension chairs hosted the group in each ecoregion and provided access to on-the-ground, hands-on research activities (no powerpoints, no classrooms!), equipment, research teams, research collaborators and stakeholders. As a result, many press releases and lay media stories were distributed through a range of media sources and produced interactions between researchers and the industry, public and legislative staff from both state and federal delegations.

2(A). A brief statement of the process that was used by the recipient institution to identify individuals and groups stakeholders and to collect input from them

1. Method to identify individuals and groups

- Use Advisory Committees
- Use Internal Focus Groups
- Use External Focus Groups
- Open Listening Sessions
- Needs Assessments
- Use Surveys
- Other (fairs, blogs, conference expos)

Brief Explanation

The Oregon Agricultural Experiment Station uses formal and informal methods to identify individuals and groups of stakeholders. The most common method is to rely upon our unit leaders (departmental, station and extension leaders), their faculty and staff, and our students to inform our planning and implementation processes. We also interact regularly with local, state, and federal governmental entities to stay informed about their critical issues and stakeholders. Booths are reserved at state and county fairs, several conferences or expos each year to meet a wider range of stakeholders - surveys are often used to collect information about topics of interest. Web pages solicit input as well as deliver requested information. This past year, the College of Agricultural Sciences implemented blogs, MySpace and video clips on its website to reach younger stakeholders and provide information in more timely and graphic formats.

2(B). A brief statement of the process that was used by the recipient institution to identify individuals and groups who are stakeholders and to collect input from them

1. Methods for collecting Stakeholder Input

- Meeting with traditional Stakeholder groups
- Survey of traditional Stakeholder groups
- Meeting with traditional Stakeholder individuals
- Survey of traditional Stakeholder individuals
- Meeting with the general public (open meeting advertised to all)
- Survey of the general public
- Meeting specifically with non-traditional groups
- Survey specifically with non-traditional groups
- Meeting specifically with non-traditional individuals
- Survey specifically with non-traditional individuals
- Meeting with invited selected individuals from the general public
- Survey of selected individuals from the general public

Brief Explanation

The Oregon Agricultural Experiment Station uses formal and informal methods to collect input. individuals. The most common method is to rely upon our unit leaders (departmental, station and extension leaders), their faculty and staff, and our students to inform our planning and implementation processes-through surveys, conversations, comment forms, meeting minutes and summaries. We also interact regularly with local, state, and federal governmental entities to stay informed about their critical issues and stakeholders. Booths are reserved at state and county fairs, several conferences or expos each year to meet a wider range of stakeholders - surveys are often used to collect information about topics of interest. Web pages solicit input as well as deliver requested information. This past year, the College of Agricultural Sciences implemented blogs, MySpace and video clips on its website to reach younger stakeholders and provide information in more timely and graphic formats.

3. A statement of how the input was considered

- In the Budget Process
- To Identify Emerging Issues
- Redirect Extension Programs
- Redirect Research Programs
- In the Staff Hiring Process
- In the Action Plans
- To Set Priorities

Brief Explanation

We reviewed our strategic plan against input gathered and adjusted the implementation plan based on that analysis. This was done for the research, extension and academic elements. Unit leaders use the information to prepare their biannial priority staffing requests and the station/college uses information to evaluate the requests. This past year's information was also used to prepare the biennial Experiment Station and Extension state legislative requests (these units have budget lines separate from the the university itself). The requests are shared with our stakeholders for their comments and use in preparing supporting letters.

Brief Explanation of what you learned from your Stakeholders

- Information on organic, specialty crops, aquaculture/algae, as well as standard, production, were requested.
- Interest in sustainable food systems and local foods were more pronounced as were more information about biofuel implications.
- Not just urban populations need a better understanding about food systems, how food is grown and what the differences are between natural and organic production.
- More interest was expressed about use of crop, forestry, urban residues for biofuels, bioenergy, and bioproducts.

IV. Expenditure Summary

1. Total Actual Formula dollars Allocated (prepopulated from C-REEMS)

Extension		Research	
Smith-Lever 3b & 3c	**1890 Extension**	**Hatch**	**Evans-Allen**
0	0	2990753	0

2. Totaled Actual dollars from Planned Programs Inputs

	Extension		Research	
	Smith-Lever 3b & 3c	**1890 Extension**	**Hatch**	**Evans-Allen**
Actual Formula	0	0	4868744	0
Actual Matching	0	0	29081108	0
Actual All Other	0	0	19619169	0
Total Actual Expended	0	0	53569021	0

3. Amount of Above Actual Formula Dollars Expended which comes from Carryover funds from previous years

Carryover	0	0	1877991	0

V. Planned Program Table of Content

Program #1

V(A). Planned Program (Summary)

1. Name of the Planned Program

Alternative Energy Systems and Bioproducts

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
511	New and Improved Non-Food Products and Processes			100%	
	Total			100%	

V(C). Planned Program (Inputs)

1. Actual amount of professional FTE/SYs expended this Program

Year: 2008	Extension		Research	
	1862	1890	1862	1890
Plan	0.0	0.0	5.1	0.0
Actual	0.0	0.0	1.7	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	92088	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
0	0	487358	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
0	0	485881	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

- Conduct Research Experiments
- Develop new culture strains and metabologic engineering tools
- Develop simulation models
- Conduct Workshops, meetings.

- Develop Products, Curriculum, Resources.

- Provide Training.

- Provide Counseling.

- Assessments.

- Work with Media.

- Partnering.

2. Brief description of the target audience

The target audiences for this research are potential producers and industrial manufacturers of hydrogen and bio-diesel.

V(E). Planned Program (Outputs)

1. Standard output measures

Target for the number of persons (contacts) reached through direct and indirect contact methods

	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	Target	Target	Target	Target
Plan	600	6000	60	60
2008	300	1000	30	30

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

Patent Applications Submitted

Year	Target
Plan:	0
2008 :	3

Patents listed

1. Single chamber microbial electrolyzer
2. Pressurized microbial electrolyzer
3. Precious metal free catalysts

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

	Extension	Research	Total
Plan	0	7	
2008	0	24	24

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- SCHOLARLY excellence in referred articles, book chapters, and books; participation on professional boards and panels, as well as science panels.

Year	Target	Actual
2008	9	36

Output #2

Output Measure

- DEVELOP IMPROVED BIOPRODUCT PRODUCTION SYSTEMS – boost solar energy capture for hydrogen production through development of a variety of feedstocks – improved microbial feedstocks for biodiesel production

Year	Target	Actual
2008	1	3

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O No.	OUTCOME NAME
1	Improved knowledge about feedstocks for biofuels and bioenergy: - Researchers learn new methods of metabolic engineering for photobiological H2 production on a 24-hour basis - Energy sector will learn that the electrical energy required with the photobiological approach could be much lower than the typical energy requirement of hydrogen produced by water electrolysis. - Growers learn to produce algae as a biofuel feedstock
2	Applications will advance production systems for bioenergy: - Peers develop biomimetic models to create biobased generators to produce molecular H2 and O2 from water and light, and these generators are incorporated into integrated H2 energy systems, providing generation, storage, and utilization of H2 in one unit. - Energy producers otimizatize the photobiological process to yield higher energy efficiencies. - Construction and operation of bioenergy facilities close to potential feedstocks will generate additional economic activity in rural areas. - If waste biomass, such animal wastes and organic component of urban wastewater is used as feedstocks, not only biohydrogen can be harvested, but also the wastes can be treated. - Algae can produce 30 times more oil per unit area of land than terrestrial oilseed crops

Outcome #1

1. Outcome Measures

Improved knowledge about feedstocks for biofuels and bioenergy: - Researchers learn new methods of metabolic engineering for photobiological H2 production on a 24-hour basis - Energy sector will learn that the electrical energy required with the photobiological approach could be much lower than the typical energy requirement of hydrogen produced by water electrolysis. - Growers learn to produce algae as a biofuel feedstock

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2008	0	3

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

The discovery of a novel hydrogen producing pathway is a potentially important step on the path to 24 hour H2 production and producing H2 from sunlight and agricultural feedstocks and developing biodiesel production.

What has been done

The team has begun engineering Synechocystis sp. PCC. 6803 to have a more oxygen tolerant variant of the previously identified oxygen sensitive hydrogenase. A new high-throughput screening assay for hydrogen production has been developed, which is the critical step in the isolation of mutants during rando mutagenesis. Finally, the team performed extensive studies of the impact of environmental factors on H2 production and developed a flux balance analysis production model of H2 production.

Results

The research team has discovered a novel hydrogen producing pathway in Synechocystis sp. PCC 6803. Creation of an oxygen-tolerant H2ase in a photosynthetic organism could be highly instrumental for realizing the promise of bisolar H2 production. With this in mind the team is currently working to reduce O2-sensitivity of the bidirectional hydrogenase using two approaches: creating a mutant of Synechocystis sp. PCC 6803 in which one gene is replaced with a O2-tolerant, bidirectional hydrogenase and developing a metabolic reconstruction of Synechocystis sp. PCC 6803 to help examine the impacts of different environmental factors on H2 production. The model contains 97 reactions and has been recently submitted for publication. Model development is ongoing and will be used for mutant discovery and hypothesis development.

4. Associated Knowledge Areas

KA Code	Knowledge Area
511	New and Improved Non-Food Products and Processes

Outcome #2

1. Outcome Measures

Applications will advance production systems for bioenergy: - Peers develop biomimetic models to create biobased generators to produce molecular H2 and O2 from water and light, and these generators are incorporated into integrated H2 energy systems, providing generation, storage, and utilization of H2 in one unit. - Energy producers otimizatize the photobiological process to yield higher energy efficiencies. - Construction and operation of bioenergy facilities close to potential feedstocks will generate additional economic activity in rural areas. - If waste biomass, such animal wastes and organic component of urban wastewater is used as feedstocks, not only biohydrogen can be harvested, but also the wastes can be treated. - Algae can produce 30 times more oil per unit area of land than terrestrial oilseed crops

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2008	0	1

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

The use of non-precious metal catalysts can significantly reduce the cost for the construction of large scale microbial electrolytic cells (MECs)

What has been done

The research team focused their work on developing various electrode materials for MECs to increase the hydrogen production rate and reduce the cost of fabrication.

Results

While the functionization of carbon cloth (anode materials) with carboxylic groups and the treatment of anode with anthraquinone-1,6-disulfonic acid (AQDS) did not enhance the MEC performance, non-precious metal catalysts that were developed on the cathode demonstrated comparable performance with the platinum catalyst, a commonly used precious metal catalyst in MEC systems.

4. Associated Knowledge Areas

KA Code	Knowledge Area
511	New and Improved Non-Food Products and Processes

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Economy
- Appropriations changes
- Public Policy changes
- Government Regulations
- Competing Public priorities

Brief Explanation

{No Data Entered}

V(I). Planned Program (Evaluation Studies and Data Collection)

1. Evaluation Studies Planned

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Evaluation Results

{No Data Entered}

Key Items of Evaluation

{No Data Entered}

Program #2

V(A). Planned Program (Summary)

1. Name of the Planned Program

Innovation, Technical Change, and Productivity Growth

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
609	Economic Theory and Methods			100%	
	Total			100%	

V(C). Planned Program (Inputs)

1. Actual amount of professional FTE/SYs expended this Program

Year: 2008	Extension		Research	
	1862	1890	1862	1890
Plan	0.0	0.0	1.3	0.0
Actual	0.0	0.0	1.6	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	78272	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
0	0	393392	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
0	0	141771	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

- Conduct Research Experiments.
- Develop models, computer algorithms

- Develop Products, Resources.

- Assessments.

- Partnering.

2. Brief description of the target audience

Public sector
Private sector
economists.

policy makers.

agricultural biotechnology firms
farmers

V(E). Planned Program (Outputs)

1. Standard output measures

Target for the number of persons (contacts) reached through direct and indirect contact methods

	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	**Target**	**Target**	**Target**	**Target**
Plan	100	0	0	0
2008	52	0	0	0

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

Patent Applications Submitted

Year	Target
Plan:	0
2008 :	0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

	Extension	Research	Total
Plan	0	3	
2008	0	2	2

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- PROVIDE ECONOMIC AND MARKETING MODELS AND ANALYSES THAT INFORM DECISION-MAKERS, INDUSTRY, AND PEERS generate theoretical and computational tools, both parametric and non-parametric, for evaluating technical change, capacity utilization, and productivity growth. incorporate bads into production model dynamizing the technology technological change in function spaces effects on nature and origins of technical shifts apply economic tools to a number of industries and products important to Oregon's agriculture and rural economy. examine rural health look at rate of biotechnological innovation formulate types of technical change to sustain per capita output and income growth identify determinants of innovation in agricultural biotechnology to examine coordination between public and private sector and the mix of public-good and private-good inventions. responsiveness of biotechnical and agricultural innovations to alternative government investment strategies optimal R&D investments

Year	Target	Actual
2008	0	4

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O No.	OUTCOME NAME
1	Learning, awareness, knowledge, skills, motivations Information exchange - Peers understand the reverse impact of downstream on upstream research - Peers and decision-makers gain information on the following assumptions - whether basic research has a decisive influence on downstream applications and product development, - that cross-field spillovers are pronounced, - that intellectual property regimes greatly influence the course and intensity of innovation Improved technologies and practices - Decision-makers learn whether returns to public R&D are skewed, risky, but on average high - Decision-makers learn where to distribute investments on the basic-to-applied research continuum and in which fields or subfields to focus. For example, - do research investments directly influence outputs - do investments influence outputs in collateral fields and at points above and below them on the R&D continuum - does one institution's investments influence another's?
2	Action such as behavior, practices, decision-making, policies Best Practices - Funding agencies make better investments in basic-to-applied research continuum

Outcome #1

1. Outcome Measures

Learning, awareness, knowledge, skills, motivations Information exchange - Peers understand the reverse impact of downstream on upstream research - Peers and decision-makers gain information on the following assumptions - whether basic research has a decisive influence on downstream applications and product development, - that cross-field spillovers are pronounced, - that intellectual property regimes greatly influence the course and intensity of innovation Improved technologies and practices - Decision-makers learn whether returns to public R&D are skewed, risky, but on average high - Decision-makers learn where to distribute investments on the basic-to-applied research continuum and in which fields or subfields to focus. For example, - do research investments directly influence outputs - do investments influence outputs in collateral fields and at points above and below them on the R&D continuum - does one institution's investments influence another's?

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2008	1	4

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Productivity growth is the principal source of long-run growth and prosperity in the U.S. economy. One area of special regard will be the innovations occurring at a rapid rate in agricultural biotechnology, as well as the manner in which private-and public-sector research and funding efforts ought to be coordinated.

What has been done

We used a dynamic investment-response model to examine U.S. government expenditure impacts on private-sector agricultural and medical research success. Further we decomposed growth rate into that explained by technology change and technical efficiency change. We also developed the theory under which a firm's plant-level data can be used to draw inferences about the total firm's technology, cost, and output supply.

Results

We were able to show that applied research in government labs have substantial positive effect on the rate of innovation in private-sector applied research. Further, we now know that, in both agriculture and medicine, public expenditures create substantial spillovers for private firms. While spillovers are partially nullified by government competition for scare research inputs, public investment has been strongly complementary to private investment. For the first time, we believe we have ascertained that publically financed agricultural research has had a much stronger spillover effect on private agricultural research than public medical research has had on private medical research.

4. Associated Knowledge Areas

KA Code	Knowledge Area
609	Economic Theory and Methods

Outcome #2

1. Outcome Measures

Action such as behavior, practices, decision-making, policies Best Practices - Funding agencies make better investments in basic-to-applied research continuum

Not reporting on this Outcome for this Annual Report

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Economy
- Appropriations changes
- Public Policy changes
- Government Regulations
- Competing Public priorities
- Competing Programmatic Challenges

Brief Explanation

{No Data Entered}

V(I). Planned Program (Evaluation Studies and Data Collection)

1. Evaluation Studies Planned

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Evaluation Results

{No Data Entered}

Key Items of Evaluation

{No Data Entered}

Program #3

V(A). Planned Program (Summary)

1. Name of the Planned Program

Economics of Land and Water Use on Private and Public Lands

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
605	Natural Resource and Environmental Economics	100%		100%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

1. Actual amount of professional FTE/SYs expended this Program

Year: 2008	Extension		Research	
	1862	1890	1862	1890
Plan	1.0	0.0	3.0	0.0
Actual	0.1	0.0	1.9	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	112641	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
0	0	769632	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
0	0	262344	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

1.To evaluate current irrigation practices and identify ways in which water can be used more efficiently.
Specifically to:
•Identify the relative costs of different irrigation delivery systems and the costs of obtaining water from surface and groundwater sources. •Evaluate the economic benefits of deficit irrigation, including development of models to predict the impacts of deficit irrigation on crop yield and quality, as well as cost savings accrued from this management strategy.
•Develop economic decision making models that farm operators can use to deficit irrigate crops on an entire farm.
•Estimate the value of irrigation water in parts of Oregon and the West.
2.To assess the impact of changes in policies influencing the supply and cost of water in agricultural and non-agricultural uses.
Specifically to:
•Identify the potential cost savings from market-based water allocation mechanisms, when used in response to water shortages and competing uses between agriculture and instream use. •Evaluate the economic benefits of water markets and water banks, and with management of groundwater/surface water interactions. •Develop economic decision making models that can be used to inform policy decisions for more cost-effective water allocation.
3.Assess market mechanisms governing water and private land-use decisions
Specifically to:
•Develop econometric models that identify and quantify the effects of key determinants of private land-use decisions.
•Improve understanding of the effects of land-use policies on private land-use decisions and housing markets. •Develop theoretical and empirical models to understand land use changes, particularly, the causes of urban sprawl.
4.Investigate the environmental and economic impacts of various land-use policies.
Specifically to:
•Develop theoretical and empirical models to analyze impacts of land use policies on land use changes. •Use models to simulate land-use policies and determine impacts on water quality, wildlife habitat, watershed health, and other ecological indicators. •Explore implications of land-use change for wildlife populations. •Develop theoretical and empirical models to understand causes of urban sprawl and its economic, environmental, and health consequences. •Explore the impact of land use changes, in particular, urban development on communities and social organizations.
5.To examine the adequacy and efficiency of policy options to reduce environmental impacts of land use and farming practices.
Specifically to:

- Use models to examine how resource and agricultural policy affects major land use and cropping patterns, and how the changes in land use and cropping patterns may affect water quality.

- To evaluate the adequacy and relative efficiency of policy options to reduce the environmental impacts of land use and farming practices (e.g., voluntary vs. mandatory environmental regulations).

To examine the optimal design of conservation programs, including optimal targeting of land and resources for environmental conservation, optimal allocation of funds between different geographic regions (e.g., watersheds) and environmental objectives (e.g., water quality and biodiversity).

2. Brief description of the target audience

Managers of land and water resources in Oregon and the United States
Policymakers who determine regulations that govern management of land and water resources.
Farm operators
Communities
Research and Extension Peers

Indirect beneficiaries are:
Citizens of Oregon and other states

V(E). Planned Program (Outputs)

1. Standard output measures

Target for the number of persons (contacts) reached through direct and indirect contact methods

	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	**Target**	**Target**	**Target**	**Target**
Plan	930	2700	55	0
2008	0	0	0	0

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

Patent Applications Submitted

Year	Target
Plan:	0
2008 :	0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

	Extension	Research	Total
Plan	0	5	
2008	0	2	0

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- SCHOLARLY excellence in referred articles, book chapters, and books; participation on professional boards and panels, as well as science panels.

Year	Target	Actual
2008	5	4

Output #2

Output Measure

- PROVIDE ECONOMIC AND MARKETING MODELS AND ANALYSES THAT INFORM DECISION-MAKERS, INDUSTRY, AND PEERS - Farmers learn how to use water more efficiently - Decision makers obtain models to assess changes in policies that influence supply and cost of water in agricultural and non-agricultural uses - Decision makers obtain regional models to assess market mechanisms governing water and private land-use decisions - Researchers investigate, compare, and integrate the environmental and economic impacts of various land-use policies in Oregon (07), regional, 08, compare, 09, integrate 11

Year	Target	Actual
2008	11	10

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O No.	OUTCOME NAME
1	(1) Provide farm operators with a new set of tools to help them make better irrigation scheduling decisions. - Introduce the idea of deficit irrigation to progressive farmers in Oregon and elsewhere. - Develop models for farmers to schedule irrigation applications each day such that water use is reduced and farm profit is maximized. - Work with irrigation districts and water conservation districts in cooperative projects, as well as provide web-based tools that farmers can access to help in scheduling irrigation applications. - Simplify crop growth models to be easily applied to variety of soils, climates and irrigation technologies and still predict yields with enough accuracy that farmers can profitably use them in making production decision. Ultimately, they directly will decide when and how much to irrigate each field each day during the growing season, and become more aware of the economic tradeoffs between various decisions, making a decision that better utilizes resources and results in higher profit.
2	(2) Produce realistic models that demonstrate the potential gains, and help point to ways that the conflicts between competing goals can be minimized.
3	(3) Develop regional econometric models that reveal the importance of localized factors such as climate and access to commodity markets on private land-use decisions, and incorporate these results into the national model to increase the accuracy of land-use change predictions. (3.1) Develop GIS-based, spatially explicit model to predict development patterns and land prices that would have existed when one or more land use regulation had been removed in the southern part of the Willamette Valley. (3.2) Develop a spatially explicit model to examine the causes of sprawl and its socioeconomic consequences.
4	(4) Increase our understanding of the impacts of land use changes on water quality and ecosystems by examining land-use policies at the national scale, using land cover and land use maps, and spatially-explicit policy simulations. A key advance in this research will be to estimate the effects of land-use changes on populations of different wildlife species.

Outcome #1

1. Outcome Measures

(1) Provide farm operators with a new set of tools to help them make better irrigation scheduling decisions. - Introduce the idea of deficit irrigation to progressive farmers in Oregon and elsewhere. - Develop models for farmers to schedule irrigation applications each day such that water use is reduced and farm profit is maximized. - Work with irrigation districts and water conservation districts in cooperative projects, as well as provide web-based tools that farmers can access to help in scheduling irrigation applications. - Simplify crop growth models to be easily applied to variety of soils, climates and irrigation technologies and still predict yields with enough accuracy that farmers can profitably use them in making production decision. Ultimately, they directly will decide when and how much to irrigate each field each day during the growing season, and become more aware of the economic tradeoffs between various decisions, making a decision that better utilizes resources and results in higher profit.

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2008	1	2

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

The idea of economic-based irrigation decisions remains an area of great importance. Better management of irrigation water saves water. If that water is applied through a pressurized irrigation system, the result is reduced energy use. If less water is applied, more water remains instream. The additional water supports a healthier stream ecosystem and, in some cases, can also be used to generate electricity.

What has been done

A project was completed in cooperation with Wy'east Resource and Conservation Area to develop a series of analytical tools to reduce irrigation water use. The project involved local NRCS and extension personnel in Crook and Jefferson Counties, as well as four farming operations from the area. These tools included field monitoring equipment to track soil moisture, water applications and weather data. These data were coupled with the Oregon Irrigation Scheduling Online (OISO) software program to predict water use and availability. To this was added an economic model to calculate profitability of alternative irrigation strategies.

Results

The OISO software is now available to any farmer in the state and includes an economic component to the analysis. This project (and previous versions) has worked with farmers in Central Oregon, in the Columbia Basin in Oregon, and in the Klamath Basin to educate them about approaching irrigation applications from a profit maximizing rather than yield maximizing standpoint.

4. Associated Knowledge Areas

KA Code	Knowledge Area
605	Natural Resource and Environmental Economics

Outcome #2

1. Outcome Measures

(2) Produce realistic models that demonstrate the potential gains, and help point to ways that the conflicts between competing goals can be minimized.
Not reporting on this Outcome for this Annual Report

Outcome #3

1. Outcome Measures

(3) Develop regional econometric models that reveal the importance of localized factors such as climate and access to commodity markets on private land-use decisions, and incorporate these results into the national model to increase the accuracy of land-use change predictions. (3.1) Develop GIS-based, spatially explicit model to predict development patterns and land prices that would have existed when one or more land use regulation had been removed in the southern part of the Willamette Valley. (3.2) Develop a spatially explicit model to examine the causes of sprawl and its socioeconomic consequences.

Not reporting on this Outcome for this Annual Report

Outcome #4

1. Outcome Measures

(4) Increase our understanding of the impacts of land use changes on water quality and ecosystems by examining land-use policies at the national scale, using land cover and land use maps, and spatially-explicit policy simulations. A key advance in this research will be to estimate the effects of land-use changes on populations of different wildlife species.

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2008	0	5

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

It is important to understand how land use policies can impact intended, or unintended, consequences, such as wildlife conservation or carbon sequestration.

What has been done

A study, completed in cooperation with a multidisciplinary team, analyzed different scenarios of paying landowners to take land out of production and the effect on species conservation and carbon sequestration. The researchers created five scenarios with different types of land conservation models and then applied three different budget to each scenario.

Results

The study concluded that carbon sequestration is maximized when landowners restore forests. Species conservation, on the other hand, benefits when landowners restore rare habitats. Carbon sequestration and species conservation in the Willamette Valley are not generally compatible.

4. Associated Knowledge Areas

KA Code	Knowledge Area
605	Natural Resource and Environmental Economics

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 Public priorities
- Competing Programmatic Challenges
- Populations changes (immigration,new cultural groupings,etc.)

Brief Explanation

{No Data Entered}

V(I). Planned Program (Evaluation Studies and Data Collection)

1. Evaluation Studies Planned

- After Only (post program)
- Retrospective (post program)
- During (during program)
- Case Study
- Comparisons between program participants (individuals,group,organizations) and non-participants
- Comparisons between different groups of individuals or program participants experiencing different levels of program intensity.

Evaluation Results

{No Data Entered}

Key Items of Evaluation

{No Data Entered}

Program #4

V(A). Planned Program (Summary)

1. Name of the Planned Program

Biological Control of Pests Affecting Plants

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
215	Biological Control of Pests Affecting Plants			100%	
	Total			100%	

V(C). Planned Program (Inputs)

1. Actual amount of professional FTE/SYs expended this Program

Year: 2008	Extension		Research	
	1862	1890	1862	1890
Plan	0.0	0.0	4.2	0.0
Actual	0.0	0.0	2.6	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	155089	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
0	0	705908	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
0	0	175346	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

- Conduct Research Experiments.

- Develop Products, Curriculum, Resources.

- Provide Training.

2. Brief description of the target audience

The target audiences include growers, crop consultants, extension faculty and researchers in the fruit and wheat industry; and ecologists, economists, and managers concerned with invasive species.

V(E). Planned Program (Outputs)

1. Standard output measures

Target for the number of persons (contacts) reached through direct and indirect contact methods

	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	Target	Target	Target	Target
Plan	1100	1000	10	0
2008	600	600	20	0

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

Patent Applications Submitted

Year	Target
Plan:	0
2008 :	0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

	Extension	Research	Total
Plan	0	3	
2008	24	9	33

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- SCHOLARLY excellence in referred articles, book chapters, and books; participation on professional boards and panels, as well as science panels.

Year	Target	Actual
2008	5	33

Output #2

Output Measure

- PROVIDE ADDITIONAL UNDERSTANDING FOR PLANT AND ANIMAL PROTECTION FROM DISEASES AND PESTS - Determine control of fire blight of pear and apple with the use of avirulent pathogens, including whether they induce defense responses in the host - Determine the risk of movement of the fire blight pathogen with mature symptomless pear fruit. - Determine when rust spores are first released in spring and the minimum environmental requirements for infection of leaves. - Understand the potential impact of the introduced pathogen, blackberry rust, in the Pacific Northwest region and evaluate chemical control programs for susceptible cultivars. - - Reduce harm from invasive plant species like ragwort or purple loosestrife, through biological control - - Determine if host abundance, heterogeneity, and spatial structure influence the spatiotemporal spread of disease. - Determine if increased focus size speeds the onset of velocity increase over time. - Determine if disease spread and effects of landscape variables are similar at different spatial scales. - Determine which host variables (abundance, heterogeneity, or spatial structure) need to be included in models to make predictions about disease risks, and to determine the relative importance of each to disease spread.

Year	Target	Actual
2008	15	27

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O No.	OUTCOME NAME
1	Genetic studies • Determine susceptibility of blackberry germplasm, • Compare the genotypes of P. violaceum present in the Pacific Northwest to the genotypes in other regions.
2	Models: • Develop weather-based models that indicate when spores are first released in spring and the minimum environmental requirements for infection of leaves. • Compare chemical control programs for susceptible cultivars for economic feasibility • Determine which host variables (abundance, heterogeneity, or spatial structure) need to be included in models to make predictions about disease risks, and to determine the relative importance of each to disease spread. .
3	Best Practices …5%/yr Increase learning, awareness, knowledge, skills, motivations, conformity to codes of best practices related to use of biological control to combat invasive plant specie
4	Improved technologies and practices Develop technologies that enhance the ability of the U.S pear and apple industry to suppress this disease. Develop economical chemical control programs for susceptible cultivars Develop novel control approaches to other diseases of plants. Changes in behavior, practices, decision-making, policies with respect to invasive species and biological control. Develop epidemic modeling at large scales
5	In the long term: • Risk management of fire blight pathogen could lead to larger export markets for U.S. grown pears. • Pest impacts on social, economic, environmental, and civic conditions are continuously updated and published in collaboration with ecologists, economists, manager • Provide more sustainable approaches for managing plant disease.

Outcome #1

1. Outcome Measures

Genetic studies

- Determine susceptibility of blackberry germplasm,
- Compare the genotypes of P. violaceum present in the Pacific Northwest to the genotypes in other regions.

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2008	2	2

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

The blackberry rust pathogen, Phragmidium violaceum, was first observed in Oregon in spring 2005 where it was observed on both weedy Rubus armeniacus and on commercially cultivated Rubus laciniatus, of which several plantings were impacted severely.

What has been done

All five spore stages were observed over the course of the growing season with no asexual perrenation of the pathogen evident in the disease cycle. In subsequent studies, we observed that teliospore germination and infection by basidiospores occurred mostly during April, and over three years of observation, the relative intensity/success of this phase appeared to greatly influence epidemic severity during the summer. Over three seasons, field experiments were conducted at two locations in western Oregon to evaluate appropriate timing and application intervals of fungicides. In 2006-2008, one to two fungicides treatments provided excellent control of blackberry rust. In 2007-2008, lime sulfur applied as a delayed dormant (early April) provided good suppression of initial infection.

Results

P. violaceum was identified on blackberries west of the Cascade Mountains from Santa Cruz, CA to the Canadian Border below 2000 feet in elevation. Protocols for AFLP analysis were developed and preliminary data indicates that there is considerable genetic diversity among isolates across states indicating that multiple introductions or rapid genetic change have occurred. AFLP analysis of 200 isolates from CA, WA, OR, Australia is currently being conducted.

4. Associated Knowledge Areas

KA Code	Knowledge Area
215	Biological Control of Pests Affecting Plants

Outcome #2

1. Outcome Measures

Models:

- Develop weather-based models that indicate when spores are first released in spring and the minimum environmental requirements for infection of leaves.
- Compare chemical control programs for susceptible cultivars for economic feasibility
- Determine which host variables (abundance, heterogeneity, or spatial structure) need to be included in models to make predictions about disease risks, and to determine the relative importance of each to disease spread. .

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2008	3	11

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Understanding epidemic spread of wheat stripe rust has enabled a new, alternative theory to be developed which is relevant to many long-distance, aerially dispersed pathogens over a very wide range of spatial scale up to the continental level. This new model, which fits data sets of established diseases, is applicable to diseases in plants, animals and humans, as well as to the ecology of invasive species.

What has been done

Two large field experiments with wheat stripe rust, incorporating 30 ha. of plots, were conducted to test these effects. These experiments have been successfully completed over three seasons. Disease severity levels were collected over multiple distances from the inoculation sites and on multiple dates during the season. Preliminary data analyses have been conducted for the three seasons of data. The fourth season will be established in fall of 2008.

Results

Our model of accelerating epidemic velocity predicts that location of the epidemic front will approximately double per unit time used to measure initial velocity and that a plot of velocity versus distance will have a slope of approximately 1/2 regardless of epidemic speed. This model has provided a good fit to experimental data for wheat stripe rust regardless of year, location,degree of host heterogeneity, or direction relative to predominant wind. The scale-invariance of the inverse square law allowed us to then scale-up by five orders of magnitude to describe the continental-scale spread of epidemics of a diversity of diseases: potato late blight, wheat stem rust, southern corn leaf blight, West Nile virus, and avian bird flu strain H5N1. Our model provided a good fit to all of these data sets. Our model seems to work well whenever the pathogen's dispersal kerenel is dominated by simple dilution and there is potential for signficant long-distance dispersal. The model predicts very different outcomes than the classic traveling wave model, which has been the primary model for describing epidemic spread in the past. Our work is contributing to development of common models and concepts between plant disease and the epidemiology of humans and other animals. The work also may have relevance to the ecology of invasive species of other sorts, in addition to that of pathogens.

4. Associated Knowledge Areas

KA Code	Knowledge Area
215	Biological Control of Pests Affecting Plants

Outcome #3

1. Outcome Measures

Best Practices …5%/yr Increase learning, awareness, knowledge, skills, motivations, conformity to codes of best practices related to use of biological control to combat invasive plant specie

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2008	5	7

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Invasive species are becoming an increasing problem, threatening our economy and environment, and can have severe, adverse environmental impacts on ecosystems.

What has been done

Research identified and exploited weed and pest vulnerabilities using targeted disruption of their life and analyzed causes and consequences of wide variation in state noxious weed regulations. The faculty conducted non-formal education at stakeholder conferences, performed analyses and made recommendations on invasive species for policy and decision makers in both governmental and nongovernmental organizations. Understanding the biology and environmental impacts of invasive plant species has shown that control strategies can exploit weed/pest vulnerabilities to disrupt life cycles.

Results

New knowledge is enabling discussion and transformation of policies and regulations governing new species introductions at state, and national level for the U.S. and other countries. There is evidence of increased awareness of invasive species issues shown by more frequent discussions in the popular media.

4. Associated Knowledge Areas

KA Code	Knowledge Area
215	Biological Control of Pests Affecting Plants

Outcome #4

1. Outcome Measures

Improved technologies and practices Develop technologies that enhance the ability of the U.S pear and apple industry to suppress this disease. Develop economical chemical control programs for susceptible cultivars Develop novel control approaches to other diseases of plants. Changes in behavior, practices, decision-making, policies with respect to invasive species and biological control. Develop epidemic modeling at large scales

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2008	1	4

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Export of winter pears grown in the Pacific Northwest into countries where fire blight does not occur is restricted by phytosanitary concerns over the possible contamination of fruit with the fire blight bacterium, Erwinia amylovora. Similar concerns have been applied to apples.

What has been done

From our study, we concluded that epiphytic E. amylovora shows similar survival characteristics on both pear and apple fruit, this pathogen is not an endophytic within mature symptomless pear fruit, its presence is exceptionally rare on commercially-produced fruit, and that epiphytic survival of E. amylovora through a postharvest chilling period is unlikely given the unrealistically high population size required for persistence.

Results

Biological and chemical methods of fire blight suppression appear to be complementary, and consequently, an integrated strategy consisting of a biological control agent sprayed in early and near full-bloom, followed by oxytetracycline treatment at late bloom improves disease control with a reduced number of antibiotic applications. Also, research, risk assessment analyses and trade resolution proceedings have concluded that introduction and successful establishment of E. amylovora into a new geographic region via commercial shipments of apple fruit is very unlikely. With both crops, the risk is extremely low. These results will be used in trade negotiations to further open foreign markets for U.S. grown pear fruit.

4. Associated Knowledge Areas

KA Code	Knowledge Area
215	Biological Control of Pests Affecting Plants

Outcome #5

1. Outcome Measures

In the long term:

- Risk management of fire blight pathogen could lead to larger export markets for U.S. grown pears.
- Pest impacts on social, economic, environmental, and civic conditions are continuously updated and published in collaboration with ecologists, economists, manager
- Provide more sustainable approaches for managing plant disease.

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2008	0	2

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Fruit production in Oregon is worth several hundred million per year. A commonality among fruit commodities grown in western Oregon is that all are susceptible to infectious diseases caused by fungal and bacterial pathogens.

What has been done

The ability to cause disease via a functional type III secretion system is apparently the reason that the fire blight pathogen, E. amylovora, shows special abilities as an epiphyte on the stigmas of rosaceous plants relative to bacteria that do not possess this ability (e.g., avirulent strains of E. amylovora). This may explain why it has been difficult to select biological agents that can achieve more than the typical 40 to 60% suppression of floral infection in pathogen-inoculated field trails. Nonetheless, integrated biological and chemical control shows great promise. We speculated that the two-pronged approach reduces pathogen establishment, then suppresses pathogen growth rate, which allows flowers to progress through their natural developmental stages from highly susceptible to less susceptible before the pathogen attains a sufficient population size for infection. Also, we determined that epiphytic E. amylovora pathogen is not an endophytic within mature symptomless pear fruit, its presence is exceptionally rare on commercially-produced fruit, and that epiphytic survival of E. amylovora through a postharvest chilling period is unlikely given the unrealistically high population size required for persistence.

Results

Several biological products have been registered in the last few years; the U.S. pear and apple industry is in the process of adopting this control strategy. Further, the potential for successful establishment of E. amylovora into disease-free environments via the importation of fresh winter pear fruit is no greater than that predicted for apple; with both crops, the risk is extremely low. These results will be used in trade negotiation to further open foreign markets for U.S.-grown pear fruit.

4. Associated Knowledge Areas

KA Code	Knowledge Area
215	Biological Control of Pests Affecting Plants

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 Public priorities
- Competing Programmatic Challenges

Brief Explanation

V(I). Planned Program (Evaluation Studies and Data Collection)

1. Evaluation Studies Planned

-

Evaluation Results

Key Items of Evaluation

Program #5

V(A). Planned Program (Summary)

1. Name of the Planned Program

Managing Marine Resources for Sustainable Systems

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
135	Aquatic and Terrestrial Wildlife	50%		50%	
302	Nutrient Utilization in Animals	5%		5%	
303	Genetic Improvement of Animals	10%		10%	
311	Animal Diseases	15%		15%	
604	Marketing and Distribution Practices	10%		10%	
605	Natural Resource and Environmental Economics	10%		10%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

1. Actual amount of professional FTE/SYs expended this Program

Year: 2008	Extension		Research	
	1862	1890	1862	1890
Plan	0.0	0.0	9.5	0.0
Actual	0.2	0.0	3.4	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	250899	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
0	0	1276842	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
0	0	1437396	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

- Conduct Research Experiments.

- Construct Research Facilities.

- Conduct Workshops, meetings.

- Deliver Services.

- Develop Products, Curriculum, Resources.

- Provide Training.

- Provide Counseling.

- Assessments.

- Work with Media.

- Partnering.

- Facilitating.

2. Brief description of the target audience

Fishing industry and managers, coastal communities and leaders, peers, extension educators, economists, aquaculture producers, food safety agencies and seafood producers.

V(E). Planned Program (Outputs)

1. Standard output measures

Target for the number of persons (contacts) reached through direct and indirect contact methods

	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	Target	Target	Target	Target
Plan	720	27700	170	3000
2008	600	20000	100	3000

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

Patent Applications Submitted

Year	Target
Plan:	0
2008 :	0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

	Extension	Research	Total
Plan	0	6	
2008	0	0	0

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- CARRY OUT STUDIES TO DECIPHER GENOMES, GENETICS AND MECHANISMS OF PLANTS AND ANIMALS – use emerging statistical and molecular genetic techniques to determine distinctions among alternate life history strategies and separate breeding units among fishery components, particularly in salmon, groundfish, and oysters. (Banks) – develop selective breeding program, repository, and resource center for various desirable traits of Pacific oysters (Langdon)

Not reporting on this Output for this Annual Report

Output #2

Output Measure

- PROVIDE ADDITIONAL UNDERSTANDING FOR PLANT AND ANIMAL PROTECTION FROM DISEASES AND PESTS– complete and apply stochastic and deterministic models for fish disease life cycles (Reno)

Not reporting on this Output for this Annual Report

Output #3

Output Measure

- PROVIDE TECHNOLOGY, MODELS AND ANALYSES THAT INFORM DECISION-MAKERS, INDUSTRY, AND PEERS REGARDING FOOD PRODUCTION – provide fishery scientists and the fishing industry with information on how stock assessments to evaluate stock status, harvest management policies, and areas of misunderstanding or disagreement between fishery scientists and fishing industry (Sampson) – publications and educational materials and programs describing drivers of fishing change plus incentive-based and other management tools, their applicability to Oregon fishery problems and fishing community sustainability (Hanna) – produce economic and market information to improve fisheries management and marketing in Oregon and the Pacific Northwest (Sylvia) and PROVIDE ECONOMIC AND MARKETING MODELS AND ANALYSES THAT INFORM DECISION-MAKERS, INDUSTRY, AND PEERS

Year	Target	Actual
2008	5	21

Output #4

Output Measure

- DEVELOP IMPROVED ANIMAL AND PLANT PRODUCTION SYSTEMS – develop microparticulate diets for marine fish larvae(Langdon)

Not reporting on this Output for this Annual Report

Output #5

Output Measure

- SCHOLARLY excellence in referred articles, book chapters, and books; participation on professional boards and panels, as well as science panels.

Year	Target	Actual
2008	9	53

Output #6

Output Measure

- EFFECTS ON AND PROTECTION OF ENVIRONMENTAL HEALTH AND ECOLOGY – compare information gained through life history information synthesis, molecular genetic laboratory analyses, otolith elemental and isotopic analyses to evaluate fish life history variations and migration behaviors (Miller) – characterize for marine resource managers seasonal distributions of endangered great whales and characterize their year-round critical habitats (Mate)

Year	Target	Actual
2008	12	4

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O No.	OUTCOME NAME
1	Knowledge generated regarding marine fisheries and their management: • Fisheries managers and researchers are informed of critical life history and migratory issues, i.e., whether there is genetic variation associated with the variations in juvenile migratory behavior of Chinook and coho salmon within coastal watersheds, if stream-estuary ecotone is important to the survival of coastal coho in Oregon, and larval dispersal and juvenile and adult movement patterns in Pacific rockfish and Pacific herring • Informed managers and industry about how stock assessments can be used to evaluate stock status, harvest management policies, and areas of misunderstanding or disagreement between fishery scientists and fishing industry • Managers are more aware about incentive-based fishery management tools, spatial ocean management approaches, community-based management, and ecosystem-based management. • Knowledge and awareness increased of traceability and case studies for seafood industry and educators. • Educate the shrimp industry and resource managers on new approaches for managing the fishery to increase economic benefits. Educate stakeholders and managers on using market-based tools for managing the environmental impacts of fishing
2	• Discuss with aquaculture feed companies the performance of complex microparticle types that provide nutrients to marine larval fish
3	• Understanding of the process of pathogen dispersal.
4	• Provide peers and students with information on location and migration patterns of whales
5	Improved fisheries management: Fisheries managers and researchers use information to establish management and conservation/restoration efforts for salmonids, Pacific rockfish, Pacific herring, and shellfish. Resource managers, industries, and agencies can effect better conservation practices, reduce mortalities, and promote population recovery of whales Better fishery management and ocean policies that are compatible with issues of economics, incentives, communities and ecosystems. Oregon and Pacific Northwest industries will adopt traceability systems for marketing and science research (electronic logbooks). Case studies will be used to teach industry, managers, and students princples of seafood marketing and trade. Policy makers and fishery managers will adopt new approaches for managing the pink shrimp fishery and the environmental effects of fishing. Alter fisheries management strategies to encompass detailed knowledge of the dispersal/disease process
6	Improve nutrition of early larval stages of marine fish with microparticle feeds
7	Contributions are made toward ecosystem-based fisheries management and habitat restoration efforts for Pacific fish, shellfish and whales. Enhanced fish, shellfish, and whale populations will be of economic value in tourism, to restore health and stability to marine food webs, and to achieve a more enlightened populace with regard to the value of habitats and conservation. • Ocean resource management approaches that integrate ecological and economic components and promote sustained economic productivity for the Oregon seafood industry. • Traceability will increase marketing success and generate higher exvessel prices and profits for fishermen, processors, and retailers. Traceability will also be used to collect science information to improve science and management. Case studies will improve the success of seafood marketing, improve fishery management, and generate greater industry profit and social and economic benefits. • There will be an increase in economic and social benefits through the improved management of Oregon's pink shrimp fishery. The adoption of rights based approaches for managing the environmental effects of fishing will improve economic performance of the industry while also protecting marine species, habitats, and ecosystems. • Improvements in marine fish nutrition will result in expansion of marine aquaculture to meet the increased global demand for fish. • The Pacific oyster breeding program will provide significant benefits to this $3.7 billion dollar industry as well as provide global benefits through its approach to oyster breeding. • Reduce impact of disease on wild and cultured salmonids

Outcome #1

1. Outcome Measures

Knowledge generated regarding marine fisheries and their management:

- Fisheries managers and researchers are informed of critical life history and migratory issues, i.e., whether there is genetic variation associated with the variations in juvenile migratory behavior of Chinook and coho salmon within coastal watersheds, if stream-estuary ecotone is important to the survival of coastal coho in Oregon, and larval dispersal and juvenile and adult movement patterns in Pacific rockfish and Pacific herring
- Informed managers and industry about how stock assessments can be used to evaluate stock status, harvest management policies, and areas of misunderstanding or disagreement between fishery scientists and fishing industry
- Managers are more aware about incentive-based fishery management tools, spatial ocean management approaches, community-based management, and ecosystem-based management.
- Knowledge and awareness increased of traceability and case studies for seafood industry and educators.
- Educate the shrimp industry and resource managers on new approaches for managing the fishery to increase economic benefits. Educate stakeholders and managers on using market-based tools for managing the environmental impacts of fishing

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2008	0	25

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

The fishing community was motivated to explore alternative spatial management regulations to maximize harvest of hatchery Chinook salmon while reducing harvest impacts to a local, naturally-spawning population of concern. There was, however, no information on the spatial and temporal pattern of stock composition in the terminal fishery with which to evaluate current and alternative management scenarios.

What has been done

Developed methodologies for reconstruction of juvenile salmonid migration histories and the application of those methodologies to studies focused on variability in ocean survival of Chinook salmon. Additionally, current research is determining how juvenile migratory behavior of Chinook salmon affects interannual patterns of survival. Through a collaborative project with state agencies and a nonprofit, the team combined genetic and otolith isotopic data to provide information on the mixed stock composition of a terminal fishery.

Results

The research completed has focused on providing measurable indicators of life history variation in marine and anadromous fishes relevant to sound management and conservation. Understanding and quantifying these synergistic relationships should lead to more robust predictions of year-class strength for local Chinook salmon populations. The collaborative team and local salmon fisherman working together were able to provide the first estimate of the mixed stock composition for this terminal fishery, thereby allowing for an assessment of potential impact to the local naturally-spawning run and evaluate the efficacy of the current spatial management regulation.

4. Associated Knowledge Areas

KA Code	Knowledge Area

605	Natural Resource and Environmental Economics
135	Aquatic and Terrestrial Wildlife
604	Marketing and Distribution Practices

Outcome #2

1. Outcome Measures

• Discuss with aquaculture feed companies the performance of complex microparticle types that provide nutrients to marine larval fish

Not reporting on this Outcome for this Annual Report

Outcome #3

1. Outcome Measures

• Understanding of the process of pathogen dispersal.

Not reporting on this Outcome for this Annual Report

Outcome #4

1. Outcome Measures

• Provide peers and students with information on location and migration patterns of whales

Not reporting on this Outcome for this Annual Report

Outcome #5

1. Outcome Measures

Improved fisheries management: Fisheries managers and researchers use information to establish management and conservation/restoration efforts for salmonids, Pacific rockfish, Pacific herring, and shellfish. Resource managers, industries, and agencies can effect better conservation practices, reduce mortalities, and promote population recovery of whales Better fishery management and ocean policies that are compatible with issues of economics, incentives, communities and ecosystems. Oregon and Pacific Northwest industries will adopt traceability systems for marketing and science research (electronic logbooks). Case studies will be used to teach industry, managers, and students princples of seafood marketing and trade. Policy makers and fishery managers will adopt new approaches for managing the pink shrimp fishery and the environmental effects of fishing. Alter fisheries management strategies to encompass detailed knowledge of the dispersal/disease process

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2008	0	4

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

This project seeks to improve the quality, accuracy and understanding of the stock assessment results and harvest management procedures used in the management of Oregon's fisheries so that they can achieve greater economic benefits.

What has been done

Developed methodologies for the reestablishment of local, native oyster (Ostrea conchaphila). Native oysters were outplanted at three densities to quantify effects of oyster density on growth and reproduction rates as well as impacts to native eelgras (Zostera marina). Other research includes efforts to take stock assessments for black rockfish using a time-series modeling approach to predict when catch quotas are met. Others are using biochemical markers to understand migration of cartilaginous fishes.

Results

The results from these studies have been disseminated to fisheries managers. The selection of of outplanting densities of the local, native oyster for the second year of restoration efforts was based directly on the findings of this research. The stock assessment of black rockfish was adopted by the Pacific Fishery Management Council and provided a bases for substantially increased harvest quotas for 2009 and 2010.

4. Associated Knowledge Areas

KA Code	Knowledge Area
604	Marketing and Distribution Practices
311	Animal Diseases
135	Aquatic and Terrestrial Wildlife
605	Natural Resource and Environmental Economics
303	Genetic Improvement of Animals

Outcome #6

1. Outcome Measures

Improve nutrition of early larval stages of marine fish with microparticle feeds

Not reporting on this Outcome for this Annual Report

Outcome #7

1. Outcome Measures

Contributions are made toward ecosystem-based fisheries management and habitat restoration efforts for Pacific fish, shellfish and whales. Enhanced fish, shellfish, and whale populations will be of economic value in tourism, to restore health and stability to marine food webs, and to achieve a more enlightened populace with regard to the value of habitats and conservation.

- Ocean resource management approaches that integrate ecological and economic components and promote sustained economic productivity for the Oregon seafood industry.
- Traceability will increase marketing success and generate higher exvessel prices and profits for fishermen, processors, and retailers. Traceability will also be used to collect science information to improve science and management. Case studies will improve the success of seafood marketing, improve fishery management, and generate greater industry profit and social and economic benefits.
- There will be an increase in economic and social benefits through the improved management of Oregon's pink shrimp fishery. The adoption of rights based approaches for managing the environmental effects of fishing will improve economic performance of the industry while also protecting marine species, habitats, and ecosystems.
- Improvements in marine fish nutrition will result in expansion of marine aquaculture to meet the increased global demand for fish.
- The Pacific oyster breeding program will provide significant benefits to this $3.7 billion dollar industry as well as provide global benefits through its approach to oyster breeding.
- Reduce impact of disease on wild and cultured salmonids

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2008	0	10

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

The workshops and reports on economic data resulting from this research are expected to lead to recommendations for enhanced investment in the information base supporting decision-making related to marine reserves, coastal communities, economic uses of ocean space, and a broad suite of ocean management. Results should also lead to better integration of economic and ecological components of a sustainable seafood industry.

What has been done

Produced knowledge for fishermen through presentations, publications, and computer tools on new approaches for using traceability concepts via barcoding, computers, and websites for tracing seafood and related science and fishery information through market systems. Trained over 40 individuals in three workshops and one report on using multiattribute decisiomaking computer tools on improving fishery management and reducing environmental impacts of fishery management.

Results

Workshops and reports led to increases in knowledge among ocean and fishery managers about the economic dimensions of marine reserves, spatial ocean planning, fishery management and ocean planning. Activities also led to increased knowledge of the properties of market-based management tools and the economic data and research needed to support decision-making about ocean resources. The traceability project including ocean science, barcoding, time temperature information, and the use of a comprehensive web site and kiosks opens a new opportunity for marketing seafood. Through the use of the PacificFishTrax website, consumers are learning how their seafood is harvested and processed and making connections to local food and the fishermen, processors, scientists, and managers working together to sustainably produce that food.

4. Associated Knowledge Areas

KA Code	Knowledge Area
604	Marketing and Distribution Practices
135	Aquatic and Terrestrial Wildlife
605	Natural Resource and Environmental Economics

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 Public priorities
- Competing Programmatic Challenges
- Populations changes (immigration,new cultural groupings,etc.)

Brief Explanation

{No Data Entered}

V(I). Planned Program (Evaluation Studies and Data Collection)

1. Evaluation Studies Planned

- Other (peer review process)

Evaluation Results

{No Data Entered}

Key Items of Evaluation

{No Data Entered}

Program #6

V(A). Planned Program (Summary)

1. Name of the Planned Program

Soil, Water, and Environmental Systems

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
101	Appraisal of Soil Resources	15%		16%	
102	Soil, Plant, Water, Nutrient Relationships	40%		58%	
103	Management of Saline and Sodic Soils and Salinity	15%		0%	
136	Conservation of Biological Diversity	30%		26%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

1. Actual amount of professional FTE/SYs expended this Program

Year: 2008	Extension		Research	
	1862	**1890**	**1862**	**1890**
Plan	0.0	0.0	5.7	0.0
Actual	0.2	0.0	3.9	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	190736	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
0	0	1104151	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
0	0	1291920	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

- Conduct Research Experiments.

- Conduct Workshops, meetings.

- Develop Products, Curriculum, Resources.

- Provide Training.

- Assessments.

2. Brief description of the target audience

Professional peers and scientific communities

State, federal, and international agencies–Soil and Water Conservation Districts, Natural Resource Conservation Service, Oregon Department of Agriculture, Department of Energy, USDA, NSF, United Nations

Natural resource and agricultural industry clientele

Undergraduate and graduate students being trained in research activities

V(E). Planned Program (Outputs)

1. Standard output measures

Target for the number of persons (contacts) reached through direct and indirect contact methods

	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	**Target**	**Target**	**Target**	**Target**
Plan	500	1000	0	0
2008	100	100	0	0

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

Patent Applications Submitted

Year	Target
Plan:	0
2008 :	0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

	Extension	Research	Total
Plan	0	12	
2008	0	26	26

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- SCHOLARLY excellence in referred articles, book chapters, and books; participation on professional boards and panels, as well as science panels.

Year	Target	Actual
2008	18	91

Output #2

Output Measure

- EFFECTS ON AND PROTECTION OF ENVIRONMENTAL HEALTH AND ECOLOGY – improve understanding about fluxes of energy and mass in soils by peers and clients – improve understanding of how abiotic and biotic factors influence size and composition of microbial communities in soil and how microorganisms affect key soil and plant processes. – Assess soil-landscape evolution in Oregon and partition soil respiration measurements on the landscape scale

Year	Target	Actual
2008	900	21

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O No.	OUTCOME NAME
1	New research methods and discoveries will be published in the areas of fluid movement though soils, biogeochemical recycling in soils, carbon and nitrogen cycling in soils, microbial diversity in soils, and soil-landscape evolution.
2	New research methods will be adopted by the research community. Research on fluid flows in soils will allow for better waste material containment facility design. Research on carbon and nitrogen cycling will lead to better regional and national nutrient sequestration plans as partial solutions for nutrient contamination and global warming concerns. Research on microbial diversity will lead to better understandings of changes that occur in soils under different management regimes, of inherent differences in soil microbe diversity, and of the ability of soils to recover from events that affect microbial populations. Research on soil-landscape evolution will allow for use of remote-sensing and modeling techniques to predict the affects of human, biotic and abiotic forces on soil formation and to use this information in soil mapping, land use planning and other activities.
3	Nuclear and other waste storage will be safer. Global warming will be addressed in part by carbon sequestration strategies. Soil microbial health will be maintained or improved. Soil maps will be available as a resource assessment tool where they are now not available.

Outcome #1

1. Outcome Measures

New research methods and discoveries will be published in the areas of fluid movement though soils, biogeochemical recycling in soils, carbon and nitrogen cycling in soils, microbial diversity in soils, and soil-landscape evolution.

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2008	300	15

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Disseminated knowledge from this study provides the research community and land managers with a better understanding of changes in soil under different management regimes, the effect of fluid movement through soils and biogeochemical recycling processes in soils.

What has been done

Research methods, discoveries and results were published and disseminated to stakeholders and the research community. Areas of research include fluid movement through soils, biogeochemical recycling in soils, carbon and nitrogen cycling in soils, microbial diversity in soils and soil-landscape evolution.

Results

Published matter includes refereed book chapters and journal articles.

4. Associated Knowledge Areas

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships
103	Management of Saline and Sodic Soils and Salinity
101	Appraisal of Soil Resources
136	Conservation of Biological Diversity

Outcome #2

1. Outcome Measures

New research methods will be adopted by the research community. Research on fluid flows in soils will allow for better waste material containment facility design. Research on carbon and nitrogen cycling will lead to better regional and national nutrient sequestration plans as partial solutions for nutrient contamination and global warming concerns. Research on microbial diversity will lead to better understandings of changes that occur in soils under different management regimes, of inherent differences in soil microbe diversity, and of the ability of soils to recover from events that affect microbial populations. Research on soil-landscape evolution will allow for use of remote-sensing and modeling techniques to predict the affects of human, biotic and abiotic forces on soil formation and to use this information in soil mapping, land use planning and other activities.

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2008	0	6

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

This information may be useful to understanding how soil ecosystems will respond to changes brought about through management or more gradual environmental change. The positive effect on soil fertility of the incorporation of plant residues into the soil prior to planting has been recognized by farmers since the beginning of agriculture. Increasingly in developing countries, this woody plant material is being used as firewood rather than as a soil amendment or nutrient source. Our results serve to remind the farmer of the benefits of incorporation and decomposition of crop residues on soil fertility.

What has been done

A collaborative team of Oregon State University, national and international scientists have conducted theoretical, field and laboratory research on the relationship between organic matter to soil properties. Specifically, the team has investigated the effect of orgnaic matter on microbial activity in the soil, the ability to predict vegetation composition at the surface and the process of water infiltration through the soil.

Results

This work has demonstrated the utility of a new method for studying the relative contribution of bacteria and fungi to various properties in the soil. One finding was that the compostion of overall bacterial and fungal communities responded to this perturbation within one or two years but a general measure of microbial activity, soil respiration, was not affected. This suggests that although there is redundancy in the microbial community for a general process such as decomposition. Conversely, more specific microbial activities, such as nitrification and denitrification, responded more quickly to this change than did the composition of their bacterial communities. This suggests that physiological responses of the microbial community likely prestage changes in community structure.

4. Associated Knowledge Areas

KA Code	Knowledge Area
101	Appraisal of Soil Resources
136	Conservation of Biological Diversity
102	Soil, Plant, Water, Nutrient Relationships
103	Management of Saline and Sodic Soils and Salinity

Outcome #3

1. Outcome Measures

Nuclear and other waste storage will be safer. Global warming will be addressed in part by carbon sequestration strategies. Soil microbial health will be maintained or improved. Soil maps will be available as a resource assessment tool where they are now not available.

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2008	0	5

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Metropolitan areas and large-engineered facilites, such as nuclear power plants, in the United States and around the world remain vulnerable to catastrophic seismic activity. Scientists at OSU seek to improve earthquake-hazard assessments. Global warming, another large-scale issue, will have untold affects on the globe. OSU scientists are researching carbon sequestration strategies.

What has been done

A team of scientists have developed a new theory of predictive spatial geochronology and its application of mapping to landscapes, with examples of faulted volcanic terrain. This should lead to improved earthquake-hazard studies assessing siesmic vulnerabilities. Carbon sequestration studes have modeled the effect of shrub species on sequestration in soils across a large region for the next century, given different land management scenarios.

Results

Current results have been shared with appropriate stakeholders. Research is ongoing.

4. Associated Knowledge Areas

KA Code	Knowledge Area
101	Appraisal of Soil Resources
103	Management of Saline and Sodic Soils and Salinity
102	Soil, Plant, Water, Nutrient Relationships

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Appropriations changes
- Public Policy changes
- Competing Public priorities
- Competing Programmatic Challenges
- Populations changes (immigration,new cultural groupings,etc.)

Brief Explanation

{No Data Entered}

V(I). Planned Program (Evaluation Studies and Data Collection)

1. Evaluation Studies Planned

-

Evaluation Results

{No Data Entered}

Key Items of Evaluation

{No Data Entered}

Program #7

V(A). Planned Program (Summary)

1. Name of the Planned Program

Conservation and Restoration of Aquatic, Marine and Terrestrial Ecosystems

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%		18%	
135	Aquatic and Terrestrial Wildlife	60%		45%	
136	Conservation of Biological Diversity	30%		37%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

1. Actual amount of professional FTE/SYs expended this Program

Year: 2008	Extension		Research	
	1862	1890	1862	1890
Plan	0.6	0.0	4.5	0.0
Actual	0.1	0.0	1.4	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	43484	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
0	0	281171	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
0	0	1019366	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

•Conducting field and laboratory experiments and data collection. •Developing individual and community models of terrestrial and aquatic systems. •Developing curricular materials. •Developing monitoring protocols. •Presenting seminars and professional talks. •Conducting workshops and training sessions. •Publishing scientific findings.

2. Brief description of the target audience

The proposed program has numerous target audiences:

•Natural resources policy makers •State, federal, private, and nonprofit organization natural resources managers •University, state, federal and industry scientists •Watershed councils •Community leaders •Environmental educators •Natural resource users •Urban and rural citizens

V(E). Planned Program (Outputs)

1. Standard output measures

Target for the number of persons (contacts) reached through direct and indirect contact methods

	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	Target	Target	Target	Target
Plan	3000	5000	500	2000
2008	3000	5000	0	0

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

Patent Applications Submitted

Year	Target
Plan:	0
2008 :	0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

	Extension	Research	Total
Plan	0	35	
2008	0	16	16

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- SCHOLARLY excellence in referred articles, book chapters, and books; participation on professional boards and panels, as well as science panels.

Year	Target	Actual
2008	45	90

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O No.	OUTCOME NAME
1	Approximately 8,000 adults and 2,500 youth per year will have increased awareness and knowledge of ecosystem processes and functions and methods for restoring degraded habitats.
2	As a result of this program individuals will modify behaviors and practices so that ecosystem functions and processes can be restored. Policy makers will develop incentives, rules and regulations that prevent further resource damage or encourage ecosystem restoration.
3	Changes in policies will result in sustainable natural resources use or restoration of ecosystems with positive impacts on social, economic, and environmental conditions.

Outcome #1

1. Outcome Measures

Approximately 8,000 adults and 2,500 youth per year will have increased awareness and knowledge of ecosystem processes and functions and methods for restoring degraded habitats.

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2008	10500	9000

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Conservation, restoration and management of native fishes, primarily salmon and steelhead, are of major importance throughout the Pacific Northwest. Tribal, commercial and recreational angling harvest rely upon scientifically-based management of these fish species. A number of populations of all these species are listed under federal or state legislation and so must receive protection or restoration efforts. Enormously complex historical, economic, social and cultural factors affect salmon and steelhead. Federal listing of species, or closure of harvest can result in very substantial economic impacts on major sectors of the economy, especially in coastal areas. The operation of hydroelectric dams, forestry and agricultural practices and urban development can have significant impact on salmonid populations.

What has been done

The Oregon Hatchery Research Center (OHRC) has conducted a number of meetings with Watershed Councils, Lincoln County School District, the OHRC Advisory Commmittee, the Oregon Department of Fish and Wildlife, local community groups, recreational anglers, and Fish Conservation groups, in addition to formal Research Workshops. We have carried out collaborative research at the OHRC with colleagues from OSU, US - EPA, USGS, FWS, NMFS, NOAA, and national and international colleagues from academia. We have given invited research presentations at research conferences.

Results

We are producing a series of publications and reports, in electronic format, printed and electronic newsletters, and in the primary scientific literature. We have established and tested hatchery production techniques for commercially formulated fish diets, routine handling procedures for hatchery fish, handling of wild brood stock, and assessment of behavioral and physiological condition in hatchery and wild fish. We have detailed studies in progress to determine the relative contributions of genetics and early experience on growth, survival and reproduction of wild and hatchery salmon and steelhead. We have recently completed a combined field and laboratorystudy to establish operational techniques for management of hatchery steelhead in river systems with protected wild stocks of the same species. We have just initiated a large-scale study of the factors determining freshwater survival of juvenile steelhead, and will follow those fish through an international ocean tracking system to correlate freshwater and marine survival.

4. Associated Knowledge Areas

KA Code	Knowledge Area
136	Conservation of Biological Diversity
112	Watershed Protection and Management
135	Aquatic and Terrestrial Wildlife

Outcome #2

1. Outcome Measures

As a result of this program individuals will modify behaviors and practices so that ecosystem functions and processes can be restored. Policy makers will develop incentives, rules and regulations that prevent further resource damage or encourage ecosystem restoration.

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2008	0	10

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Large river floodplains in the Pacific Northwest are the most ecologically and economically productive lands in the region.

What has been done

We have integrated a study of thermal patterns in the Willamette River, development of a model of hyporheic influence on water temperature, creation of dynamic visualizations of technical concepts and research results. We developed empirical water temperature data, models of hyporheic exchange, tools for geographic prioritization to an iterative, and interaction with citizens and agencies to find socially plausible solutions.

Results

We have used this information and informatics tools to work with regional decision makers and state agencies to simultaneously derive water temperature reductions, terrestrial and aquatic habitat enhancements, increased recreation and improved non-structural flood storage in large river floodplains while meeting the requirements of the Clean Water Act Total Maximum Daily Load (TMDL) for elevated temperature as a water quality limiting factor and federal Endangered Species Act concerns for elevated stream temperature effects on listed salmonids and other native riverine species. We worked with the Willamette Partnership to provide the technical foundation for developing a market-based thermal credit trading system in the Willamette River mainstem.

4. Associated Knowledge Areas

KA Code	Knowledge Area
112	Watershed Protection and Management
135	Aquatic and Terrestrial Wildlife
136	Conservation of Biological Diversity

Outcome #3

1. Outcome Measures

Changes in policies will result in sustainable natural resources use or restoration of ecosystems with positive impacts on social, economic, and environmental conditions.

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2008	0	10

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Livestock grazing is a prevalent land use in the western United States. Although much research has focused on examining the impact of livestock grazing on grassland biodiversity and ecosystem function, past studies have been limited in several ways. Most have been observational studies rather than experimental manipulations, most have been conducted at limited spatial and temporal scales, and most have examined only presence and absence of livestock grazing rather than diffent intensities of grazing.

What has been done

My collaborators and I are conducting a large-scale field manipulaton in eastern Oregon grasslands examining four different levels of livestock grazing (none, low, medium, and high intensity grazing). We are examining a variety of response variables related to biodiversity and ecosystem function, including diversity and community composition of plants, invertebrates, birds, food web dynamics, and pollinations services. We are also examining the response of cattle with respect to weight gained and diet preferences to treatment.

Results

Results from this study will be useful to livestock producers and resource managers in developing sustainable grazing practices that minimize negative ecological effects and maximize economic return to the grower.

4. Associated Knowledge Areas

KA Code	Knowledge Area
112	Watershed Protection and Management
136	Conservation of Biological Diversity
135	Aquatic and Terrestrial Wildlife

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 Public priorities
- Competing Programmatic Challenges
- Populations changes (immigration,new cultural groupings,etc.)

Brief Explanation

{No Data Entered}

V(I). Planned Program (Evaluation Studies and Data Collection)

1. Evaluation Studies Planned

-

Evaluation Results

{No Data Entered}

Key Items of Evaluation

{No Data Entered}

Program #8

V(A). Planned Program (Summary)

1. Name of the Planned Program

Microbiology and a Healthy World

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			7%	
135	Aquatic and Terrestrial Wildlife			7%	
136	Conservation of Biological Diversity			7%	
201	Plant Genome, Genetics, and Genetic Mechanisms			7%	
212	Pathogens and Nematodes Affecting Plants			19%	
311	Animal Diseases			7%	
313	Internal Parasites in Animals			7%	
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins			7%	
723	Hazards to Human Health and Safety			32%	
	Total			100%	

V(C). Planned Program (Inputs)

1. Actual amount of professional FTE/SYs expended this Program

Year: 2008	Extension		Research	
	1862	1890	1862	1890
Plan	0.0	0.0	3.7	0.0
Actual	0.0	0.0	2.8	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	102529	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
0	0	784235	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
0	0	528671	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

- Conduct Research Experiments.

- Develop Products.

- Provide Training.

- Assessments.

- Partnering.

2. Brief description of the target audience

Salmonid industry
iomedical researchers
oceanographers
climatographers
agricultural producers
virologists

V(E). Planned Program (Outputs)

1. Standard output measures

Target for the number of persons (contacts) reached through direct and indirect contact methods

	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	**Target**	**Target**	**Target**	**Target**
Plan	600	2800	0	0
2008	300	1400	0	0

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

Patent Applications Submitted

Year	Target
Plan:	0
2008 :	0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

	Extension	Research	Total
Plan	0	12	
2008	0	21	21

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- SCHOLARLY excellence in referred articles, book chapters, and books; participation on professional boards and panels, as well as science panels.

Year	Target	Actual
2008	16	39

Output #2

Output Measure

- CARRY OUT STUDIES TO DECIPHER GENOMES, GENETICS AND MECHANISMS OF BACTERIA AND VIRUSES AND OTHER MICROORGANISMS – identify aspects of biology and biotechnology of viruses and bacteria that affect human health

Year	Target	Actual
2008	3	9

Output #3

Output Measure

- CARRY OUT STUDIES TO DECIPHER GENOMES, GENETICS AND MECHANISMS OF PLANTS AND ANIMALS – identify characteristics of food and water systems

Year	Target	Actual
2008	1	1

Output #4

Output Measure

- PROVIDE ADDITIONAL UNDERSTANDING FOR PLANT AND ANIMAL PROTECTION FROM DISEASES AND PESTS – identify genetic mechanisms of plant pathogens – describe characteristics of and changes due to zebrafish and salmonid diseases

Year	Target	Actual
2008	5	6

Output #5

Output Measure

- EFFECTS ON AND PROTECTION OF ENVIRONMENTAL HEALTH – identify marine microbial expressions of environmental health

Year	Target	Actual
2008	1	9

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O No.	OUTCOME NAME
1	UNDERSTAND ROLE OF PROTEINS AND MOLECULAR BIOLOGY TO MITIGATE DISEASE - Experiments will increase peer understanding of the structure, function and regulation of the VV G1L proteinase and the role that it plays during the assembly and maturation of infectious progeny virions - Experiments will increase peer understanding of the role a number of critical proteins play in baculovirus genome replication and processing. - understand the molecular mechanisms of quorum sensing function and consequences of these distinct properties, which will have important implications for the development of antivirulence strategies as well as for the particular role of each signaling system in P. aeruginosa group behavior and pathogenesis. - gain more detailed knowledge about the molecular biology of RNA viruses affecting corps, animals and humans, e.g., early stages of viral infection, Trojan horse model, translational enhancer sequences, dicistronic expression. - peers learn how the GALLS protein participates in gene transfer to plants and its role in plant transformation - researchers will assess chromatophore cells for their use as a living sensor for rapid detection of food- and water- associated pathogenic bacteria and their toxins. - learn about new microorganisms and the mechanisms by which microorganisms acquire and utilize foreign DNA
2	Scientists learn to use SAR11 for investigations aimed at understanding how plankton cells use light dependent proton pumps, and impact the efficiency of carbon cycling in the ocean surface.
3	Fish health managers and veterinarians gain information on host and geographic range, pathogenesis, taxonomy, modes of transmission, and treatment of infectious and toxicological diseases of importance to wild and cultured fishes, particularly those afflicting fishes in the Pacific Northwest region and how to minimize the impact of these diseases.
4	Appllication of new assays and technology will help combat viruses - .assay development and biochemical details of proteolysis will support ongoing rational drug design and high throughput screening efforts designed to develop G1L inhibitors as potential antiviral drugs. - assist in the continued application of baculovirus technology to a variety of investigations that have become so dependent upon the use of this remarkable group of viruses. - information about molecular biology of RNA viruses could be used in designing new approaches for combating pathogenesis by these viruses.
5	the knowledge about atmospheric carbon and carbon sequestered in oceanic waters will enable more accurate models for the global carbon cycle

Outcome #1

1. Outcome Measures

UNDERSTAND ROLE OF PROTEINS AND MOLECULAR BIOLOGY TO MITIGATE DISEASE - Experiments will increase peer understanding of the structure, function and regulation of the VV G1L proteinase and the role that it plays during the assembly and maturation of infectious progeny virions - Experiments will increase peer understanding of the role a number of critical proteins play in baculovirus genome replication and processing. - understand the molecular mechanisms of quorum sensing function and consequences of these distinct properties, which will have important implications for the development of antivirulence strategies as well as for the particular role of each signaling system in P. aeruginosa group behavior and pathogenesis. - gain more detailed knowledge about the molecular biology of RNA viruses affecting corps, animals and humans, e.g., early stages of viral infection, Trojan horse model, translational enhancer sequences, dicistronic expression. - peers learn how the GALLS protein participates in gene transfer to plants and its role in plant transformation - researchers will assess chromatophore cells for their use as a living sensor for rapid detection of food- and water- associated pathogenic bacteria and their toxins. - learn about new microorganisms and the mechanisms by which microorganisms acquire and utilize foreign DNA

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2008	0	5

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Food and water associated bacterial illnesses cost the U.S. economy well in excess of $10 billion annually. Besides accidental contamination, our diverse food and water supplies are also vulnerable to intentional tampering. A novel approach for evaluating the toxicity of food- and water-associated pathogenic bacteria and the environments that support their presence uses fish chromatophore cells which act as an incredibly accurate surrogate for human cells in their response to pathogenic bacteria

What has been done

We evaluated the applicability and sensitivity of this cell based biosensor for the toxicity evaluation of a broad range of food- and water-associated pathogenic bacteria, their related toxic agents and the environments that support their activities.

Results

We discovered that food-associated toxin-producing bacteria specifically cause the pigment organelles of erythrophores from Betta splendens (Siamese fighting fish) to migrate rapidly to the cell center, similar to the response seen when these fish are sick or frightened. In essence, what we have discovered is that a response related to stress or sickness, can be used to monitor the toxicity of the surrounding environment. This cell-based bioassay is expected to ultimately have wide impact in toxin detection in the food industry because of the simplicity of the assay.

4. Associated Knowledge Areas

KA Code	Knowledge Area
212	Pathogens and Nematodes Affecting Plants
135	Aquatic and Terrestrial Wildlife
311	Animal Diseases
201	Plant Genome, Genetics, and Genetic Mechanisms

136	Conservation of Biological Diversity

Outcome #2

1. Outcome Measures

Scientists learn to use SAR11 for investigations aimed at understanding how plankton cells use light dependent proton pumps, and impact the efficiency of carbon cycling in the ocean surface.

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2008	10	5

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Our quest to understand keystone microbial plankton species is leading us to develop an important theory about their metabolism and evolution. Unusual patterns of genome streamlining, genome reduction, and metabolic and regulatory re-organization are emerging in some cosmopolitan marine microbial species. Specifically, these organisms deviate from the common paradigm of alternative substrate carbon metabolism, in which metabolism is understood as a pliant web of regulatory mechanisms and enzymatically catalyzed reactions that confer the ability to shift between different nutrient resources. E. coli is the archetype of that model.

What has been done

The study of globally distributed organisms such as SAR11 suggests a very different model that maximizes growth efficiency by minimizing complexity, making these organisms directly dependent on other species for compounds they need to survive. An important feature of this model is that it confers the ability to efficiently use many compounds simultaneously, at the sacrifice of versatility. This model may help to explain the massive accumulation of DOM in the oceans, to predict what molecules are oxidized to carbon dioxide, and to understand the resiliency of planktonic communities to global change.

Results

Considered more broadly, our progress in culturing keystone plankton species and supplying genome sequences to the scientific community can be measured by the numerous publications from other researchers that use these genome sequences to interpret metagenomic data. This technological 'know how' and its products are clearly playing an important role in the advancement of knowledge about marine microbial ecology.

4. Associated Knowledge Areas

KA Code	Knowledge Area
135	Aquatic and Terrestrial Wildlife

Outcome #3

1. Outcome Measures

Fish health managers and veterinarians gain information on host and geographic range, pathogenesis, taxonomy, modes of transmission, and treatment of infectious and toxicological diseases of importance to wild and cultured fishes, particularly those afflicting fishes in the Pacific Northwest region and how to minimize the impact of these diseases.

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2008	10	12

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Various infectious diseases affect the health of fish, along with the economic viability of the associated fishing industries. Diseases also threaten certain fish species that serve as important laboratory models.

What has been done

Described three new species of myxozoan parasites from fishes, looked at a variety of diseases and stressors in fish.

Results

Four publications were released and eight other peer articles are in press.

4. Associated Knowledge Areas

KA Code	Knowledge Area
135	Aquatic and Terrestrial Wildlife
311	Animal Diseases

Outcome #4

1. Outcome Measures

Appllication of new assays and technology will help combat viruses - .assay development and biochemical details of proteolysis will support ongoing rational drug design and high throughput screening efforts designed to develop G1L inhibitors as potential antiviral drugs. - assist in the continued application of baculovirus technology to a variety of investigations that have become so dependent upon the use of this remarkable group of viruses. - information about molecular biology of RNA viruses could be used in designing new approaches for combating pathogenesis by these viruses.
Not reporting on this Outcome for this Annual Report

Outcome #5

1. Outcome Measures

the knowledge about atmospheric carbon and carbon sequestered in oceanic waters will enable more accurate models for the global carbon cycle

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2008	0	5

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

One of the striking observations to emerge from the large-scale cultivation of oligotrophic bacterioplankton is that many strains can grow in autoclaved seawater. However, they often stop growing at cell densities similar to those observed in nature (104-106 cells/ml), prompting questions about factors that limit their growth.

What has been done

The most intensively studied case is SAR11 (Pelagibacter), which initially would not grow to densities above 106 cells/ml, and was found to have unusual requirements for the amino acid glycine and reduced forms of sulfur Tripp et al., 2008, a,b)). These requirements were traced to metabolic shortcuts that apparently evolved in these organisms in response to selective pressure to maintain a minimal genome size (Giovannoni et al., 2008).

Results

In the presence of added glycine and reduced sulfur in the form of methionine, SAR11 cells can now be grown in culture to 107 cells/ml. Ongoing work is aimed at understanding the factor(s) that limit SAR11 growth in seawater supplemented with the requirements that we are aware of, and similar enquiries are underway about other organisms that exhibit an apparent dependence on unidentified factors.
Additionally, new culturing technologies developed at OSU's High Throughput Culturing laboratory are being applied widely to culture new microorganisms from important environments. New findings extend basic knowledge about marine microbial diversity, and describe factors that control plankton populations that are being used by scientists directly addressing socially relevant issues, such as predicting environmental responses to global change, forecasting environmental impacts, and evaluating geoengineering plans.

4. Associated Knowledge Areas

KA Code	Knowledge Area
136	Conservation of Biological Diversity
135	Aquatic and Terrestrial Wildlife

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Economy
- Appropriations changes
- Public Policy changes
- Competing Public priorities

Brief Explanation

{No Data Entered}

V(I). Planned Program (Evaluation Studies and Data Collection)

1. Evaluation Studies Planned

- Before-After (before and after program)

Evaluation Results

{No Data Entered}

Key Items of Evaluation

{No Data Entered}

Program #9

V(A). Planned Program (Summary)

1. Name of the Planned Program

Rangeland Ecology and Management

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
121	Management of Range Resources	84%		84%	
125	Agroforestry	16%		16%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

1. Actual amount of professional FTE/SYs expended this Program

Year: 2008	**Extension**		**Research**	
	1862	**1890**	**1862**	**1890**
Plan	0.0	0.0	4.4	0.0
Actual	0.2	0.0	2.8	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	148131	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
0	0	1133034	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
0	0	431578	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

- Conduct Research Experiments.
- Develop Models and Protocols
- Conduct GIS analysis

- Develop Products, Curriculum, Resources.

- Assessments.

- Partnering. - - team development

2. Brief description of the target audience

- peers
- ranchers
- land managers
- policy makers.

farmers, ranchers, government scientists, academics, and the general public, policy-makers (politicians), and land managers.

V(E). Planned Program (Outputs)

1. Standard output measures

Target for the number of persons (contacts) reached through direct and indirect contact methods

	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	**Target**	**Target**	**Target**	**Target**
Plan	26000	57400	525	35050
2008	1500	1500	0	0

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

Patent Applications Submitted

Year	Target
Plan:	0
2008 :	0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

	Extension	Research	Total
Plan	0	3	
2008	0	0	0

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- SCHOLARLY excellence in referred articles, book chapters, and books; participation on professional boards and panels, as well as science panels.

Year	Target	Actual
2008	6	6

Output #2

Output Measure

- EFFECTS ON AND PROTECTION OF ENVIRONMENTAL HEALTH AND ECOLOGY - State-and-transition models developed for riparian zones that incorporate different ecological processes than upland models. - Knowledge of functional groups and a functional group key for meadow riparian systems developed - Awareness of riparian relationships and issues associated with livestock grazaing - Develop and utilize new techniques, technology, and models to characterize sagegrouse habitat, e.g., a new and simplier global positioning system as well as techniques integrating infrared wavelengths of light for more accurate classification algorithms, and on the landscape modeling side, a kinetic resource and environmental spatial systems modeler (KRESS modeler 3.0) developed in 2006 will allow predictions of the suitability of locations on landscapes for either plants or animals. - Understand the floral components and landscape features that contribute to insect biodiversity - Evaluate conservation efforts through long-term trends in population dynamics of insects and discover species previously unknown and interact with taxonomists in getting these species described

Year	Target	Actual
2008	10	18

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O No.	OUTCOME NAME
1	Informed decision-makers and citizenry - Understand threshold concepts within riparian systems as they relate to channel morphology, water table and plant community dynamics - Greater awareness of watersheds/invasive species/animal behaviors/watershed conditions. - Enhance awareness of potential problems associated with riparian grazing. - Improved monitoring and management of rangelands and forest lands, including modeling for preservation and expansion of native ungulates in North America and Asia. - New knowledge about ecology of a variety of insect species and the dynamics of multi-hundred species assemblages in forested habitats
2	Informed policy-making and management Develop and improve successful monitoring and restoration techniques utilizing the knowledge gained from water-table, channel morphology, soil relationships and the associated response in vegetation (functional groups instead of species level data). Application of new knowledge to the development of strategies to diminish the negative impacts of grazing riparian areas. Influence policy within land management agencies on management of riparian systems through an understanding of ecological processes driving maintenance and/or restoration. Improve environmental conditions of riparian systems within the West through promotion of appropriate management decisions based on sound ecological knowledge. Increased land use and management practices to prevent encroaching species such as juniper and Potentilla rect More acceptance of properly managed livestock on wildland watershed. Establish and or modify existing conservation practices including monitoring protocols for biota Indices developed for understanding biodiversity.
3	In the long run: • Improved management of rangelands worldwide • Watersheds managed for soil stability, clean water production, and grazable grasslands for both a quality environment and a sustainable resource production base presents itself.

Outcome #1

1. Outcome Measures

Informed decision-makers and citizenry - Understand threshold concepts within riparian systems as they relate to channel morphology, water table and plant community dynamics - Greater awareness of watersheds/invasive species/animal behaviors/watershed conditions. - Enhance awareness of potential problems associated with riparian grazing. - Improved monitoring and management of rangelands and forest lands, including modeling for preservation and expansion of native ungulates in North America and Asia. - New knowledge about ecology of a variety of insect species and the dynamics of multi-hundred species assemblages in forested habitats

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2008	5	3

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

There is little knowledge on the Lepidoptera species present in central Oregon and their relationship to sagebrush and rabbitbrush dominated plant communities. Capturing moths provided information for documenting species richness and abundance of the Lepidoptera that were present in the sagebrush (Artemisia spp.) steppe community, and therefore contributed to determining the species of caterpillars that may be available for sage-grouse chicks to eat.

What has been done

During 2008 this project consisted of three primary activities: biological control of Mediterranean sage, Lepidoptera biodiversity within coniferous forests of the Pacific Northwest, and international collaboration on long-term monitoring of insect communities in the context of climate change.

Results

Recent research has provided compelling data that shows a positive relationship between caterpillar presence/abundance and sage-grouse chick survival. Our project is the first report to document successful biological control against Mediterranean sage. Changes in knowledge were based on the collection of data regarding abundance and richness of moth species from the HJA Experimental Forest. We have currently documented 611 species and classified them according to spatial and temporal conditions.

4. Associated Knowledge Areas

KA Code	Knowledge Area
121	Management of Range Resources
125	Agroforestry

Outcome #2

1. Outcome Measures

Informed policy-making and management Develop and improve successful monitoring and restoration techniques utilizing the knowledge gained from water-table, channel morphology, soil relationships and the associated response in vegetation (functional groups instead of species level data). Application of new knowledge to the development of strategies to diminish the negative impacts of grazing riparian areas. Influence policy within land management agencies on management of riparian systems through an understanding of ecological processes driving maintenance and/or restoration. Improve environmental conditions of riparian systems within the West through promotion of appropriate management decisions based on sound ecological knowledge. Increased land use and management practices to prevent encroaching species such as juniper and Potentilla rect More acceptance of properly managed livestock on wildland watershed. Establish and or modify existing conservation practices including monitoring protocols for biota Indices developed for understanding biodiversity.

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2008	0	10

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Oregon needs proper functioning stream and riparian systems.

What has been done

We continue to support riparian scientists by developing quantitative measures of parameters that are critical for proper functioning stream and riparian systems. This work is done in conjunction with the USDA/Agricultural Research Service. Discussions and research is on-going to develop and implement BMPs to reduce potential negative impacts of grazing on stream banks.

Results

Best Management Practices (BMPs) including use of off-stream water and mineral supplementation are being implemented by federal and state land management agencies and conservation groups to attract cattle away from riparian areas into upland grazing areas. Best Management Practices have been promoted by the Oregon Watershed Enhancement Board, various SWCDs and Watershed Councils, NRCS, and federal and state management agencies for off-stream water, hardened crossings, riparian pasture development to diminish negative impacts of grazing riparian areas.

4. Associated Knowledge Areas

KA Code	Knowledge Area
121	Management of Range Resources

Outcome #3

1. Outcome Measures

In the long run:

- Improved management of rangelands worldwide
- Watersheds managed for soil stability, clean water production, and grazable grasslands for both a quality environment and a sustainable resource production base presents itself.

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2008	0	5

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

The International Center for Agricultural Research in the Dry Areas (ICARDA) is one of the 15 centers strategically located all over the world and supported by the Consultative Group on International Agricultural Research (CGIAR). With its main research station and offices based in Aleppo, Syria, ICARDA works through a network of partnerships with national, regional and international institutions, universities, non-governmental organizations and ministries in the developing world; and with advanced research institutes in industrialized countries.

What has been done

Technologies developed in our research group are being used in the Middle East and south Asia to monitor the effects of livestock on rangelands. We have recently formed cooperative research program with the Pakistan Agricultural Research Council and the International Center for Agricultural Research in the Dry Areas (ICARDA).

Results

Technologies implemented around the world will improve management and quality of rangelands worldwide.

4. Associated Knowledge Areas

KA Code	Knowledge Area
125	Agroforestry
121	Management of Range Resources

V(H). Planned Program (External Factors)

External factors which affected outcomes

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

Brief Explanation

{No Data Entered}

V(I). Planned Program (Evaluation Studies and Data Collection)

1. Evaluation Studies Planned

- Other (peer process)

Evaluation Results

{No Data Entered}

Key Items of Evaluation

{No Data Entered}

Program #10

V(A). Planned Program (Summary)

1. Name of the Planned Program

Animal and Human Health and Well Being through Nutrition

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
308	Improved Animal Products (Before Harvest)	20%		55%	
311	Animal Diseases	70%		10%	
315	Animal Welfare/Well-Being and Protection	10%		35%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

1. Actual amount of professional FTE/SYs expended this Program

Year: 2008	Extension		Research	
	1862	1890	1862	1890
Plan	0.0	0.0	1.0	0.0
Actual	0.1	0.0	0.5	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	44441	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
0	0	191568	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
0	0	26213	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

- Conduct Research Experiments.

- Conduct Workshops, meetings.

- Deliver Services.

- Develop Products, Curriculum, Resources.

- Provide Training.

- Provide Counseling.

- Assessments.

2. Brief description of the target audience

The target audiences are scientific peers in the United States and World, Extension personnel, nutritional consultants and ultimately dairy, livestock and poultry producers.

V(E). Planned Program (Outputs)

1. Standard output measures

Target for the number of persons (contacts) reached through direct and indirect contact methods

	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	Target	Target	Target	Target
Plan	50	0	0	0
2008	25	0	0	0

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

Patent Applications Submitted

Year	Target
Plan:	0
2008 :	0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

	Extension	Research	Total
Plan	0	4	
2008	0	2	2

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- PROVIDE ADDITIONAL UNDERSTANDING FOR PLANT AND ANIMAL PROTECTION FROM DISEASES AND PESTS – carry out experiments to test the effects of a natural product (OmniGen-AF) on the development of J5 titer following vaccination with aPfizer J5 E. coli vaccine.

Not reporting on this Output for this Annual Report

Output #2

Output Measure

- DEVELOP IMPROVED ANIMAL AND PLANT PRODUCTION SYSTEMS - reduce percentage of mortality to enhance hatchability in poultry – carry out tests to identify a marker of immunity in livestock

Year	Target	Actual
2008	0	4

Output #3

Output Measure

- EFFECTS ON AND PROTECTION OF HUMAN HEALTH - increase percentage of n-3 fatty acids and CLA in poultry foods to enhance availability of these health-enhancing nutrients to consumers and lead to novel product development and increased marketability of poultry products.

Year	Target	Actual
2008	0	5

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O No.	OUTCOME NAME
1	Improved Animal Health - peers are provided new knowledge about the fundamental relationship between maternal diet, fatty acid metabolism and egg hatchability. - producers learn of a technological strategy to enhance the efficacy of their vaccination programs in livestock (available by 2008 or 2009) and of a diagnostic method which will assess immune health of their livestock (available in 2009n or 2010).
2	Improved productivity - poultry industry changes feed formulations to reduce embryonic mortality during incubation (thereby enhancing hatchability) and to improve animal health and to produce health-enhancing nutrients (thus developing value-added poultry foods). - Livestock producers use diagnostic methods and new vaccination programs to increase immunity (innate and acquired) in domestic animals
3	Hatchability and value-added poultry foods will bring increased economic returns to the US poultry industry. Better human and animal health, well-being, and survivability result with the use of nutrition and nutrigenomics and organic production.

Outcome #1

1. Outcome Measures

Improved Animal Health - peers are provided new knowledge about the fundamental relationship between maternal diet, fatty acid metabolism and egg hatchability. - producers learn of a technological strategy to enhance the efficacy of their vaccination programs in livestock (available by 2008 or 2009) and of a diagnostic method which will assess immune health of their livestock (available in 2009n or 2010).

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2008	0	4

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Omega-3 (n-3) fatty acids and conjugated linoleic acid (CLA) are considered as health-promoting nutrients. The consumption of CLA and n-3 fatty acids in the US diet does not meet the required amount of these nutrients. Increasing the concentration of CLA and n-3 fatty acids in poultry foods is a possible way for humans to increase their intake. Since poultry is a major segment of animal agriculture in the US, the results reported will bring increased economic returns to the US poultry industry through improvement in hatchability, chick health and product quality.

What has been done

Experiments were conducted to enhance CLA and n-3 fatty acids in chicken eggs through manipulation of hen diet. In addition, lipid stability and nutritional quality of eggs during storage was determined.

Results

The results from the current project demonstrated that: 1) hen age and egg yolk bioactive fatty acids play an important role in the lipid metabolism in the progeny; 2) healthy eggs with increased n-3 fatty acids and CLA can be generated by diet modifications without affecting the production performance or health of birds; 3) antioxidant supplementation in the hen diet will enhance egg quality and nutritional value. These results provide a new knowledge on the role of maternal diet in modulating fatty acid metabolism during embryogenesis affecting chick health and hatchability. The results were disseminated to the public at international meetings, or were published as manuscripts or as abstracts.

4. Associated Knowledge Areas

KA Code	Knowledge Area
308	Improved Animal Products (Before Harvest)
315	Animal Welfare/Well-Being and Protection
311	Animal Diseases

Outcome #2

1. Outcome Measures

Improved productivity - poultry industry changes feed formulations to reduce embryonic mortality during incubation (thereby enhancing hatchability) and to improve animal health and to produce health-enhancing nutrients (thus developing value-added poultry foods). - Livestock producers use diagnostic methods and new vaccination programs to increase immunity (innate and acquired) in domestic animals

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2008	0	9

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Low levels of n-3 fatty acids in the eggs from younger breeder hens, and the role of diet in modifying egg lipid composition will enable nutritionists in formulating diets that will enhance hatchability and chick health while increasing the nutritional quality.

What has been done

Experiments were conducted to enhance CLA and n-3 fatty acids in chicken eggs through manipulation of hen diet. In addition, lipid stability and nutritional quality of eggs during storage was determined.

Results

The results reported in the current project indicate that availability of yolk fatty acids to the progeny is crucial during the early pre and post-hatch period in broiler chickens that are selected for rapid growth and muscle yield.

4. Associated Knowledge Areas

KA Code	Knowledge Area
315	Animal Welfare/Well-Being and Protection
308	Improved Animal Products (Before Harvest)
311	Animal Diseases

Outcome #3

1. Outcome Measures

Hatchability and value-added poultry foods will bring increased economic returns to the US poultry industry. Better human and animal health, well-being, and survivability result with the use of nutrition and nutrigenomics and organic production.

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2008	0	9

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Poor hatchability, economic loss due to culls, and chick mortality during the first two weeks of life remains a problem for the broiler industry. About 20% of the 11.5 billion broiler set in commercial hatcheries in the US do not hatch costing the US poultry industry over $450 million annually. Understanding the role of parent age and egg lipids during avian embryogenesis will enable animal nutritionists in designing diets that can provide the optimum supply of fatty acids at each stage of production. In addition, developing value-added poultry products enriched with CLA and n-3 fatty acids can provide an alternate source of these health-promoting nutrients in the US diet.

What has been done

The current project examined the role of parent age and dietary fatty acids in modulating lipid metabolism during avian embryogenesis and its effect on hatchability and post-hatch health of chicks. Meat-type breeder hens were fed diets with high or low n-3 fatty acids during the entire laying cycle.

Results

Egg yolk lipid composition, hatchability and fatty acid metabolism during early post-hatch was determined. Our research demonstrated that healthy eggs with increased n-3 fatty acids and CLA can be generated by diet modifications without affecting the production performance or health of birds.

4. Associated Knowledge Areas

KA Code	Knowledge Area
315	Animal Welfare/Well-Being and Protection
308	Improved Animal Products (Before Harvest)
311	Animal Diseases

V(H). Planned Program (External Factors)

External factors which affected outcomes

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

Brief Explanation

{No Data Entered}

V(I). Planned Program (Evaluation Studies and Data Collection)

1. Evaluation Studies Planned

- Retrospective (post program)
- Other (peer review process)

Evaluation Results

{No Data Entered}

Key Items of Evaluation

{No Data Entered}

Program #11

V(A). Planned Program (Summary)

1. Name of the Planned Program

Reproductive Performance of Animals

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
301	Reproductive Performance of Animals	60%		60%	
304	Animal Genome	40%		40%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

1. Actual amount of professional FTE/SYs expended this Program

Year: 2008	**Extension**		**Research**	
	1862	**1890**	**1862**	**1890**
Plan	0.0	0.0	1.2	0.0
Actual	0.3	0.0	1.7	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	278838	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
0	0	572806	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
0	0	122742	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

- Conduct Research Experiments.

- Deliver Services.

- Develop Products, Curriculum, Resources.

- Assessments.

- Partnering.

2. Brief description of the target audience

Target audiences are scientists working in reproductive physiology, Extension personnel, genetic companies in all species and Oregon producers.

V(E). Planned Program (Outputs)

1. Standard output measures

Target for the number of persons (contacts) reached through direct and indirect contact methods

	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	Target	Target	Target	Target
Plan	100	300	0	0
2008	50	150	0	0

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

Patent Applications Submitted

Year	Target
Plan:	0
2008 :	0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

	Extension	Research	Total
Plan	0	2	
2008	0	2	2

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- DEVELOP BETTER UNDERSTANDING OF BASIC PHYSIOLOGY OF PLANTS AND ANIMALS - Inform peers of factors affecting differentiation and outgrowth of endodermal cells from the bovine inner cell mass during the formation of extraembryonic endoderm. (Menino) - inform peers of the relationship and interactions between the immune and reproductive systems with regard to establishment and maintenance of pregnancy. (Cannon) - conduct experiments on physiological constraints limiting gamete viability (Froman) 1/yr

Year	Target	Actual
2008	10	4

Output #2

Output Measure

- CARRY OUT STUDIES TO DECIPHER GENOMES, GENETICS AND MECHANISMS OF PLANTS AND ANIMALS - describe effects of the reproductive hormones on gene expression and cell function - Know expression patterns and identity of cells expressing suppressors of cytokine signaling genes, and how these genes are regulated in reproductive tissues

Year	Target	Actual
2008	0	2

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O No.	OUTCOME NAME
1	Knowledge gained regarding reproductive biology - Peers gain new information regarding the developmental biology of the early bovine embryo and factors affecting establishment of extraembryonic endoderm - Peers and producers learn new means to improve fertility in dairy cattle and to reduce uterine infections - Peers gain detailed knowledge of sperm cell function and a conceptual basis for understanding a genetic basis for fertility in male poultry
2	Improved fertility and genetic stock - Producers and animal health professionals use information to improve fertility and prevent uterine infections in dairy cattle into every-day on-farm practices. - Industry stores sperm cells with minimal loss of function for use as a commodity and for long-term maintenance of genetic stock
3	Reduced costs and economic benefits achieved - Costs associated with uterine disease and infertility in the dairy industry are reduced - A method for cryopreservation of poultry semen enables an emergence of frozen poultry semen as a commodity, and it changes the way in which commercial breeders of poultry conduct their business, i.e., through reproductive management of male stock, selection schemes, retention of traits in the form of cryopreserved semen, and the emergence of cryopreserved poultry semen as a commodity - A collateral effect will be improved semen preservation in vertebrates in general.

Outcome #1

1. Outcome Measures

Knowledge gained regarding reproductive biology - Peers gain new information regarding the developmental biology of the early bovine embryo and factors affecting establishment of extraembryonic endoderm - Peers and producers learn new means to improve fertility in dairy cattle and to reduce uterine infections - Peers gain detailed knowledge of sperm cell function and a conceptual basis for understanding a genetic basis for fertility in male poultry

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2008	10	5

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Identifying critical factors involved in the establishment of extraembryonic endoderm may provide insights into aberrant mechanisms predisposing the early bovine embryo to pregnancy loss due to abnormal development and/or implantation failure.

What has been done

Factors affecting differentiation and outgrowth of bovine endodermal cells from the inner cell mass (ICM) during the formation of extraembryonic endoderm were investigated. Inner cell masses were isolated from bovine blastocysts using an immunosurgical procedure and cultured on vitronectin-coated microdrops in medium containing 0, 33, or 330 ug/ml PAI-1.

Results

Complete procedures have been validated and collection and culture of cells is ongoing. Collectively, these data suggest bovine endodermal cells utilize uPAR to bind vitronectin during their departure from the ICM and formation of extraembryonic endoderm. Furthermore, endodermal cell migration can be modulated by PAI-1 where its presence inhibits and absence stimulates cell movements. The PI mentored graduate students in the procedures associated with the conduct of this research. Research findings were disseminated at departmental seminars and through USDA multi-state research project reports.

4. Associated Knowledge Areas

KA Code	Knowledge Area
301	Reproductive Performance of Animals
304	Animal Genome

Outcome #2

1. Outcome Measures

Improved fertility and genetic stock - Producers and animal health professionals use information to improve fertility and prevent uterine infections in dairy cattle into every-day on-farm practices. - Industry stores sperm cells with minimal loss of function for use as a commodity and for long-term maintenance of genetic stock

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2008	0	1

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

The poultry industry would benefit from the ability to store poultry sperm cells with minimal loss of function and for maintenance of genetic stock.

What has been done

Sperm cell proteomes were compared between lines of chickens selected for low and high sperm mobility. Work is currently underway to replicate and thereby confirm the results below. This work will be completed in 2009.

Results

Sperm mobility is a quantitative trait and is defined as the net movement of a sperm cell population against resistance at body temperature. Work performed during the summer of 2008 lead to the discovery of a phenotypic difference within the mitochondrial proteome, i.e. the subunit of ATP synthase. If successful, it will be the first effort in history to explain fowl sperm cell function at the level of the proteome.

4. Associated Knowledge Areas

KA Code	Knowledge Area
304	Animal Genome
301	Reproductive Performance of Animals

Outcome #3

1. Outcome Measures

Reduced costs and economic benefits achieved - Costs associated with uterine disease and infertility in the dairy industry are reduced - A method for cryopreservation of poultry semen enables an emergence of frozen poultry semen as a commodity, and it changes the way in which commercial breeders of poultry conduct their business, i.e., through reproductive management of male stock, selection schemes, retention of traits in the form of cryopreserved semen, and the emergence of cryopreserved poultry semen as a commodity - A collateral effect will be improved semen preservation in vertebrates in general.

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2008	0	1

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Unlike sperm from most domestic species, poultry sperm can remain viable in the hen's oviduct for days to weeks following a single insemination. Whereas the physical basis for sperm sequestration was discovered in the 1960s, i.e. sperm storage tubules at the junction of the shell gland and vagina, the underlying mechanism was not deduced until 2003 (Froman, D.P., 2003, Biology of Reproduction 69:248-253). This finding is highly significant because artificial semen storage is - in effect - a mitochondrial stressor as evidenced by on-going work within the team member's laboratory.

What has been done

The experimental approach for artificial poultry semen preservation has by and large been trial and error over a period of decades. In contrast, the present work affords a theoretical approach to artificial semen storage in which mitochondrial function rather than post-storage fertilizing ability is the key experimental end point. It is noteworthy that the advent of this novel insight is concomitant with a new emergent knowledge of mitochondrial function within biology at large.

Results

The team member has unequivocally demonstrated the following: (1) fowl sperm can be treated with a calcium chelator in order to inhibit mitochondrial calcium cycling and thereby sperm motility, (2) immotile sperm can be reactivated by the addition of calcium without significant loss of function, where loss of function is defined as the percentage of fertilized eggs and the hatchability of such eggs, (3) inactivated sperm can be stored for a matter of hours at 10 C and reactivated by addition of calcium, and (4) fertilized eggs - and chicks - can be procured by inseminating hens with sperm that were inactivated, stored at 10 C, and then reactivated after 3-h of storage. Based upon preliminary data, the fertility so obtained is approximately 60 to 70% of that of a fresh control.

4. Associated Knowledge Areas

KA Code	Knowledge Area
301	Reproductive Performance of Animals

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Economy
- Government Regulations

Brief Explanation

{No Data Entered}

V(I). Planned Program (Evaluation Studies and Data Collection)

1. Evaluation Studies Planned

- After Only (post program)
- Retrospective (post program)
- During (during program)
- Case Study
- Comparisons between program participants (individuals,group,organizations) and non-participants
- Comparisons between different groups of individuals or program participants experiencing different levels of program intensity.

Evaluation Results

{No Data Entered}

Key Items of Evaluation

{No Data Entered}

Program #12

V(A). Planned Program (Summary)

1. Name of the Planned Program

Environmental Chemicals as Transcriptional Modulators: Understanding Health Effects as a Function of

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
723	Hazards to Human Health and Safety			100%	
	Total			100%	

V(C). Planned Program (Inputs)

1. Actual amount of professional FTE/SYs expended this Program

Year: 2008	Extension		Research	
	1862	1890	1862	1890
Plan	0.0	0.0	2.5	0.0
Actual	0.0	0.0	4.0	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	134959	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
0	0	882918	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
0	0	1584570	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

- Conduct Research Experiments.

- Develop Products, Curriculum, Resources.

- Assessments.

2. Brief description of the target audience

Scientists, Medical organizations

V(E). Planned Program (Outputs)

1. Standard output measures

Target for the number of persons (contacts) reached through direct and indirect contact methods

	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	Target	Target	Target	Target
Plan	100	0	0	0
2008	0	0	0	0

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

Patent Applications Submitted

Year	Target
Plan:	0
2008 :	{No Data Entered}

Patents listed

{No Data Entered}

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

	Extension	Research	Total
Plan	0	6	
2008	{No Data Entered}	{No Data Entered}	0

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- SCHOLARLY excellence in referred articles, book chapters, and books; participation on professional boards and panels, as well as science panels.

Year	Target	Actual
2008	8	18

Output #2

Output Measure

- EFFECTS ON AND PROTECTION OF HUMAN HEALTH For a diverse set of developmental toxicants, identify, validate, localize and characterize specific responsive genes, which have the potential to serve as biomarkers Develop a number of transgenic lines that show changes in reporter gene expression in response to toxicants Assessed risk of dioxins to humans Understand downstream pathways and novel antagonists for Ah receptor Understand immunosuppressive effects of Ahr activation Explore potential role of Ahr in thymocytes and T cells as a factor in the development of T cell lymphomas Examine chlorophylls/chlorophyllin absorption and transport across biological barriers and explore mechanism(s) of action in a mouse transplacental carcinogenesis model. Examine pathology and possible mechanisms of absorption action, primarily by employing a genomics approach. Examine dose response with DBP and I3C, examination of additional PAHs including some environmental mixtures such as diesel exhaust, coal tar and urban dust.

Year	Target	Actual
2008	7	71

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O No.	OUTCOME NAME
1	Characterize and model • Characterization of specific responsive genes to toxicants • Model system to evaluate dioxin toxicity to humans • Role of human AhR polymorphisms and role of Arnt in mediating dioxin toxicity • Understand downstream effectors of and Ahr antagonists to relieve dioxin toxicity • Examine mechanisms that underlie the immune suppression induced by TCDD • Novel role for Ahr in the induction of Treg cells • Identify agents, mechanisms of action, and dose response for reducing fetal risk from toxic chemicals
2	Develop transgenic lines of zebrafish for response to toxicants
3	Advance scientific knowledge Evaluate gene expression changes in control and toxicant exposed animals over time Ability to conduct genetic or small molecule screens for modifiers of the toxic response Risk assessment of various hydrocarbons to humans Development of agents to treat accidental human dioxin exposure or deliverate poisoning Modulate maternal diet to reduce the risk to the fetus from toxic chemicals

Outcome #1

1. Outcome Measures

Characterize and model

- Characterization of specific responsive genes to toxicants
- Model system to evaluate dioxin toxicity to humans
- Role of human AhR polymorphisms and role of Arnt in mediating dioxin toxicity
- Understand downstream effectors of and Ahr antagonists to relieve dioxin toxicity
- Examine mechanisms that underlie the immune suppression induced by TCDD
- Novel role for Ahr in the induction of Treg cells
- Identify agents, mechanisms of action, and dose response for reducing fetal risk from toxic chemicals

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2008	5	14

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

The vast majority of chemicals that are present in the environment as a consequence of their manufacture, use, or intentional consumption (e.g. food additives) have not been tested for their toxicity at all. In the latter case, efficacy testing is also lacking for many natural food substances that are now being widely used, sometimes at pharmacologic doses. Thus there is a profound need develop a new strategy for testing xenobiotics that will lead to the early identification of those chemicals most likely to be hazardous, as well as to an understanding of the mechanism(s) by which a given chemical causes, or is likely to cause, toxic and other health related effects. Understanding the mechanism of chemical action will lead to more appropriate and rational extrapolation of risk from experimental studies to humans and the safer use of beneficial chemical supplements.

What has been done

Examined dose response with di(n-butyl) phthalate and I3C, examined additional polycyclic aromatic hyrdocarbons (PAHs) including some environmental mixtures such as diesel exhaust, coal tar and urban dust. Examined chlorophylls/chlorophyllin absorption and transport across biological barriers and explore mechanism(s) of action in a mouse transplacental carcinogenesis model.

Results

In our mouse Transplacental cancer model, we demonstrated that the cancer incidence in the offspring was a function of the DBP dose to the mother; three days of in utero exposure resulted in more cancers than three weeks of nursing; the dimer of I3C was not effective in chemoprevention of DBP Transplacental cancer; environmental mixtures of PAHs were capable of causing lung cancer in offspring of exposed mothers but no lymphoma was observed (as with DBP). We determined the importance of the timing of DBP exposure to the mother on cancer risk to the offspring; we also determined that the mechanism of chemoprevention by green tea was due to the caffeine content.

4. Associated Knowledge Areas

KA Code	Knowledge Area
723	Hazards to Human Health and Safety

Outcome #2

1. Outcome Measures

Develop transgenic lines of zebrafish for response to toxicants

Not reporting on this Outcome for this Annual Report

Outcome #3

1. Outcome Measures

Advance scientific knowledge Evaluate gene expression changes in control and toxicant exposed animals over time Ability to conduct genetic or small molecule screens for modifiers of the toxic response Risk assessment of various hydrocarbons to humans Development of agents to treat accidental human dioxin exposure or deliverate poisoning Modulate maternal diet to reduce the risk to the fetus from toxic chemicals

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2008	0	3086

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

The Transcription Factor Cluster (TFC) carry out research aimed at understanding the health effects of environmental chemicals as a function of their ability to act as ligands for certain ligand-activated transcription factors (TFs). The research carried out by the TFC will contribute to the development and validation of new models for toxicity testing, to the identification of underlying molecular mechanisms of toxicant action, and to the ability of other chemicals to prevent or mitigate the toxic effects of environmental chemicals.

What has been done

Our laboratory has helped to identify a new way to kill cancer cells - a peptide that binds to Bcl-2, a protein that protects cancer cells from programmed cell death, and converts it into a cancer cell killer.

We also found that pregnant mice exposed to polycyclic aromatic hydrocarbons (PAHs), common environmental pollutants, could cause lymphoma and lung cancer in her offspring.

Results

The NuBCP-9 peptide was generated from Nur77, a potent pro-apoptotic protein. Nur77 often moves from the nucleus to mitochondria, in response to different death signals, where it binds to Bcl-2, changing its shape and function. The research, published in the October issue of Cancer Cell, may lead to new cancer treatments. This finding is widely reported by 67 different news media (print/online).

The finding that cancer can be caused in offspring generated a great deal of interest in both the scientific community and the popular press. Furthermore, our studies showing that it is possible to reduce this risk by maternal dietary supplementation with phytochemicals have been novel and generated a great deal of interest with respect to the potential in protection of human health

4. Associated Knowledge Areas

KA Code	Knowledge Area
723	Hazards to Human Health and Safety

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Appropriations changes
- Public Policy changes
- Competing Public priorities

Brief Explanation

{No Data Entered}

V(I). Planned Program (Evaluation Studies and Data Collection)

1. Evaluation Studies Planned

- Other ()

Evaluation Results

{No Data Entered}

Key Items of Evaluation

{No Data Entered}

Program #13

V(A). Planned Program (Summary)

1. Name of the Planned Program

New and Improved Food Processing Systems to Ensure a Safe, Wholesome and High-Value Food Supply

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
501	New and Improved Food Processing Technologies	20%		20%	
502	New and Improved Food Products	50%		50%	
511	New and Improved Non-Food Products and Processes	5%		5%	
711	Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sourc	5%		5%	
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins	20%		20%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

1. Actual amount of professional FTE/SYs expended this Program

Year: 2008	Extension		Research	
	1862	1890	1862	1890
Plan	2.5	0.0	9.1	0.0
Actual	1.0	0.0	7.6	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	431956	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
0	0	2892798	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
0	0	1131646	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

This program will result in multiple outputs as a result of the following proposed activities:
•Conducting laboratory, pilot-plant experiments and data collection. •Developing knowledge and new technology of food processing systems. •Developing curricular materials. •Developing quality monitoring protocols. •Presenting seminars and professional talks. •Conducting workshops and training sessions. •Publishing scientific findings.

2. Brief description of the target audience

The proposed program has numerous target audiences:
•State and federal food regulatory policy makers •University, state, federal and industry scientists •Commodity groups (dairy, seafood, fruit, vegetable, winegrape) •Food processing industry •Science educators •Agricultural and natural resource stakeholders •Food consumers

V(E). Planned Program (Outputs)

1. Standard output measures

Target for the number of persons (contacts) reached through direct and indirect contact methods

	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	Target	Target	Target	Target
Plan	3000	5000	500	2000
2008	1500	2000	100	0

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

Patent Applications Submitted

Year	Target
Plan:	0
2008 :	0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

	Extension	Research	Total
Plan	0	48	
2008	0	42	42

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- SCHOLARLY excellence in referred articles, book chapters, and books; participation on professional boards and panels, as well as science panels.

Year	Target	Actual
2008	58	100

Output #2

Output Measure

- PROVIDE TECHNOLOGY, MODELS AND ANALYSES THAT INFORM DECISION-MAKERS, INDUSTRY, AND PEERS REGARDING FOOD PRODUCTION

Year	Target	Actual
2008	5	5

Output #3

Output Measure

- EFFECTS ON AND PROTECTION OF HUMAN HEALTH

Year	Target	Actual
2008	2	2

Output #4

Output Measure

- DEVELOP IMPROVED BIOPRODUCT PRODUCTION SYSTEMS

Year	Target	Actual
2008	1	10

Output #5

Output Measure

- DEVELOP DISTANCE EDUCATION OUTLETS TO FURTHER REACH CLIENTELE.

Year	Target	Actual
2008	2	2

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O No.	OUTCOME NAME
1	Distance and Extension education regarding food safety, food processing, value-added foods and products, food packaging, and bioproducts. Information targeted to consumers, food processing industry, and government agency / regulatory decision-makers.
2	Knowledge generation and databases of food safety and food processing technologies; flavor / ingredient databases that relate to food quality parameters. As a result of this program individuals and industry will modify food production and handling practices. Policy makers will develop food processing regulations that prevent incidences of food-borne illnesses.
3	Application of knowledge and new leading-edge food technologies will result in improved food quality, value and safety with positive impacts on value-added food production, processing, handling, and distribution systems. Another expected outcome is to provide intervention strategies to reduce bacterial contamination, increase shelf life, and reduce occurrences of food-borne illnesses.

Outcome #1

1. Outcome Measures

Distance and Extension education regarding food safety, food processing, value-added foods and products, food packaging, and bioproducts. Information targeted to consumers, food processing industry, and government agency / regulatory decision-makers.

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2008	10	10

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Vibrio parahaemolyticus is human pathogen that is commonly found in molluscan shellfish, particularly oysters. Consumption of raw or undercooked oysters containing this bacterium can lead to development of acute gastroenteritis and a life-threatening condition, septicemia, in people having underlying medical conditions such as liver disease or immune disorders. The United States Centers for Disease Control and Prevention (CDC) estimated 4,500 cases of V. parahaemolyticus infection occur each year in the U.S. Illness resulted from consuming raw seafoods is a concern for public health and can cause substantial economic losses to the shellfish industries

What has been done

We studied efficacies of flash freezing followed by frozen storage in reducing V. parahaemolyticus in raw Pacific oysters and demonstrated that a process of flash freezing followed by storage at -21C for five months was capable of achieving greater than 3.52-log (MPN/g) reductions of V. parahaemolyticus in half-shell Pacific oysters. The process was validated three times according to the National Shellfish Sanitation Program's post harvest processing (PHP) validation/verification interim guidance for Vibrio vulnificus and Vibrio parahaemolyticus. The finding provides the shellfish industries an effective means for decontaminating V. parahaemolyticus in oysters.

Results

Foodborne illnesses caused by V. parahaemolyticus associated with consumption of raw oysters typically results in reduced sale of oysters and a consequent significant financial burden for the industries. The shellfish industries in the Pacific Northwest suffered from loss of millions of dollars in the summer of 2006 due to a V. parahaemolyticus outbreak linked to consumption of oysters produced in Washington. Flash freezing followed by storage at -21C for five months is a simple and inexpensive process for reducing V. parahaemolyticus contamination by greater than 3.52-log (MPN/g) in Pacific oysters. The process can easily be adopted by the industry for producing raw oysters for safe consumption. Results of our studies were reviewed by the FDA for post-harvest process validation and the FDA (on August 6, 2008) concurred with approval by the Washington Department of Health for Taylor Shellfish Company, Inc. (Shelton, WA) to label oysters processed in strict accordance with the validated treatment with safety added language as outlined in Chapter XVI of NSSP Model Ordinance. Implementation of this post-harvest process treatment for reducing V. parahaemolyticus in shellfish to no-detectable levels allows the shellfish industries produce safe products and prevents financial loss from unexpected outbreaks.

4. Associated Knowledge Areas

KA Code	Knowledge Area
511	New and Improved Non-Food Products and Processes
711	Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sourc
501	New and Improved Food Processing Technologies
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins
502	New and Improved Food Products

Outcome #2

1. Outcome Measures

Knowledge generation and databases of food safety and food processing technologies; flavor / ingredient databases that relate to food quality parameters. As a result of this program individuals and industry will modify food production and handling practices. Policy makers will develop food processing regulations that prevent incidences of food-borne illnesses.

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2008	0	5

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

High pressure processing is a newly commercialized and still-developing food processing technology. Because it is a low energy input processing technique, it results in high quality foods that are preserved and safe to eat. At the same time, one of the key quality faults is the outgrowth of lactic acid bacteria that can spoil foods treated with high pressure.

What has been done

We have investigated the impact of organic versus inorganic acids as a means of controlling pH and modifying it under pressure to achieve a greater lethality against lactic acid bacteria.

Results

Organic acids posses a weak dissociation constant, and it appears that these types of acids can be more lethal under pressure as mineral (inorganic) acids when used to achieve the same starting pH value.

4. Associated Knowledge Areas

KA Code	Knowledge Area
711	Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sourc
501	New and Improved Food Processing Technologies
502	New and Improved Food Products
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins

Outcome #3

1. Outcome Measures

Application of knowledge and new leading-edge food technologies will result in improved food quality, value and safety with positive impacts on value-added food production, processing, handling, and distribution systems. Another expected outcome is to provide intervention strategies to reduce bacterial contamination, increase shelf life, and reduce occurrences of food-borne illnesses.

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2008	0	10

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Wine has been shown to be a possible protective agent against microbial foodborne illness. The chemical environment of wine makes it difficult, if not impossible, for microorganisms to survive. The low pH, high concentration of organic acids, relatively high ethanol concentrations, and the potential for high levels of sulfur dioxide provide a series of hurdles for any microorganism that comes into contact with wine. The objective of this research was to determine the role these parameters contribute to the observed antimicrobial effect.

What has been done

Studies involved evaluating combinations of pH, titratable acidity, sulfur dioxide, and ethanol in a wine background. Analysis of overall trends showed that titratable acidity and ethanol concentration were not ideal predictors of efficacy. Molecular sulfur dioxide concentration was found to be a relatively good predictor of antimicrobial effects. Hydrogen ion concentration (pH) levels appear to be the most important parameter for predicting inactivation of S. aureus. The antimicrobial effects of ethanol are known to be enhanced by lowering the pH of the solution.

Results

This initial study concluded that decreasing pH enhanced the antimicrobial effect of ethanol. Other combinations may also lead to some strong conclusions that may enhance the ability to predict disinfection ability of a given wine. Of all the tested parameters, pH appears to be the most influential; however the combination of all the components is more important than any one parameter.

4. Associated Knowledge Areas

KA Code	Knowledge Area
711	Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sourc
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins
501	New and Improved Food Processing Technologies
502	New and Improved Food Products

V(H). Planned Program (External Factors)

External factors which affected outcomes

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

Brief Explanation

{No Data Entered}

V(I). Planned Program (Evaluation Studies and Data Collection)

1. Evaluation Studies Planned

- Other (peer process)

Evaluation Results

Key Items of Evaluation

Program #14

V(A). Planned Program (Summary)

1. Name of the Planned Program

Human Nutrition, Food Safety, and Human Health and Well Being

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
702	Requirements and Function of Nutrients and Other Food Components	40%		40%	
703	Nutrition Education and Behavior	25%		25%	
724	Healthy Lifestyle	35%		35%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

1. Actual amount of professional FTE/SYs expended this Program

Year: 2008	Extension		Research	
	1862	1890	1862	1890
Plan	0.2	0.0	2.6	0.0
Actual	0.2	0.0	1.0	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	112384	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
0	0	502737	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
0	0	33809	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

- Conduct Research Experiments.

- Conduct Workshops, meetings.

- Deliver Services.

- Develop Products, Curriculum, Resources.

- Provide Training.

- Provide Counseling.

- Assessments.

- Partnering.

2. Brief description of the target audience

- youth aged 13-18
- economists
- nutritionist
- policy makers
- social program agencies

V(E). Planned Program (Outputs)

1. Standard output measures

Target for the number of persons (contacts) reached through direct and indirect contact methods

	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	**Target**	**Target**	**Target**	**Target**
Plan	50	0	0	0
2008	0	0	0	0

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

Patent Applications Submitted

Year	Target
Plan:	0
2008 :	0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

	Extension	Research	Total
Plan	0	4	
2008	0	16	16

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- SCHOLARLY excellence in referred articles, book chapters, and books; participation on professional boards and panels, as well as science panels.

Year	Target	Actual
2008	5	42

Output #2

Output Measure

- EFFECTS ON AND PROTECTION OF HUMAN HEALTH establish low zinc as a risk factor for the development of prostate cancer by inducing oxidative DNA damage and compromising DNA repair mechanisms. test the ability of zinc supplementation to reduce the incidence of prostate cancer via modification of prostate inflammation, oxidative damage and DNA damage/repair. identify strategies (message, pricing, foods) that will increase choosing healthful food choices among adolescents and young adults new or improved intervention strategies for implementation in the community setting. and tools for measuring the effectiveness of the interventions targeted to childhood overweight in low income families. Identification of objective, physiological-based measures that correspond to target behaviors (bio-behavioral markers) for use later as measures of intervention progress and success or means for tailoring interventions in ways that will be most effective for specific groups and subgroups. Identification of key parent-child relationships that contribute to childhood overweight and resiliency in various populations.

Year	Target	Actual
2008	3	21

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O No.	OUTCOME NAME
1	Informed decision-makers and citizenry • Identify new risk factors in prostate cancer and offer novel dietary modifications to reduce the incidence of prostate cancer o Establish low zinc as a risk factor for the development of prostate cancer by inducing oxidative DNA damage and compromising DNA repair mechanisms. o Understand mechanisms of how zinc deficiency alters DNA integrity. • Gain knowledge of the mechanisms behind the health benefits of cruciferous vegetables. • Develop an understanding of motivations for food choice and strategies to impact them and identify strategies (message, pricing, foods) that will increase choosing healthful food choices among adolescents and young adults • new or improved obesity intervention strategies in the community setting • Objective, physiological-based measures that correspond to target behaviors (bio-behavioral markers) for use later as measures of intervention progress and success or means for tailoring effective interventions • key parent-child relationships that reflect resiliency and the interaction of these relationships with targeted nutritional behaviors • understanding of various inputs and interactions of family and child, SES, nutrition, physiology and behavior
2	Best Practices Assist and influence food service vendors to find successful strategies for marketing healthful food options Influence school policies for offering/encouraging healthful foods Markers and strategies will become the standards of methods and measurement of childhood overweight and resiliency. More effective programs and student experiences
3	Improved technologies and practices found Markers for oxidative stress and DNA integrity would potentially lead to novel approaches for identifying biomarkers of zinc deficiency in humans. Zinc supplementation will be an effective strategy in limiting the incidence of prostate cancer Effective dietary intervention strategies that are broadly applicable and public health recommendations that will significantly reduce the burden of prostate cancer. Advances in the study of obesity
4	In the long run: Reduce health care costs associated with prostate cancer Improve the quality of life of thousands of American men Control the growth in the rate of obesity and osteoporosis among youth Solutions reverse trends in childhood obesity

Outcome #1

1. Outcome Measures

Informed decision-makers and citizenry

- Identify new risk factors in prostate cancer and offer novel dietary modifications to reduce the incidence of prostate cancer o Establish low zinc as a risk factor for the development of prostate cancer by inducing oxidative DNA damage and compromising DNA repair mechanisms. o Understand mechanisms of how zinc deficiency alters DNA integrity.
- Gain knowledge of the mechanisms behind the health benefits of cruciferous vegetables.
- Develop an understanding of motivations for food choice and strategies to impact them and identify strategies (message, pricing, foods) that will increase choosing healthful food choices among adolescents and young adults
- new or improved obesity intervention strategies in the community setting
- Objective, physiological-based measures that correspond to target behaviors (bio-behavioral markers) for use later as measures of intervention progress and success or means for tailoring effective interventions
- key parent-child relationships that reflect resiliency and the interaction of these relationships with targeted nutritional behaviors
- understanding of various inputs and interactions of family and child, SES, nutrition, physiology and behavior

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2008	10	9

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

This knowledge can be used to help establish dietary strategies with cruciferous vegetables to help prevent prostate cancer. This knowledge highlights the importance of consuming zinc-rich foods.

What has been done

Identified a novel mechanism of sulforaphane for prostate cancer prevention; identified men with low zinc intakes had increased DNA damage and may be at higher risk for cancer and performed broccoli sprout bioavailabity studies to understand the metabolism of isothiocyantes from cruciferous vegetables.

Results

These studies will help establish levels of cruciferous vegetables needs to exert biologic effects in humans and will help direct recommendations for cruciferous vegetables for disease prevention.

4. Associated Knowledge Areas

KA Code	Knowledge Area
703	Nutrition Education and Behavior
702	Requirements and Function of Nutrients and Other Food Components
724	Healthy Lifestyle

Outcome #2

1. Outcome Measures

Best Practices Assist and influence food service vendors to find successful strategies for marketing healthful food options Influence school policies for offering/encouraging healthful foods Markers and strategies will become the standards of methods and measurement of childhood overweight and resiliency. More effective programs and student experiences

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2008	0	3

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Students in college need to learn how to adapt during this transition to maintain healthy diets.

What has been done

Researcher is developing focus group questions in collaboration with two other stations to reveal perceptions of healthy eating.

Results

Work by the researcher includes evidence that college students are challenged to make healthy food selections; being unprepared in coming to college and losing the support and structures (fixed schedule and family meals) after coming to college.

4. Associated Knowledge Areas

KA Code	Knowledge Area
702	Requirements and Function of Nutrients and Other Food Components
703	Nutrition Education and Behavior
724	Healthy Lifestyle

Outcome #3

1. Outcome Measures

Improved technologies and practices found Markers for oxidative stress and DNA integrity would potentially lead to novel approaches for identifying biomarkers of zinc deficiency in humans. Zinc supplementation will be an effective strategy in limiting the incidence of prostate cancer Effective dietary intervention strategies that are broadly applicable and public health recommendations that will significantly reduce the burden of prostate cancer. Advances in the study of obesity

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2008	0	3

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Over 70% of Americans are not getting the recommended level of zinc. This research addresses the importance of getting adequate zinc from zinc-rich foods to improve health. Thus, this research will aid in improving the health of Oregonians and the U.S. population as a whole.

What has been done

Developed DNA damage assay to monitor DNA damage in humans consuming low zinc diets. Developed cell culture assays to monitor cell proliferation with zinc supplementation at different stages of prostate cancer. Other research focused on developing a new model using Zebra fish to study the effects of low zinc status on DNA repair mechanisms

Results

Our data suggest an important function of zinc could be to protect the cell from DNA damage and oxidative stress. Zinc deficiency does provide an environment for increased DNA damage, inability to respond stress and risk for cancer. Found that crucerifous vegetable intake was correlated with histone deacetylase (HDAC) inhibition in the prostate.

4. Associated Knowledge Areas

KA Code	Knowledge Area
703	Nutrition Education and Behavior
702	Requirements and Function of Nutrients and Other Food Components
724	Healthy Lifestyle

Outcome #4

1. Outcome Measures

In the long run: Reduce health care costs associated with prostate cancer Improve the quality of life of thousands of American men Control the growth in the rate of obesity and osteoporosis among youth Solutions reverse trends in childhood obesity

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2008	0	3

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Over 60% of adult Americans are currently overweight or obese (Body Mass Index [BMI]>25 kg/m2), we must identify ways to slow this trend, especially in our children and youth. This research addressed the importance of teaching women to make changes in their own health behaviors that become part of their lifestyle, and then model these healthy behaviors in the home to improve the health of the family.

What has been done

Identified the amount of physical activity needed to keep weight off after weight loss, prevent weight gain, and contribute to weight loss. Role of diet and physical activity for weight loss was addressed.

Results

Our research suggests that changes in both diet composition and level of physical activity are important to reverse risk factors for chronic disease in individuals who are overweight or obese. One position paper (MSSE) on the appropriate intervention strategies for physical activity, weight loss and prevention of weight regain for adults. One paper on how to prevent gestational diabetes in young women, which can increase risk of obesity and diabetes in their child and themselves.

4. Associated Knowledge Areas

KA Code	Knowledge Area
724	Healthy Lifestyle
703	Nutrition Education and Behavior
702	Requirements and Function of Nutrients and Other Food Components

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Economy
- Public Policy changes
- Competing Public priorities

Brief Explanation

{No Data Entered}

V(I). Planned Program (Evaluation Studies and Data Collection)

1. Evaluation Studies Planned

-

Evaluation Results

{No Data Entered}

Key Items of Evaluation

{No Data Entered}

Program #15

V(A). Planned Program (Summary)

1. Name of the Planned Program

Animal Health and Disease

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
307	Animal Management Systems			5%	
311	Animal Diseases			40%	
502	New and Improved Food Products			5%	
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins			20%	
722	Zoonotic Diseases and Parasites Affecting Humans			10%	
723	Hazards to Human Health and Safety			20%	
	Total			100%	

V(C). Planned Program (Inputs)

1. Actual amount of professional FTE/SYs expended this Program

Year: 2008	**Extension**		**Research**	
	1862	**1890**	**1862**	**1890**
Plan	0.0	0.0	2.3	0.0
Actual	0.0	0.0	3.5	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	144482	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
0	0	1105123	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
0	0	555810	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

- Conduct Research Experiments.

- Assessments.

- Develop Products, Resources.

2. Brief description of the target audience

- farmers (terrestrial and aquatic), producers, ranchers
- veterinarians
- general public
- vaccine producers
- seafood producers
- microbial and medical researchers
- public health officials

V(E). Planned Program (Outputs)

1. Standard output measures

Target for the number of persons (contacts) reached through direct and indirect contact methods

	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	**Target**	**Target**	**Target**	**Target**
Plan	1000	0	0	0
2008	1000	0	0	0

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

Patent Applications Submitted

Year	Target
Plan:	0
2008 :	0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

	Extension	Research	Total
Plan	0	15	
2008	0	9	9

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- CARRY OUT STUDIES TO DECIPHER GENOMES, GENETICS AND MECHANISMS OF PLANTS AND ANIMALS - genomic sequencing and cloning of viruses (1a/b) and bacteria to understand protein generation and control and other molecular mechanisms of infection, expression, and spread

Year	Target	Actual
2008	4	4

Output #2

Output Measure

- PROVIDE ADDITIONAL UNDERSTANDING FOR PLANT AND ANIMAL PROTECTION FROM DISEASES AND PESTS –diagnostic tools and effective vaccines, e.g, recombinant vaccine against influenza virus or potential experimental vaccine for Johne's disease – studies to establish the degree of permissiveness of pigs to infection with Asian strains of HPAI H5N1 and their potential role in the emergence of pandemic strains.

Year	Target	Actual
2008	2	2

Output #3

Output Measure

- EFFECTS ON AND PROTECTION OF HEALTH Output Measure – efficacious chitosan bandages of different formulations for control of hemorrhaging and infection

Year	Target	Actual
2008	1	0

Output #4

Output Measure

- SCHOLARLY excellence in referred articles, book chapters, and books; participation on professional boards and panels, as well as science panels.

Year	Target	Actual
2008	30	15

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O No.	OUTCOME NAME
1	Researchers gain information about how viruses and bacteria operate in animals and shellfish: - the different pathways for influenza occurrence and pathogenesis - genetic transformation system for C. suis. - molecular mechanisms underlying Vibrio bacterial-shellfish interaction - how SPO0A regulates CPE synthesis - M. paratuberculosis interacts with the intestinal mucosa
2	Knowledge obtained for diagnostic tools for detection and control - BVDV persistent infection in cattle and alpaca. - generation of recombinant vaccine for type A influenza virus
3	Medical personnel learn about merits of chitosan bandages
4	Industry adoption of new diagnostic methods and vaccine and bandage products - Vaccine production industry adopt breakthrough recombinant vaccine methods - Early treatment of BVDV would better control the disease - Adoption of chitosan bandages would help treat acute injuries - therapy and possibly the development of live, attenuated chlamydial strains for vaccination.
5	New techniques will change how we manage diseases - Understanding Vibrio ecology will change how the industry handles post-harvest treatment of shellfish - Better prevention of flu virus - More effective programs for public health measures, personal protection, and clinical therapies for flu - Better control over Clostridium, by modulating SPO0A-CPE interactions for therapeutic purposes - Better and more efficacious practices of prevention of Johne's disease within the cattle industry
6	Lives would be saved or made safer through recombinant flu vaccine, Chitosan-based bandages, and reduction/elimination of Vibrio presence in shellfish. Furthermore, preparedness in anticipation of zoonotic outbreaks of avian influenza and better health promotion.
7	Up to $20-57 million per million calvings could be saved through control of BVDV and dramatic savings in annual costs due to early diagnosis and control of Johne's disease and Clostridium

Outcome #1

1. Outcome Measures

Researchers gain information about how viruses and bacteria operate in animals and shellfish: - the different pathways for influenza occurrence and pathogenesis - genetic transformation system for C. suis. - molecular mechanisms underlying Vibrio bacterial-shellfish interaction - how SPO0A regulates CPE synthesis - M. paratuberculosis interacts with the intestinal mucosa

Not reporting on this Outcome for this Annual Report

Outcome #2

1. Outcome Measures

Knowledge obtained for diagnostic tools for detection and control - BVDV persistent infection in cattle and alpaca. - generation of recombinant vaccine for type A influenza virus

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2008	2	3

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Production of type A influenza virus vaccine is a very slow, difficult process and limited by the nature of the virus replication in embryonic eggs. The biggest challenge is that it takes a long time to grow a large amount of type A influenza virus in the embryonic eggs for vaccine production. Furthermore, incomplete inactivation of the influenza virus in the vaccine production often jeopardizes the application of the vaccine. For these reasons, new safe influenza virus vaccine is very much in demand.

What has been done

The sequence of HA antigenic domain will be inserted in the gC or gI of AILV first in a vector, then inserted into the viral genome at the glycoprotein gene location by homology recombination. The recombinant will be tested in mice for LD =50 first. Both inactivated and attenuated virus will be used to vaccine the mouse and then challenge the mouse with lethal dose of flu viruses. The antibody against the specific HA will be tested by specific mAb.

Results

Research continues on this project. Generation of recombinant vaccine for type A influenza virus will not only benefit animal but also humans. If we prove that alphaherpes virus could serve as an excellent vector for H5N1 avian influenza virus vaccine production, it will make type A influenza virus vaccine product for other species much easier, safer and faster. It will be a break through in the production of flu vaccine and eliminate the used of embryonic egg for Flu vaccine production.

4. Associated Knowledge Areas

KA Code	Knowledge Area
311	Animal Diseases

Outcome #3

1. Outcome Measures

Medical personnel learn about merits of chitosan bandages

Not reporting on this Outcome for this Annual Report

Outcome #4

1. Outcome Measures

Industry adoption of new diagnostic methods and vaccine and bandage products - Vaccine production industry adopt breakthrough recombinant vaccine methods - Early treatment of BVDV would better control the disease - Adoption of chitosan bandages would help treat acute injuries - therapy and possibly the development of live, attenuated chlamydial strains for vaccination.

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2008	0	5

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

With respect to chlamydial transformation, we have worked under a hypothesis that a unique insertions sequence will be a useful tool for the generation of chlamydial recombinants.

What has been done

In combination with individuals at the University of Washington, we developed the techniques for creating and analyzing chlamydial recombinants. This is an excellent arrangement in which our colleagues generate recombinant strains between different chlamydia and, then, these recombinants are analyzed by the group. We have also worked this past year to greatly augment our genome sequencing capabilities.

Results

Recent work in the labroatory suggests that recombination in this system is primarily a result of straight homologous recombination, without the participation of the insertion sequence. In the past year our collaborators in Seattle have created a large number of recombinants that were subsequently characterized in our laboratory. These analyses demonstrate that the chlamydiae are actively recombinogenic, and these recombination events can occur, in a single cross, over the entire length of the genome. We have for example, a progeny strain from a C. trachomatis cross that has approximately equal amounts of each parental chromosome, resulting from 16 different recombination events. We continue to explore this as a mechanism for generating a transformation system in the chlamydia, by identifying and testing loci that can be used as insertion points following electroporation of recipient chlamydiae.

4. Associated Knowledge Areas

KA Code	Knowledge Area
722	Zoonotic Diseases and Parasites Affecting Humans
311	Animal Diseases
307	Animal Management Systems
723	Hazards to Human Health and Safety
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins

Outcome #5

1. Outcome Measures

New techniques will change how we manage diseases - Understanding Vibrio ecology will change how the industry handles post-harvest treatment of shellfish - Better prevention of flu virus - More effective programs for public health measures, personal protection, and clinical therapies for flu - Better control over Clostridium, by modulating SPO0A-CPE interactions for therapeutic purposes - Better and more efficacious practices of prevention of Johne's disease within the cattle industry

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2008	5	5

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Enterotoxin-producing Clostridium perfringens isolates have been associated with C. perfringens type A food poisoning, which currently ranks as the third most commonly reported foodborne illness in the USA. C. perfringens type A food poisoning is acquired when people consume a food (typically a beef or poultry product) contaminated with large numbers of vegetative cells of enterotoxigenic C. perfringens type A isolates.

What has been done

The central goal of our research is to determine the molecular basis for C. perfringens spore-heat resistance and spore germination.

Results

Recent studies suggested that the C. perfringens isolates are strongly associated with food poisoning because these isolates have the ability to form heat-resistant spores, which should enhance their survival in incompletely cooked or inadequately warmed foods. The significant outcomes of our studies are: spore heat resistance is critical for C. perfringens spores to survive in the environment and these heat activated spores can germinate, return to vegetative growth and contaminate the food to cause food-borne illness; thoroughly cooking food is the best approach to prevent and control C. perfringens type A food-borne illness; rapid cooling of cooked foods and then storing and serving these foods at non permissive conditions for vegetative growth of C. perfringens also a step for preventing C. perfringens type A food-borne illness.

4. Associated Knowledge Areas

KA Code	Knowledge Area
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins
307	Animal Management Systems
723	Hazards to Human Health and Safety
722	Zoonotic Diseases and Parasites Affecting Humans
311	Animal Diseases

Outcome #6

1. Outcome Measures

Lives would be saved or made safer through recombinant flu vaccine, Chitosan-based bandages, and reduction/elimination of Vibrio presence in shellfish. Furthermore, preparedness in anticipation of zoonotic outbreaks of avian influenza and better health promotion.

2. Associated Institution Types

•1862 Research

3a. Outcome Type:
Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2008	0	5

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Lives would be saved or made safer through recombinant influenza vaccines.

What has been done

We have conducted preliminary experiments to validate assays on previous years' work and are ready to start the project with a minor modification of using a reassortant PR8 virus expressing H5 and N1 envelope proteins instead of HPAI H5N1 viruses. The team has reconstructed a reassortant PR8 viruses expressing the original HPAI H5 and N1 proteins.

Results

We have also produced monoclonal antibodies against H5 and H7 antigens and these monoclonal antibodies are critical for the detection of specific virus strains in various tissues of infected mini-pig by insitu hybridization. These monoclonal antibodies are also required for virus neutralization experiments. We also have preliminary information on H1N1 influenza virus infection in pigs including the minimal infectious dose, pathogenesis, and validation of various assays required for this project.

4. Associated Knowledge Areas

KA Code	Knowledge Area
723	Hazards to Human Health and Safety
722	Zoonotic Diseases and Parasites Affecting Humans
502	New and Improved Food Products
311	Animal Diseases
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins
307	Animal Management Systems

Outcome #7

1. Outcome Measures
Up to $20-57 million per million calvings could be saved through control of BVDV and dramatic savings in annual costs due to early diagnosis and control of Johne's disease and Clostridium

2. Associated Institution Types

•1862 Research

3a. Outcome Type:
Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2008	0	5

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Mycobacterium avium subsp paratuberculosis (hereafter referred as MAP) is an important bacterial pathogen causing incurable disease (Johne's Disease) in ruminants. Johne's disease is responsible for millions of dollars in losses. The bacterium is found in the environment and infects the young calf through the gastrointestinal tract. The sources of infection could be the environment as well infected milk or stool from a diseased animal.

What has been done

Recent studies have been initiated to unravel the mechanisms of MAP entry into M cells and enterocytes. Several studies have suggested that MAP binds to M cells using the fibronectin receptor. The research team has used mice lacking Peyer's patch to examine the point of entry of MAP into the intestinal mucosa.

Results

Experimental studies suggest that bacteria delivered to the calf in the milk or stool from the infected mother represent the most efficient manner of infection. The mechanism(s) used by the pathogen to interact with the intestinal mucosa of the young host should be key for the infection to happen. Ultimately, the knowledge of the critical steps in the MAP entry into the mucosal epithelial cells, would allow for the design of therapy to prevent or interfere with phases of the interaction between the pathogen and the host.

4. Associated Knowledge Areas

KA Code	Knowledge Area
311	Animal Diseases
307	Animal Management Systems
723	Hazards to Human Health and Safety

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 Public priorities
- Competing Programmatic Challenges

Brief Explanation

{No Data Entered}

V(I). Planned Program (Evaluation Studies and Data Collection)

1. Evaluation Studies Planned

-

Evaluation Results

{No Data Entered}

Key Items of Evaluation

{No Data Entered}

Program #16

V(A). Planned Program (Summary)

1. Name of the Planned Program

Soil and Water Resource Conservation, Management and Engineering

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
101	Appraisal of Soil Resources	10%		10%	
102	Soil, Plant, Water, Nutrient Relationships	10%		10%	
111	Conservation and Efficient Use of Water	10%		10%	
112	Watershed Protection and Management	10%		10%	
132	Weather and Climate	10%		10%	
133	Pollution Prevention and Mitigation	10%		10%	
403	Waste Disposal, Recycling, and Reuse	10%		10%	
404	Instrumentation and Control Systems	10%		10%	
405	Drainage and Irrigation Systems and Facilities	10%		10%	
902	Administration of Projects and Programs	10%		10%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

1. Actual amount of professional FTE/SYs expended this Program

Year: 2008	Extension		Research	
	1862	1890	1862	1890
Plan	0.5	0.0	6.0	0.0
Actual	0.1	0.0	0.2	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	23960	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
0	0	183271	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
0	0	265604	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

- Conduct Research Experiments.

- Construct Research Facilities.
- Monitor and evaluate

- Conduct Workshops, meetings.

- Deliver Services.

- Develop Products, Curriculum, Resources.

- Provide Training.

- Assessments.

- Partnering.

2. Brief description of the target audience

The audience includes typical citizens in urban settings through extension outreach, those responsible for agricultural production through extension outreach and workshops, the engineering profession through publication of results in professional journals, and undergraduate and graduate students through presentation of project descriptions and results in a classroom setting.

V(E). Planned Program (Outputs)

1. Standard output measures

Target for the number of persons (contacts) reached through direct and indirect contact methods

	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	**Target**	**Target**	**Target**	**Target**
Plan	200	300	50	100
2008	0	0	0	0

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

Patent Applications Submitted

Year	Target
Plan:	2
2008 :	{No Data Entered}

Patents listed

{No Data Entered}

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

	Extension	Research	Total
Plan	0	2	
2008	{No Data Entered}	{No Data Entered}	0

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- SCHOLARLY excellence in referred articles, book chapters, and books; participation on professional boards and panels, as well as science panels.

Not reporting on this Output for this Annual Report

Output #2

Output Measure

- EFFECTS ON AND PROTECTION OF ENVIRONMENTAL HEALTH AND ECOLOGY Investigate optimization of water resource utilization within hydrologic and agricultural environments considering the soil-plant-atmosphere continuum. Understand feedbacks between plants, soil hydraulic processes and atmospheric boundary layer development and the partitioning of all components of the diurnal energy balance. Apply recently developed spatial analysis techniques with current meteorological network data available to develop updated maps of reference evapotranspiration over the state of Oregon for water resources planning and hydrologic analysis. Develop a flume facility to demonstrate general river mechanics principles and to test hypotheses regarding the physical response of rivers to management strategies, such as dam removal, stabilizing structures, and environmental flows. Monitor and evaluate the dynamics and variability in fish and benthic macroinvertebrate communities Document natural processes and indicate ecological outcomes of management strategies.

Not reporting on this Output for this Annual Report

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O No.	OUTCOME NAME
1	Informed decision-makers and citizenry Understanding of the interconnectivity of soil and water resources, aquatic species habitat and survival, water resource allocation for multiple urban, environmental, hydroelectric power, industrial and agricultural uses. Revision of Oregon Irrigation Water Requirements guide Inform the citizenry of the state of Oregon, as well as provide scientific assessment tools and resource evaluation for policy makers to base decisions on in the state of Oregon.
2	Informed policy-making and management Informed policy-making and management of landscape and water resources. Extension faculty in cooperation with watershed councils provide outreach on well water quality, crop water use estimates, and irrigation management for improved watershed management.
3	National and international impact as evidenced by the past record of professional publications and the cooperative international programs this group is involved with.

Outcome #1

1. **Outcome Measures**
   Informed decision-makers and citizenry Understanding of the interconnectivity of soil and water resources, aquatic species habitat and survival, water resource allocation for multiple urban, environmental, hydroelectric power, industrial and agricultural uses. Revision of Oregon Irrigation Water Requirements guide Inform the citizenry of the state of Oregon, as well as provide scientific assessment tools and resource evaluation for policy makers to base decisions on in the state of Oregon.
   Not reporting on this Outcome for this Annual Report

Outcome #2

1. **Outcome Measures**
   Informed policy-making and management Informed policy-making and management of landscape and water resources. Extension faculty in cooperation with watershed councils provide outreach on well water quality, crop water use estimates, and irrigation management for improved watershed management.
   Not reporting on this Outcome for this Annual Report

Outcome #3

1. **Outcome Measures**
   National and international impact as evidenced by the past record of professional publications and the cooperative international programs this group is involved with.
   Not reporting on this Outcome for this Annual Report

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 Public priorities
- Competing Programmatic Challenges
- Populations changes (immigration,new cultural groupings,etc.)

Brief Explanation

{No Data Entered}

V(I). Planned Program (Evaluation Studies and Data Collection)

1. **Evaluation Studies Planned**
   - Before-After (before and after program)

Evaluation Results

{No Data Entered}

Key Items of Evaluation

{No Data Entered}

Program #17

V(A). Planned Program (Summary)

1. Name of the Planned Program

Agricultural and Emerging Chemicals: Fate, Effect & Exposure

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
133	Pollution Prevention and Mitigation	20%		20%	
135	Aquatic and Terrestrial Wildlife	10%		10%	
306	Environmental Stress in Animals	10%		10%	
314	Toxic Chemicals, Poisonous Plants, Naturally Occurring Toxins, and Other Hazards Affecting Animals	10%		10%	
711	Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sourc	20%		20%	
723	Hazards to Human Health and Safety	30%		30%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

1. Actual amount of professional FTE/SYs expended this Program

Year: 2008	Extension		Research	
	1862	1890	1862	1890
Plan	1.1	0.0	3.8	0.0
Actual	0.3	0.0	4.3	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	218870	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
0	0	1519297	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
0	0	924729	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

The experimental approaches that will be used to meet the specific objectives of these subprograms include field studies in the Oregon, the Pacific Northwest, the U.S., and abroad.In addition, the experimental approaches will also include controlled laboratory experiments and database/model development.The methods that will be employed to reach direct and indirect, youth and adult, target audiences will encompass a variety of media including workshops, seminars, peer-reviewed manuscripts, newsletters, and websites. Expected short-term accomplishments that will result from successful completion of this five-year program include peer-reviewed manuscripts and other forms of information dissemination. Over the mid- to long term, the data and information generated as part of this Program will contribute to risk assessment and risk-based policy decisions and to the continued development of the theoretical understanding of processes affecting contaminant fate and exposure and on the effects of contaminant exposure on human and aquatic and terrestrial organism health.

2. Brief description of the target audience

There are diverse audiences for information this project generates. They can be classified into three general groups. (1) the general public and those in the food production system. (2) State and Federal regulatory agencies. (3) The research community: including scientists working in governmental, industrial, and academic sectors, both in the U.S. and globally.

V(E). Planned Program (Outputs)

1. Standard output measures

Target for the number of persons (contacts) reached through direct and indirect contact methods

	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	**Target**	**Target**	**Target**	**Target**
Plan	4750	21700	250	3000
2008	4500	25000	250	3000

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

Patent Applications Submitted

Year	Target
Plan:	0
2008 :	0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

	Extension	Research	Total
Plan	0	8	
2008	0	10	10

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- SCHOLARLY excellence in referred articles, book chapters, and books; participation on professional boards and panels, as well as science panels.

Year	Target	Actual
2008	12	36

Output #2

Output Measure

- Analytical methodology and the application of the methods to assess spatial, temporal and risk of bioavailable contaminants behavior of bioavailable contaminants in terrestrial and aquatic eco-systems with temporal variation (seasonal) and aging. new types of passive sampling devices for use as in-situ analysis of contaminants increased understanding of fish responses to PAH exposures. identify proteins that are potential new biomarkers for exposure to and effects of persistent contaminants in fish. develop analytical methodology and the application of the methods to wastewater, atmospheric samples, and to landfill leachates determine behavior of fluorochemicals in wastewater, in the atmosphere, and in landfills. determine remote atmospheric concentrations of fluorochemicals and atmospheric residence times determine the importance of snow in removing FTOHs from the atmosphere understand the fate of agricultural chemicals in various compartments of remote ecosystems. clarify the role of exogenous estrogenic compounds in the disruption of vertebral formation in fish refine agrichemical risk assessment for aquatic insects to include life history and behavior develop, refine, improve quantitative procedures that improve our ability to assess the risks that pest management practices pose to beneficial invertebrates. analytical methods and biomarkers for agricultural chemicals and other contaminants

Year	Target	Actual
2008	5	26

Output #3

Output Measure

- EFFECTS ON AND PROTECTION OF HUMAN HEALTH understand the regional/county variation in the epidemiology of pesticide exposures throughout the state. determine whether there is regional and/or temporal variation in the incidence of human pesticide exposures within the State of Oregon, and to identify opportunities for preventive interventions. communicate specific findings on the regional epidemiology of pesticide exposure incidents to public health officials and other agencies that oversee the use of pesticides.

Not reporting on this Output for this Annual Report

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O No.	OUTCOME NAME
1	Informed decision makers and citizenry Improved understanding of the spatial and temporal variability and distribution of bioavailable agricultural contaminants Fate and impact of temporal influences on bioavailable contaminants Methods and approaches for evaluating effects of aging on bioavailability of agricultural contaminants Document occurrence, exposure, fate, and treatment options of fluorochemicals in wastewater, the atmosphere, landfill leachate, snow, and crops Determine extent that landfills are a significant source of fluorochemicals and a significant extent in the crops intended for human consumption Provide technical training and resources to agricultural and regulatory stakeholders on ecotoxicology of pesticidesand integrated pest, nutrient, and water management. Increase ability of governments in Senegal and Mauritania, and eventually throughout the sub-region, to economically and efficiently monitor pesticides and their impacts of human and ecological systems.
2	Improved technology and strategies found New biomarkers of exposure to and effects of persistent contaminants in fish. Cost effective assessment of fish health in PAH contaminated aquatic ecosystems. New analytical methods and biomarkers for agricultural chemicals and other contaminants
3	Informed policy-making and management Data for environmental models, risk assessment, and risk management. Improved decision-making and policy on regulation of PAH in aquatic ecosystems. Predict the fate of agricultural chemicals in remote aquatic ecosystems Determine the relative contribution of regional U.S. and Canadian agricultural sources (both current and historic uses of these chemicals) and long-range or global sources in contributing to the deposition of agricultural chemicals to remote ecosystems Agencies that regulate or enforce the regulations relating to pesticides in the state develop policies or regulations. Able to assess trends, identify possible new issues, or assess the success of interventions
4	In the long run: • Risk assessment, policies and management of exposure of human and aquatic organisms to contaminants • Enhanced environmental quality within an economically responsible context. • Reduced exposure of human and aquatic organisms to fluorochemicals • Moderate the relative contribution of regional U.S. and Canadian agricultural sources (both current and historic uses of these chemicals) and long-range or global sources in contributing to the deposition of agricultural chemicals to remote ecosystems in the Western U.S. • Minimize the risk of adverse impact of pesticide use on human health. • Build environmental public health capacity

Outcome #1

1. Outcome Measures

Informed decision makers and citizenry Improved understanding of the spatial and temporal variability and distribution of bioavailable agricultural contaminants Fate and impact of temporal influences on bioavailable contaminants Methods and approaches for evaluating effects of aging on bioavailability of agricultural contaminants Document occurrence, exposure, fate, and treatment options of fluorochemicals in wastewater, the atmosphere, landfill leachate, snow, and crops Determine extent that landfills are a significant source of fluorochemicals and a significant extent in the crops intended for human consumption Provide technical training and resources to agricultural and regulatory stakeholders on ecotoxicology of pesticidesand integrated pest, nutrient, and water management. Increase ability of governments in Senegal and Mauritania, and eventually throughout the sub-region, to economically and efficiently monitor pesticides and their impacts of human and ecological systems.

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2008	5	24

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Economically and environmentally sustainable agriculture requires an integrated approach to pest management. Agricultural chemicals are one of many tools used to ensure an abundant food supply. Judicious use of agricultural chemicals demands practical knowledge of their fate and effects in agricultural and natural ecosystems. This new knowledge is required for the advancement of science-based management strategies which prevent or mitigate unacceptable adverse impacts on human and environmental health.

What has been done

An analytical method was developed based on the injection of large volumes of sample was developed as a sensitive and robust alternative methodology for detecting trace levels of organic contaminants in wastewater.

Results

Research on fluorochemicals indicated that municipal wastewater is a major source of fluorochemicals in the environment and that their removal during wastewater treatment is minimal. We discovered that fluorochemicals associated with wastewater move undegraded through a river system and that the only means of controlling the occurrence of select fluorochemicals in the environment is to decrease human use.
This finding may help regulators focus on reducing the number of products containing the most persistent forms of fluorochemicals.

4. Associated Knowledge Areas

KA Code	Knowledge Area
711	Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sourc
133	Pollution Prevention and Mitigation
723	Hazards to Human Health and Safety
314	Toxic Chemicals, Poisonous Plants, Naturally Occurring Toxins, and Other Hazards Affecting Animals

Outcome #2

1. Outcome Measures

Improved technology and strategies found New biomarkers of exposure to and effects of persistent contaminants in fish. Cost effective assessment of fish health in PAH contaminated aquatic ecosystems. New analytical methods and biomarkers for agricultural chemicals and other contaminants

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2008	3	3

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Since fluorochemicals are widely used in consumer-products as well as in many industrial applications, fluorochemicals enter aquatic and terrestrial environments upon disposal. Untreated fluorochemicals may enter the environment via wastewater effluent, septic discharge or application of treated sludge to agricultural lands.

What has been done

We developed an analytical methodology for fluorochemicals to their occurrence and behavior in a river receiving municipal wastewater.

Results

The large-volume injection technology that was developed represents a significant advance in analytical technology that makes environmental analyses more efficient and cost-effective. Dissemination of this new findings may lead to laboratory practices that will decrease the time and amount of solvent used.

4. Associated Knowledge Areas

KA Code	Knowledge Area
711	Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sourc
723	Hazards to Human Health and Safety
314	Toxic Chemicals, Poisonous Plants, Naturally Occurring Toxins, and Other Hazards Affecting Animals
306	Environmental Stress in Animals
135	Aquatic and Terrestrial Wildlife
133	Pollution Prevention and Mitigation

Outcome #3

1. Outcome Measures

Informed policy-making and management Data for environmental models, risk assessment, and risk management. Improved decision-making and policy on regulation of PAH in aquatic ecosystems. Predict the fate of agricultural chemicals in remote aquatic ecosystems Determine the relative contribution of regional U.S. and Canadian agricultural sources (both current and historic uses of these chemicals) and long-range or global sources in contributing to the deposition of agricultural chemicals to remote ecosystems Agencies that regulate or enforce the regulations relating to pesticides in the state develop policies or regulations. Able to assess trends, identify possible new issues, or assess the success of interventions

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2008	0	6

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Alterations in homeostatic endocrine function in early development of an organism may have far-reaching implications in many physiological processes later in life. Exposure assessment is a component of ecological risk assessment in which the contact between the pollutant and organisms in the environment is described and quantified.

What has been done

We participated in, and served as a technology and science resource for, the Oregon Legislative 'Workgroup on Pesticide Use in and Around Oregon Schools', Chaired by Senator Suzanne Bonamici.

Results

To date this effort resulted in the draft bill LC 804 that requires adoption of integrated pest management (IPM) plans for schools, specifies certain requirements for integrated pest management plans, provides for State Department of Agriculture enforcement, and makes public pesticide applicator license requirements applicable to pesticide applications at school campuses.

Full implementation of IPM in Oregon schools includes a thorough understanding of pests and pest biology by pest managers; careful inspection and monitoring for pest presence and pest-conducive conditions; and pest prevention through effective education, sanitation and facility maintenance. This approach mandates the use of pesticides only when non-chemical measures are inadequate. When needed, pesticide products are selected that minimize toxicity and potential for exposure.

4. Associated Knowledge Areas

KA Code	Knowledge Area
723	Hazards to Human Health and Safety
711	Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sourc
314	Toxic Chemicals, Poisonous Plants, Naturally Occurring Toxins, and Other Hazards Affecting Animals
133	Pollution Prevention and Mitigation
306	Environmental Stress in Animals
135	Aquatic and Terrestrial Wildlife

Outcome #4

1. Outcome Measures

In the long run:

- Risk assessment, policies and management of exposure of human and aquatic organisms to contaminants
- Enhanced environmental quality within an economically responsible context.
- Reduced exposure of human and aquatic organisms to fluorochemicals
- Moderate the relative contribution of regional U.S. and Canadian agricultural sources (both current and historic uses of these chemicals) and long-range or global sources in contributing to the deposition of agricultural chemicals to remote ecosystems in the Western U.S.
- Minimize the risk of adverse impact of pesticide use on human health.
- Build environmental public health capacity

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2008	0	4

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Protection of stream ecological health is a high priority for a number of reasons, including the conservation of fish populations. Evidence for declines in wild salmon populations in the Pacific Northwest has lead to research into the factors that might inhibit habitat quality, including the exposure of stream organisms to pesticides.

What has been done

We examined the effect of riparian vegetation on surface water loading of aerial and ground-applied organophosphate pesticides in cherry production. This project promoted an environmentally responsible approach to agriculture and provides critical information on spray drift, riparian vegetation barriers and their ability to preserve water quality. We examined the effectiveness of adapted and native woody plant species used as drift barriers for the protection of water resources.

Results

The project evaluated existing riparian vegetation for the reduction of pesticide pollution in waterways bearing anadromous species and providing drinking water to The Dalles, Oregon. This project supports the Integrated Fruit Production project which promotes the best practices for economical and environmental agricultural sustainability.

Grower and non-grower clientele have been informed on the outcome of this research with emphasis on the potential for pesticide loading into adjacent streams via spray drift and mitigation through the use of drift barriers. We carried out informational meetings and made presentations within the county and region, and with the Cherry Commission.

4. Associated Knowledge Areas

KA Code	Knowledge Area
314	Toxic Chemicals, Poisonous Plants, Naturally Occurring Toxins, and Other Hazards Affecting Animals
135	Aquatic and Terrestrial Wildlife
306	Environmental Stress in Animals
133	Pollution Prevention and Mitigation
723	Hazards to Human Health and Safety
711	Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sourc

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 Public priorities
- Competing Programmatic Challenges
- Populations changes (immigration,new cultural groupings,etc.)

Brief Explanation

{No Data Entered}

V(I). Planned Program (Evaluation Studies and Data Collection)

1. Evaluation Studies Planned

- Other (peer reviewed)

Evaluation Results

{No Data Entered}

Key Items of Evaluation

{No Data Entered}

Program #18

V(A). Planned Program (Summary)

1. Name of the Planned Program

Comparative Advantage of U.S. and Oregon Agricultural and Food Industries

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
606	International Trade and Development			90%	
609	Economic Theory and Methods			10%	
	Total			100%	

V(C). Planned Program (Inputs)

1. Actual amount of professional FTE/SYs expended this Program

Year: 2008	**Extension**		**Research**	
	1862	**1890**	**1862**	**1890**
Plan	0.0	0.0	0.9	0.0
Actual	0.0	0.0	0.8	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	51927	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
0	0	397185	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
0	0	43393	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

Conduct Research Experiments to test hypotheses

Use econometric techniques and calibration
- Use data from U.S. Dept of Agriculture, OECD, and UN
- Develop a stylized, internally consistent equilibrium model
- Apply trade models
- Assessments.

Quantify trade/capital flows-productivity relationship and feedbacks
Conduct Workshops, meetings.

Develop Products, Curriculum, Resources.

2. Brief description of the target audience

Policymakers
Agricultural and processed food industries

V(E). Planned Program (Outputs)

1. Standard output measures

Target for the number of persons (contacts) reached through direct and indirect contact methods

Year	Direct Contacts Adults Target	Indirect Contacts Adults Target	Direct Contacts Youth Target	Indirect Contacts Youth Target
Plan	20	200	0	0
2008	20	200	0	0

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

Patent Applications Submitted

Year	Target
Plan:	0
2008 :	0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

	Extension	Research	Total
Plan	0	0	
2008	0	2	2

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- SCHOLARLY excellence in referred articles, book chapters, and books; participation on professional boards and panels, as well as science panels.

Year	Target	Actual
2008	0	8

Output #2

Output Measure

- PROVIDE ECONOMIC AND MARKETING MODELS AND ANALYSES THAT INFORM DECISION-MAKERS, INDUSTRY, AND PEERS - Provide information to producer groups on factors shaping global markets. (G) a – use total factor productivity to measure technological strength of U.S. agriculture and processed food industries b – show productivity-convergence effects resulting from product trade and foreign direct investment (channels of international knowledge flow and rate of productivity convergence) – Model shows key relationships that tie climate change to the distribution of crop yields, comparative advantage, geography, and international trade.

Year	Target	Actual
2008	2	4

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O No.	OUTCOME NAME
1	Producer groups learn about factors shaping global markets and productivity-convergence effects on US agricultural and processed food production and trade.
2	We expect to show that international trade will be an important vehicle by which adaptations can be made to global climate change. - Researchers will uncover key relationships that tie climate change to the distribution of crop yields, comparative advantage, geography, and international trade. - Numerical estimates will be provided regarding how climate change will affect crop prices, production costs, and the economic welfare of producers, consumers, and society at large. - Policy makers will understand that climate change will be related to changes in comparative advantage in international crop production, and in turn the pattern and volume of trade.
3	The knowledge generated about productivity-convergence will be crucial in designing policies to improve the welfare of agricultural producers and food processors and the general public who will be affected by the evolution of these industries (e.g., food quality and safety, resource scarcity and pollution). If productivity convergence is indeed rapid and unlimited, then policy makers should focus on instruments to alleviate painful adjustment likely in farm and rural communities. In addition, identifying beneficiaries and the extent of their gains allow for transferring some of the gains to affected communities.
4	Domestic policymaking and multilateral trade negotiations will mitigate effects of climate change in reduction of trade barriers and subsidies. Climate change will be related to changes in comparative advantage in international crop production, and in turn the pattern and volume of trade. This information will be important in the context of domestic policymaking and multilateral trade negotiations as it pertains to reduction of trade barriers and subsidies.

Outcome #1

1. Outcome Measures

Producer groups learn about factors shaping global markets and productivity-convergence effects on US agricultural and processed food production and trade.

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2008	0	2

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Such learning allows the former to compete with latter in global markets. The resulting competition improves consumers' welfare by lowering prices, but can induce a loss of competitiveness of food industries in high-income economies. The challenge to leader countries is to sustain the rate of productivity growth without which they face significant structural adjustment within the food industries. Nevertheless, the welfare of all economies improves by the learning process.

What has been done

This effort is ongoing. Methods developed to assess the effect of market structure on productivity growth. Output has been disseminated to producer groups through professional articles and presentations to international, national, and regional meetings of professional producer associations.

Results

We show that low-income countries partly improve their productivity by learning from technologies employed in high-income economies.

4. Associated Knowledge Areas

KA Code	Knowledge Area
609	Economic Theory and Methods
606	International Trade and Development

Outcome #2

1. Outcome Measures

We expect to show that international trade will be an important vehicle by which adaptations can be made to global climate change. - Researchers will uncover key relationships that tie climate change to the distribution of crop yields, comparative advantage, geography, and international trade. - Numerical estimates will be provided regarding how climate change will affect crop prices, production costs, and the economic welfare of producers, consumers, and society at large. - Policy makers will understand that climate change will be related to changes in comparative advantage in international crop production, and in turn the pattern and volume of trade.

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2008	0	6

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Low-income countries tend to get hurt the most by global increases in yield variability, since they tend to have higher bilateral trade costs in conjunction with lower productivity in the crop sector.

What has been done

We examine a number of stylized alternative examples. We identify winners and losers from counterfactual scenarios for 21 countries. We report the percentage change in net economic welfare, crop prices, and land prices for alternative yield variability scenarios.

Results

We show that world trade volumes would need to increase substantially if crop yield variability rises further due to global climate change. We show that productivity and openness to imports are two key determinants of how countries are affected by climate change. Results vary systematically across countries with respect to per capita income. We identify specific actions that policy-makers can take to alleviate the worst effects of potential changes in yield variability.

4. Associated Knowledge Areas

KA Code	Knowledge Area
606	International Trade and Development
609	Economic Theory and Methods

Outcome #3

1. Outcome Measures

The knowledge generated about productivity-convergence will be crucial in designing policies to improve the welfare of agricultural producers and food processors and the general public who will be affected by the evolution of these industries (e.g., food quality and safety, resource scarcity and pollution). If productivity convergence is indeed rapid and unlimited, then policy makers should focus on instruments to alleviate painful adjustment likely in farm and rural communities. In addition, identifying beneficiaries and the extent of their gains allow for transferring some of the gains to affected communities.

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2008	0	2

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

The long-term beneficiaries of global productivity convergence have been the consumers and producers, barring the 2008 commodity price boom. Policy makers should focus on instruments to improve the rate of productivity growth, while alleviating painful adjustment likely in some farm and rural communities.

What has been done

The team has identified separate sources of productivity growth in U.S. agriculture and processed food industries. They will continue to address the possible erosion of technological advantages in the context of increased global economic integration.

Results

We find that productivity convergence is indeed rapid in some segments of the processed food industries. Several low- and middle-income economies have effectively competed with the United States and other high-income economies in third-world markets (e.g. China in the Korean food markets). The share of U.S. exports of some commodity and food products would have declined faster without higher productivity growth. The latter has been a key factor helping sustain resources (e.g. employment) in the U.S. food industry.

4. Associated Knowledge Areas

KA Code	Knowledge Area
606	International Trade and Development
609	Economic Theory and Methods

Outcome #4

1. Outcome Measures

Domestic policymaking and multilateral trade negotiations will mitigate effects of climate change in reduction of trade barriers and subsidies. Climate change will be related to changes in comparative advantage in international crop production, and in turn the pattern and volume of trade. This information will be important in the context of domestic policymaking and multilateral trade negotiations as it pertains to reduction of trade barriers and subsidies.
Not reporting on this Outcome for this Annual Report

V(H). Planned Program (External Factors)

External factors which affected outcomes

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

Brief Explanation

{No Data Entered}

V(I). Planned Program (Evaluation Studies and Data Collection)

1. Evaluation Studies Planned

- Before-After (before and after program)

Evaluation Results

{No Data Entered}

Key Items of Evaluation

{No Data Entered}

Program #19

V(A). Planned Program (Summary)

1. Name of the Planned Program

Sustainable Animal Production Systems

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
307	Animal Management Systems	100%		100%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

1. Actual amount of professional FTE/SYs expended this Program

Year: 2008	Extension		Research	
	1862	1890	1862	1890
Plan	1.0	0.0	1.6	0.0
Actual	0.1	0.0	0.8	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	54476	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
0	0	349787	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
0	0	68397	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

- Conduct Research Experiments.
1 – genetic selection studies
2 – sheep production efficiency
2a - reduced input sheep production
3 – efficient cropping, grazing, and feeding management systems for beef and dairy cows
3a – reduce nutrient flow, cycling, transformation and loss to environment
4 – determine nutrition and feed relationships throughout lifetime of beef cows

- Conduct Workshops, meetings.

- Develop Products, Curriculum, Resources.

- Deliver Services.

- Provide Training.

- Assessments.

- Facilitating.

2. Brief description of the target audience

- scientific peers in the United States and World,
- Extension personnel and other educators
- nutritional consultants and ultimately
- dairy, livestock and poultry producers
- policy makers, regulators, politicians
- commodity groups

V(E). Planned Program (Outputs)

1. Standard output measures

Target for the number of persons (contacts) reached through direct and indirect contact methods

	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	**Target**	**Target**	**Target**	**Target**
Plan	600	4300	100	100
2008	1280	10000	259	100

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

Patent Applications Submitted

Year	Target
Plan:	0
2008 :	0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

	Extension	Research	Total
Plan	0	3	
2008	10	0	10

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- DEVELOP IMPROVED ANIMAL AND PLANT PRODUCTION SYSTEMS - improved, surviving offspring and appropriate calving dates (cows – 40x4) - improved weaned weight (lamb - 6lb per ½ condition score) - reduced lambing production inputs (remove those of high mortality risk) - more economical and environmentally sustainable dairy and beef production systems that meet new environmental requirements - synchronizing forage and carcass data for calf and cow management

Year	Target	Actual
2008	20	7

Output #2

Output Measure

- CARRY OUT STUDIES TO DECIPHER GENOMES, GENETICS AND MECHANISMS OF PLANTS AND ANIMAL - identify previously unknown gene (1/yr) – Savage To acquire a more thorough understanding of the genetic load that is present in economically significant populations of poultry based upon the identification of embryonic failures that are present in Coturnix quail.

Year	Target	Actual
2008	1	2

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O No.	OUTCOME NAME
1	Information regarding gentic influences - Poultry breeders gain information regarding genetic causes of early embryonic failures (Savage) - Producers are aware of sire genotype effects on embryonic loss and of management factors that influence loss of potential lambs in commercial ewes, such as body condition at lambing positively correlated with total weight of lamb weaned (Meyer)
2	Information regarding forage and nutrient management - Producers, NRCS, conservation districts and environmental agencies learn about whole farm nutrient management. (Gamroth) - Information will aid Extension Specialists in producing extension workshops and other forms of teaching or consulting with farmers on issues related to grazing, manure management, and cropping systems. - Beef industry will understand forage quality dynamics for dominant forage species in Oregon, how management practices can synchronize the relationship between forage nutrient supply and cow nutrient requirements, how pre-weaning and post-weaning calf management practices influence lifetime productivity of the calf and carcass quality and how feedstuffs can influence the health and physiological stress of the calf.
3	Improved genetic stocks: - Knowing genetic causes of early embryonic failures allows poultry breeders to remove deleterious genes from their breeding populations. (Savage) - Understanding ramifications of sire effects, in the short term producers are starting to pursue alternative terminal sires such as the Texel x Suffolk. A program is initiated to develop a composite sire breed as an alternative.
4	Better nutrition strategies applied - Producers will adopt critical post-mating nutrition through the time of embryonic attachment to the placenta, having learned that body condition at lambing is positively correlated with total weight of lamb weaned - Farmers will more strategically plan for crop production and manure management.
5	Increased productivity achieved: - Producers greatly improve their reproductive efficiency by removing bad genes thus increasing productivity and economics of the industry. Industry thus has mproved resource and economic sustainability through reduced costs and/or increased productivity. - Producers use critical post-mating nutrition to produce about 6 pounds of additional weaning weight per ½ condition score. Also, intense selection reduces needs for assistance in pasture lambing conditions. - Better understanding of the costs, benefits, and potential impact of legislation on the dairy industry, and thus more economically and environmentally sustainable systems for dairy and beef production.

Outcome #1

1. Outcome Measures

Information regarding gentic influences - Poultry breeders gain information regarding genetic causes of early embryonic failures (Savage) - Producers are aware of sire genotype effects on embryonic loss and of management factors that influence loss of potential lambs in commercial ewes, such as body condition at lambing positively correlated with total weight of lamb weaned (Meyer)

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2008	10	2

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

This work to determine the genetic cause of early embryonic failures in commercial poultry breeding stocks will have benefits to the industry.

What has been done

Researchers are using the Coturnix quail model for the identification of lethal alleles present in commercial poultry breeding stocks. The disorders being studied, twinning and cranial exencephally are observed in unhatched commercial hatchery residue and their presence has been attributed to physical incubation conditions.

Results

Investigations into the detection and characterization of previously undocumented early embryonic (days 1-7) failures in Coturnix embryos has resulted in the identification of two lethal conditions- extremities duplication (additional wings and or legs) or embryo twinning and cranial exencephally. Studies to date indicate that both conditions are independent of each other and are heritable - the responsible alleles may reside at multiple loci. The conditions appear to be expressions of a genotype-environment interaction. Duration of pre-incubation storage does not influence expression while incubation at 102F vs. 100 F increases the incidences significantly.

4. Associated Knowledge Areas

KA Code	Knowledge Area
307	Animal Management Systems

Outcome #2

1. Outcome Measures

Information regarding forage and nutrient management - Producers, NRCS, conservation districts and environmental agencies learn about whole farm nutrient management. (Gamroth) - Information will aid Extension Specialists in producing extension workshops and other forms of teaching or consulting with farmers on issues related to grazing, manure management, and cropping systems. - Beef industry will understand forage quality dynamics for dominant forage species in Oregon, how management practices can synchronize the relationship between forage nutrient supply and cow nutrient requirements, how pre-weaning and post-weaning calf management practices influence lifetime productivity of the calf and carcass quality and how feedstuffs can influence the health and physiological stress of the calf.

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2008	5	3

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

The information aids farmers as they make strategic plans for crop production and animal nutrition. Extension Specialists obtain useful information for extension workshops and other forms of teaching or consulting with farmers and advisors on feed management and nutrient excretion. The results will provide a better understanding of the costs, benefits, and potential impact of precision feeding on the dairy industry. Nutrient management is an integral part of sustainable beef systems and environmental quality.

What has been done

A process to remove P from liquid dairy manure was refined from manure after anaerobic digestion treatment.

Results

Results from Oregon and Washington wastewater treatment indicate that as much as 80% of P can be removed. Struvite (mg-N-P) that has been extracted from liquid dairy manure was shown to be a good source of nutrients for growth of corn and alfalfa. Tools in the form of assessment tools, checklists, and a feed management template were developed for the species of beef, dairy, swine, and poultry. Training workshops have been held for both nutritionists and technical service providers (nutrient management planners). There were more than 10,000 visits to the Feed Management section of the Livestock Stewardship website.

4. Associated Knowledge Areas

KA Code	Knowledge Area
307	Animal Management Systems

Outcome #3

1. Outcome Measures

Improved genetic stocks: - Knowing genetic causes of early embryonic failures allows poultry breeders to remove deleterious genes from their breeding populations. (Savage) - Understanding ramifications of sire effects, in the short term producers are starting to pursue alternative terminal sires such as the Texel x Suffolk. A program is initiated to develop a composite sire breed as an alternative.

Not reporting on this Outcome for this Annual Report

Outcome #4

1. Outcome Measures

Better nutrition strategies applied - Producers will adopt critical post-mating nutrition through the time of embryonic attachment to the placenta, having learned that body condition at lambing is positively correlated with total weight of lamb weaned - Farmers will more strategically plan for crop production and manure management.

Not reporting on this Outcome for this Annual Report

Outcome #5

1. Outcome Measures

Increased productivity achieved: - Producers greatly improve their reproductive efficiency by removing bad genes thus increasing productivity and economics of the industry. Industry thus has mproved resource and economic sustainability through reduced costs and/or increased productivity. - Producers use critical post-mating nutrition to produce about 6 pounds of additional weaning weight per ½ condition score. Also, intense selection reduces needs for assistance in pasture lambing conditions. - Better understanding of the costs, benefits, and potential impact of legislation on the dairy industry, and thus more economically and environmentally sustainable systems for dairy and beef production.

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2008	0	3

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Reduced lambing inputs are an important factor in increasing productivity.

What has been done

Investigators are currently working to identify and evaluate ewe genotypes suitable for such a management system and to determine timing of lambing and other relevant parameters to make such a system feasible

Results

Results have shown the importance of female reproductive rate on net lamb production and have shown the limitations of the Dorper breed in such management systems despite their advantages in reduced shearing costs. Trial results have been disseminated through presentations at regional research meetings, local extension meetings, and annual meetings of the Oregon Sheepgrowers Association.

4. Associated Knowledge Areas

KA Code	Knowledge Area
307	Animal Management Systems

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Economy
- Public Policy changes
- Government Regulations

Brief Explanation

{No Data Entered}

V(I). Planned Program (Evaluation Studies and Data Collection)

1. Evaluation Studies Planned

- Retrospective (post program)

Evaluation Results

{No Data Entered}

Key Items of Evaluation

{No Data Entered}

Program #20

V(A). Planned Program (Summary)

1. Name of the Planned Program

Pathogens and Nematodes Affecting Plants (Molecular and Field Programs)

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
212	Pathogens and Nematodes Affecting Plants	100%		100%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

1. Actual amount of professional FTE/SYs expended this Program

Year: 2008	Extension		Research	
	1862	1890	1862	1890
Plan	0.2	0.0	6.4	0.0
Actual	0.3	0.0	4.6	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	142576	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
0	0	1090545	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
0	0	2093827	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

- Conduct Research Experiments.

- Develop Products, Curriculum, Resources.

- Conduct Workshops, meetings.

- Provide Training.

2. Brief description of the target audience

The target audiences include growers, packers, storage operators, crop consultants, extension faculty and researchers in the potato and pear industries and in the wheat, grape, and cereal industries.

V(E). Planned Program (Outputs)

1. Standard output measures

Target for the number of persons (contacts) reached through direct and indirect contact methods

	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	Target	Target	Target	Target
Plan	500	450	50	0
2008	400	0	0	0

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

Patent Applications Submitted

Year	Target
Plan:	0
2008 :	1

Patents listed

V.V. Dolja and V.P. Peremyslov 'Closterovirus Vectors and Methods'. New U.S. Provisional Patent Application, filed on January 31, 2008. OSU Ref. No. 06-57; Klarquist Ref. No. 245-79793-01

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

	Extension	Research	Total
Plan	0	3	
2008	0	15	15

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- SCHOLARLY excellence in referred articles, book chapters, and books; participation on professional boards and panels, as well as science panels.

Year	Target	Actual
2008	4	42

Output #2

Output Measure

- PROVIDE ADDITIONAL UNDERSTANDING FOR PLANT AND ANIMAL PROTECTION FROM DISEASES AND PESTS Research experiments and tests to:
  - understand virus reproduction and transport in plants.
  - technologies for efficient application of viral vectors in grapevine.
  - decay risk prediction models for use in orchards and packinghouses
  - better understand species complex and fungicide sensitivity
  - Understand physiological basis of plant disease resistance and susceptivility
  - Knowledge that fumigants used at reduced rates in combination with other nematicides are likely to be the optimum management strategies for control of CRKN.
  - Learn that applications would need to be made earlier at higher population levels. It also indicates the importance of sampling to determine population levels before management begins and emphasizes the need for early season application times at high population levels.
  - Design crop management systems for suppression of CRKN using suppressive rotation crops, green manure crops and reduced nematicide use
  - Quantify the efficacy of individual treatments for control of postharvest decay of pear fruit, and quantify and compare the efficacy of treatment programs composed of diverse, multiple control tactics.
  - Identify decay management programs appropriate to various producer objectives.

Year	Target	Actual
2008	4	60

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O No.	OUTCOME NAME
1	Genes and genetic mechanisms: • Elucidate the underlying molecular mechanisms of pathogenicity (virulence) and disease susceptibility (compatibility) and disease development. • Knowledge gained will facilitate future planned activities in functional genomics and provide a more robust sampling of the Pleosporales for comparative genomic studies by the fungal research community. • Information for the development of resistant wheat germplasm to tan spot. • Determined functions of the GLRaV-2 proteases in virus reproduction and spread, as well as characterize mechanisms of BYV Hsp70h interactions with actin cytoskeleton and targeting to plasmodesmata. We will also design approaches to engineering GLRaV-2 gene expression vectors. • Contribute to understanding molecular mechanisms responsible for closterovirus reproduction and transport in plants and develop model to predict risk • Develop technologies for efficient application of viral vectors in grapevine. • Characterize genes involved in Victoria Blight Disease susceptibility, and uncover relationships between disease susceptibility and disease resistance.
2	Management tactics • Fumigants used at reduced rates in combination with other nematicides are likely to be the optimum management strategies for control of CRKN. • Efficacy of various orchard, postharvest, and storage methods for control of postharvest decay of pear
3	Disease and pest control control of a wide-ranging and serious disease on wheat. apply knowledge to generation of the viral vectors for grapevine disease control and functional genomics vectors have a potential for replacing current strategies of using chemical fungicides and bactericides with viral biocontrol strategies. Growers, packers and extension faculty incorporate practices to lower decay risk, including reduced fungicide usage, and identify high risk fruit lots and to market these before decay has time to develop in storage. Determine packinghouse water system contamination by fungal pathogens. Commercial service lab can apply PCR technology to maintain sanitation determine most effective fungicides for each species. develop a customized decay control program for each unique pathogen complex. District-specific control programs will reduce usage of fungicides with low efficacy and emphasize integrated control practices. use of green manure crops in combination with reduced nematicide use is likely to be successful, particularly for short season potato crops. CRKN may be managed with crop rotation sequences, including green manure crops, which suppress nematode populations so that no or minimal nematicides are necessary. Establish that the interaction of program components and the overall efficacy of various combinations of orchard, postharvest, and storage factors will be the guides to the description of programs for implementation in the pear industry.
4	Scientific advancement using generated knowledge for furthering our understanding of the fundamental processes of virus-host interactions and coevolution.
5	In the long term: • enhance economic opportunities for agricultural producers, and enhance the nation's natural resource base and environment by revealing cost-effective means to control this and other plant diseases and reduce the need for pesticides. • general progress of grapevine industry in US. • biocontrols will reduce environmental damage and costs of grape growing and facilitate the development of the table and wine grapes with improved quality and nutritional value and therefore to increase competitiveness of the US grape growers and wine makers at the world markets. • control of disease • A better understanding of CRKN population cycle and the process of tuber infection will permit nematicides to be applied at more strategic times in the growing season to increase the level of control with less nematicide. • producers maximize the control of postharvest decay within the various production and marketing objectives of producers.

Outcome #1

1. Outcome Measures

Genes and genetic mechanisms:

- Elucidate the underlying molecular mechanisms of pathogenicity (virulence) and disease susceptibility (compatibility) and disease development.
- Knowledge gained will facilitate future planned activities in functional genomics and provide a more robust sampling of the Pleosporales for comparative genomic studies by the fungal research community.
- Information for the development of resistant wheat germplasm to tan spot.
- Determined functions of the GLRaV-2 proteases in virus reproduction and spread, as well as characterize mechanisms of BYV Hsp70h interactions with actin cytoskeleton and targeting to plasmodesmata. We will also design approaches to engineering GLRaV-2 gene expression vectors.
- Contribute to understanding molecular mechanisms responsible for closterovirus reproduction and transport in plants and develop model to predict risk
- Develop technologies for efficient application of viral vectors in grapevine.
- Characterize genes involved in Victoria Blight Disease susceptibility, and uncover relationships between disease susceptibility and disease resistance.

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2008	7	16

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Current evidence indicates that genes normally involved in plant defense can be exploited by some pathogens to confer susceptibility. Molecular tools have enabled determination of the complete genome sequence of the fungal organism that causes tan spot of wheat. Molecular tools have enabled the functions of genes associated with disease susceptibility and disease resistance to be understood in different hosts. Molecular tools have enabled the complete nucleotide sequence of an Oregon isolate of the grapevine leafroll associated virus to be determined. This new knowledge is used to understand how virus infection occurs, and the roles of viral and host factors in virus replication, transport and spread. Understanding pathogenicity and spread enables viral vectors to be developed and patented which growers can use to develop disease resistance and improve fruit quality.

What has been done

The research team has used molecular tools to identify the gene involved in Victoria Blight Disease susceptibility. The team has characterized the locus in the plant Arabidopsis thaliana and is moving onto finding this locus in rice, barley and oats. Another team has investigated resistant wheat germplasm to tan spot through phylogenetic and Southern analysis. Finally, another group developed two novel concepts: 1) viral proteases as factors of viral pathogenicity and spread within plants; 2)targeting of viral proteins to plasmodesmata mediated by the class VIII myosins.

Results

New knowledge has revealed that different races of the fungal organism that causes tan spot in wheat are distinguished by both disease phenotype and genetic composition. New knowledge has revealed that the host selective toxins (HST) involved in tan spot of wheat disease expression are widespread in closely related disease causing species. This is in contrast to currently described HST's in other systems. This research field enabled a significant outreach and education opportunity for minorities, and targeted for local community needs, to be achieved with a genomics and molecular biology workshop at Heritage University, Toppenish, WA. Students from that University received training at OSU. Using the Victoria blight pathogen in Arabidopsis, barley and rice, new knowledge shows that host proteins encoded by these genes interact to confer disease susceptibility and disease resistance, and that these two physiological processes share similarities and may be identical in some circumstances. Thus, results imply that the gene in Arabidopsis functions as a disease resistance gene.

4. Associated Knowledge Areas

KA Code	Knowledge Area
212	Pathogens and Nematodes Affecting Plants

Outcome #2

1. Outcome Measures

Management tactics

- Fumigants used at reduced rates in combination with other nematicides are likely to be the optimum management strategies for control of CRKN.
- Efficacy of various orchard, postharvest, and storage methods for control of postharvest decay of pear

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2008	5	3

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Columbia Root Knot Nematode infects potato tubers and causes quality defects that make tubers unsaleable. Proper management of CRKN by growing crops in the proper order can reduces economic losses and potentially could require less use of nematicides. Appropriate postharvest decay management of pear reduces economic losses due to repackaging and discard of decayed fruit. Reduced application of fungicides may provide environmental and health benefits.

What has been done

The research team focused on management strategies of CRKN tested various strategies including nematicide application, crop rotation and green manure application and the potato crop was then evaluated. A model to predict, at harvest, the risk of gray mold in pear fruit in long-term cold storage was completed and is based on multiple variables including: i) density of Botrytis cinerea DNA on fruit surfaces at harvest; ii) fungicide application within 4 weeks before harvest; iii) rainfall within 2 weeks before harvest; and iv) a relative orchard tree-growth and management rating.

Results

Damage to tubers may be effectively managed with reduced rates of the fumigant Telone II, a sudangrass green manure crop the summer before potato plus six in-season applications of Vydate nematicide, or a combination of Telone, sudangrass and Vydate. Gray mold risk prediction at harvest will be a valuable tool for packinghouse managers to determine which fruit is most suitable for long term storage. The prediction also will be useful to growers to help them understand the factors that cause fruit to be at risk of decay and to make the necessary changes in their horticultural and pest management practices to lower the risk of gray mold. The decay risk prediction model appears robust and gave reliable predictions of gray mold risk in pear fruit from Oregon, Washington and New Zealand in all three years. In addition, predictions included both d'Anjou and Bosc pear cultivars.

4. Associated Knowledge Areas

KA Code	Knowledge Area
212	Pathogens and Nematodes Affecting Plants

Outcome #3

1. Outcome Measures

Disease and pest control control of a wide-ranging and serious disease on wheat. apply knowledge to generation of the viral vectors for grapevine disease control and functional genomics vectors have a potential for replacing current strategies of using chemical fungicides and bactericides with viral biocontrol strategies. Growers, packers and extension faculty incorporate practices to lower decay risk, including reduced fungicide usage, and identify high risk fruit lots and to market these before decay has time to develop in storage. Determine packinghouse water system contamination by fungal pathogens. Commercial service lab can apply PCR technology to maintain sanitation determine most effective fungicides for each species. develop a customized decay control program for each unique pathogen complex. District-specific control programs will reduce usage of fungicides with low efficacy and emphasize integrated control practices. use of green manure crops in combination with reduced nematicide use is likely to be successful, particularly for short season potato crops. CRKN may be managed with crop rotation sequences, including green manure crops, which suppress nematode populations so that no or minimal nematicides are necessary. Establish that the interaction of program components and the overall efficacy of various combinations of orchard, postharvest, and storage factors will be the guides to the description of programs for implementation in the pear industry.

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2008	0	7

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

The timing of applications of fungicides or biocontrol agents for prevention of post-harvest decay in pears is critical. The US pear industry trend is to delay or apply fewer post-harvest treatments for health and other reasons. Knowledge of the pathogen isolates present enables growers to select the most appropriate fungicides for decay control.

What has been done

Molecular tools are being used to identify the bull's eye rot pathogen isolates occurring in the major apple and pear growing regions of Oregon, Washington, and New Zealand. Molecular tools are also being used to quantify the presence of a biocontrol yeast that controls decay in apple, pear and sweet cherry.

Results

New opportunities for growers are available with biofuels but their selection and their order of growth in rotation with potato is critical in maintaining a low population density of CRKN to reduce economic loss. New knowledge is enabling potato growers in short, cool growing areas to use green manures with fewer nematicides, and fewer fumigant applications to effectively manage CRKN. New knowledge is enabling alternative treatment strategies to be applied prior to harvest which reduce the incidence of post-harvest decay. These strategies are being welcomed by both conventional and organic producers.

4. Associated Knowledge Areas

KA Code	Knowledge Area
212	Pathogens and Nematodes Affecting Plants

Outcome #4

1. Outcome Measures

Scientific advancement using generated knowledge for furthering our understanding of the fundamental processes of virus-host interactions and coevolution.

Not reporting on this Outcome for this Annual Report

Outcome #5

1. Outcome Measures

In the long term:

- enhance economic opportunities for agricultural producers, and enhance the nation's natural resource base and environment by revealing cost-effective means to control this and other plant diseases and reduce the need for pesticides.
- general progress of grapevine industry in US.
- biocontrols will reduce environmental damage and costs of grape growing and facilitate the development of the table and wine grapes with improved quality and nutritional value and therefore to increase competitiveness of the US grape growers and wine makers at the world markets.
- control of disease
- A better understanding of CRKN population cycle and the process of tuber infection will permit nematicides to be applied at more strategic times in the growing season to increase the level of control with less nematicide.
- producers maximize the control of postharvest decay within the various production and marketing objectives of producers.

Not reporting on this Outcome for this Annual Report

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 Public priorities
- Competing Programmatic Challenges
- Other (personnel)

Brief Explanation

{No Data Entered}

V(I). Planned Program (Evaluation Studies and Data Collection)

1. Evaluation Studies Planned

-

Evaluation Results

{No Data Entered}

Key Items of Evaluation

{No Data Entered}

Program #21

V(A). Planned Program (Summary)

1. Name of the Planned Program

Plant Genome, Genetics, and Genetic Mechanisms

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
201	Plant Genome, Genetics, and Genetic Mechanisms			100%	
	Total			100%	

V(C). Planned Program (Inputs)

1. Actual amount of professional FTE/SYs expended this Program

Year: 2008	Extension		Research	
	1862	1890	1862	1890
Plan	0.0	0.0	2.3	0.0
Actual	0.0	0.0	2.0	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	81478	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
0	0	623218	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
0	0	1014099	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

- Conduct Research Experiments.

- Develop Products, Curriculum, Resources.

- Provide Training.

2. Brief description of the target audience

Growers in all agroecosystems.
Cereal industry.
Researchers and practitioners

V(E). Planned Program (Outputs)

1. Standard output measures

Target for the number of persons (contacts) reached through direct and indirect contact methods

	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	Target	Target	Target	Target
Plan	100	0	0	0
2008	100	0	2	0

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

Patent Applications Submitted

Year	Target
Plan:	0
2008 :	0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

	Extension	Research	Total
Plan	0	4	
2008	0	6	6

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- SCHOLARLY excellence in referred articles, book chapters, and books; participation on professional boards and panels, as well as science panels.

Year	Target	Actual
2008	4	6

Output #2

Output Measure

- CARRY OUT STUDIES TO DECIPHER GENOMES, GENETICS AND MECHANISMS OF BACTERIA AND VIRUSES AND OTHER MICROORGANISMS - Comparative genomics studies will provide insights to the evolutionary history and the niche of nitrifying bacteria within microbial communities and the unique niches of different species of nitrifying bacteria. - Identify differences and similarities among nitrifying bacteria in mono- and co-cultures. - Determine the role of specific genes in the Fe metabolism of N. europaea. - Determine if specific genes are required for the obligate lithoautotrophic lifestyle.and use metabolic flux analyses to model metabolism in N. europaea grown on different carbon sources.
  - identify co-regulated gene sets by their function.
  - further understand the interaction of antagonistic signaling pathways regulate the switch between embryogenesis and the maturaltion phase of maize embry development.

Year	Target	Actual
2008	4	13

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O No.	OUTCOME NAME
1	Genes and genetic mechanisms determine sets of genes involved in processes critical to the functions of nitrifiers, including genes involved in mutualistic growth between ammonia and nitrite oxidizers, genes involved in Fe metabolism, and genes involved in autotrophy and lithotrophy. test two new hypotheses regarding the regulation of embryo maturation in cereals. answer fundamental questions regarding developmental timing, mechanisms of hormone interaction, and specificity of Rop function. Our results will be relevant to "cross-talk" in hormone signaling, an increasingly important topic in plant biology.
2	Knowledge contributes to: • understanding of the molecular underpinnings involved in the processes that combine to make up nitrification. • determining patterns of coordinated gene expression and hormone regulated expression.
3	In the long term: • Mitigate the effects of nitrifiers in agricultural soils and enhance their role in wastewater treatment by a thorough understanding of their metabolism. • Avoiding failure of seeds to mature properly results in significant gains of yield and quality.

Outcome #1

1. Outcome Measures

Genes and genetic mechanisms determine sets of genes involved in processes critical to the functions of nitrifiers, including genes involved in mutualistic growth between ammonia and nitrite oxidizers, genes involved in Fe metabolism, and genes involved in autotrophy and lithotrophy. test two new hypotheses regarding the regulation of embryo maturation in cereals. answer fundamental questions regarding developmental timing, mechanisms of hormone interaction, and specificity of Rop function. Our results will be relevant to "cross-talk" in hormone signaling, an increasingly important topic in plant biology.

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2008	6	10

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Molecular tools enable the understanding of processes mediated by microorganisms in the transformation of cropland and waste water nitrogen and of genes regulated by the hormones abscisic acid and gibberellins in the development of maize embryos.

What has been done

The growth requirements of the nitrite-oxidizing bacteria, Nitrobacter hamburgensis and Nitrobacter winogradskyi were examined. The impact of nitric oxide was determined and the metabolism of lactate was investigated. The roles of two genes, bmoR and bmoG, in the regulation and expression of active butane monooxygenase in Pseudomonas butanovora were determined. The role of copper in regulating expression was also examined. Further, many previously unknown hormone responses have been shown for maize embryos. Mutated lines that show altered embryo behavior in response to ABA and GA deficiency have been identified, but are not yet fully characterized genetically or physiologically.

Results

The complete genome sequence of Nitrobacter hamburgensis was completed - this is only the second genome of a nitrite-oxidizing bacterium to be completed. The complete genome sequence of Nitrosospira mutiformis was completed and is the first genome sequence from an ammonia oxidizing bacterium that predominantly inhabits soil.

The selection of some of the identified maize hormonses for further analysis has provided new knowledge to revise hypotheses regarding the role and interaction of hormones in this system. Coordination with other groups working on these processes in other cereal systems will eventually enable gains in cereal yield and seed quality.

4. Associated Knowledge Areas

KA Code	Knowledge Area
201	Plant Genome, Genetics, and Genetic Mechanisms

Outcome #2

1. Outcome Measures

Knowledge contributes to:

• understanding of the molecular underpinnings involved in the processes that combine to make up nitrification.

• determining patterns of coordinated gene expression and hormone regulated expression.

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2008	0	3

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Complete genomes provide a blueprint to guide understanding of these microorganisms. Studying genetic mechanisms like hormonal regulation in maize embryo development will enable better understanding of developmental processes.

What has been done

The two genomes of nitrifying organisms completed this year provide additional insights to the ecological niches adopted by these organisms and to the differences among strains of bacteria. Studies revealed that copper regulates expression of butane monooxygenase through the oxidation state of the copper, a novel finding. BmoR regulates the expression of this enzyme, and BmoG serves as a chaperonin.

We also examined developmental stages in four hormone mutant backgrounds and in Rop kinase mutants, using quantitative RT_PCR. Our data do not support our original hypothesis that GA directly interferes with ABA signaling in maize embryo development.

Results

Efforts to understand the molecular underpinnings of the processes mediated by these nitrifying microorganisms should lead to mechanisms to mitigate the negative effects of these processes in croplands and the beneficial effects in wastewater treatment. Complete genomes provide a blueprint to guide understanding of these microorganisms.

Based on our studies of GA mutant embryos, we have formed a new hypothesis that the rise of ABA regulated gene expression late in the development of double mutants is due to abnormal sugar signaling patterns due to the absence of GA. We find that some central carbohydrate processing enzyme genes are reduced in expression as much as 1000x in GA mutants. We are testing this hypothesis by looking at additional mutants in sugar metabolism.

4. Associated Knowledge Areas

KA Code	Knowledge Area
201	Plant Genome, Genetics, and Genetic Mechanisms

Outcome #3

1. Outcome Measures

In the long term:

• Mitigate the effects of nitrifiers in agricultural soils and enhance their role in wastewater treatment by a thorough understanding of their metabolism.

• Avoiding failure of seeds to mature properly results in significant gains of yield and quality.

Not reporting on this Outcome for this Annual Report

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 Public priorities
- Competing Programmatic Challenges
- Populations changes (immigration,new cultural groupings,etc.)

Brief Explanation

V(I). Planned Program (Evaluation Studies and Data Collection)

1. Evaluation Studies Planned

-

Evaluation Results

{No Data Entered}

Key Items of Evaluation

{No Data Entered}

Program #22

V(A). Planned Program (Summary)

1. Name of the Planned Program

Dryland Cropping Systems

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
102	Soil, Plant, Water, Nutrient Relationships	20%		18%	
111	Conservation and Efficient Use of Water	20%		18%	
205	Plant Management Systems	20%		27%	
212	Pathogens and Nematodes Affecting Plants	20%		20%	
213	Weeds Affecting Plants	20%		17%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

1. Actual amount of professional FTE/SYs expended this Program

Year: 2008	Extension		Research	
	1862	1890	1862	1890
Plan	1.2	0.0	8.2	0.0
Actual	0.4	0.0	4.6	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	224209	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
0	0	1697877	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
0	0	409828	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

- Conduct Research Experiments.

- Construct Research Facilities.

- Conduct Workshops, meetings.

- Deliver Services.

- Develop Products, Curriculum, Resources.

- Provide Training.

- Assessments.

- Partnering.

2. Brief description of the target audience

Professional peers and scientific communities

State commodity commissions and grower groups

Natural resource industry clientele – growers, field representatives, grower co-ops and partnerships, processors and handlers, export companies, importing companies

State and federal agencies – Oregon Department of Agriculture, Natural Resources Conservation Service. Bureau of Indian Affairs, Confederated Tribes of the Umatilla Indian Reservation, US Forest Service, Bureau of Land Management.

V(E). Planned Program (Outputs)

1. Standard output measures

Target for the number of persons (contacts) reached through direct and indirect contact methods

	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	Target	Target	Target	Target
Plan	5000	15000	250	1000
2008	5005	15000	70	100

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

Patent Applications Submitted

Year	Target
Plan:	0
2008 :	0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

	Extension	Research	Total
Plan	0	5	
2008	0	32	32

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- SCHOLARLY excellence in referred articles, book chapters, and books; participation on professional boards and panels, as well as science panels.

Year	Target	Actual
2008	8	101

Output #2

Output Measure

- DEVELOP IMPROVED ANIMAL AND PLANT PRODUCTION SYSTEMS (Machado, Wysocki, Petrie) Identification of suitable alternative crops for wheat-based crop rotations; determination of best management practices for alternative crops Control of downy brome and other weeds through extracts from broadleaf plants (natural herbicides) Cultivar testing on canola and mustard Nutrient and crop management extension recommendations Improved nitrogen management strategies for soft white wheat Improved nutrient recommendations for soft white wheat grown in conservation tillage systems and for potential alternative cereal crops

Year	Target	Actual
2008	20	72

Output #3

Output Measure

- PROVIDE ADDITIONAL UNDERSTANDING FOR PLANT AND ANIMAL PROTECTION FROM DISEASES AND PESTS (Smiley, Ball) development and release of wheat cultivars with improved capacity to resist or tolerate infections by plant-pathogenic fungi (Bipolaris sorokiniana, Fusarium culmorum, and F. pseudograminearum) and plant-parasitic nematodes (Heterodera avenae, Pratylenchus neglectus, and P. thornei). integrate disease resistant cultivars into existing, but inadequate as "stand-alone" cultural management procedures including manipulation of tillage systems, planting equipment, planting dates, fertilizer placement, fungicide seed treatments, and others. Large plot studies conducted in commercial wheat fields to develop season-long chemical fallow management systems. Compare chemical fallow treatments with conventional tilled summer. Identify optimum inputs and agronomically compatible weed management in alternate crops Evaluate new herbicide candidates and non-chemical cultural practices under field conditions for weed control effectiveness, crop safety, and soil persistence under eastern Oregon dryland conditions.

Year	Target	Actual
2008	10	100

Output #4

Output Measure

- EFFECTS ON AND PROTECTION OF ENVIRONMENTAL HEALTH AND ECOLOGY (Wysocki, Petrie) Nutrient and crop management extension recommendations Improved nitrogen management strategies for soft white wheat Improved nutrient recommendations for soft white wheat grown in conservation tillage systems and for potential alternative cereal crops

Year	Target	Actual
2008	5	1

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O No.	OUTCOME NAME
1	Improved strategies and cultivars • Basic agronomic practices for commercially promising alternative crops under reduced tillage systems. • Natural herbicides to control weeds in organic and/or no-till wheat production • Disease resistant wheat lines • Improved weed control in no-till fallow systems, including optimum inputs • New herbicide candidates • Improved nutrient and crop management • Rotational crop cultivars
2	More profitable production Improved economic and biological sustainability of cropping systems in eastern Oregon No-till (direct-seed) organic wheat production Wheat breeders develop disease resistant cultivars for release Effective weed management in dryland crops Canola established as rotation crop in semiarid Oregon with markets and added value in local, rural communities Profitable alternative cereal crops for dryland cropping systems in the PNW
3	Sustainable production Sustainable and economically viable wheat and dryland cropping industry for vibrant rural economy in eastern Oregon • Improved soil, water, and crop management practices and strategies that protect Oregon resources

Outcome #1

1. Outcome Measures

Improved strategies and cultivars

- Basic agronomic practices for commercially promising alternative crops under reduced tillage systems.
- Natural herbicides to control weeds in organic and/or no-till wheat production
- Disease resistant wheat lines
- Improved weed control in no-till fallow systems, including optimum inputs
- New herbicide candidates
- Improved nutrient and crop management
- Rotational crop cultivars

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2008	5	3

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Most farmers are reluctant to rotate alternative crops with wheat because of poor and unreliable markets for alternate crops.

What has been done

Research team is experimenting with intercropping, or planting wheat and an alternative crop at the same time. Legumes, which can fix and provide nitrogen to wheat, are the choice of alternative crops for the proposed intercropping system.

Results

Results so far have indicated that some legumes like peas are better suited for intercropping with wheat than others such as hairy vetch, which was competitive with wheat. The best intercrop combination included wheat and an experimental legume line (112)), which yielded up to 12 bu/acre.

4. Associated Knowledge Areas

KA Code	Knowledge Area
212	Pathogens and Nematodes Affecting Plants
111	Conservation and Efficient Use of Water
205	Plant Management Systems
102	Soil, Plant, Water, Nutrient Relationships
213	Weeds Affecting Plants

Outcome #2

1. Outcome Measures

More profitable production Improved economic and biological sustainability of cropping systems in eastern Oregon No-till (direct-seed) organic wheat production Wheat breeders develop disease resistant cultivars for release Effective weed management in dryland crops Canola established as rotation crop in semiarid Oregon with markets and added value in local, rural communities Profitable alternative cereal crops for dryland cropping systems in the PNW

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2008	0	5

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Producers and advisory personnel have become interested in the use of alternative cereal crops for reducing nematode pests.

What has been done

Research team conducted a four-year soil testing program to test the effect of barley on cropping systems.

Results

Spring barley was confirmed as an effective crop for reducing numbers of root-lesion nematodes and thereby increasing the productivity of winter wheat in cropping systems that include both crop species. Furthermore, results indicate that root-lesion nematodes were greatly suppressed by barley in all cropping systems tested, leading to an opportunity for growers to produce an economically viable crop that can also reduce the risk for nematode injury in subsequent winter wheat crops. The productivity of winter wheat in the various cropping systems tested was significantly and inversely correlated with the numbers of root-lesion nematodes in soil plus root segments during the early spring of the winter wheat growing season.

4. Associated Knowledge Areas

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships
213	Weeds Affecting Plants
111	Conservation and Efficient Use of Water
205	Plant Management Systems

Outcome #3

1. Outcome Measures

Sustainable production Sustainable and economically viable wheat and dryland cropping industry for vibrant rural economy in eastern Oregon

• Improved soil, water, and crop management practices and strategies that protect Oregon resources

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2008	0	5

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Improved soil and water management practices reduce adverse off-site environmental impacts and improve soil health. Findings from this project will assist growers in making better decisions on adopting conservation farming systems. This will minimize off-site environmental impacts and maximize profits for growers.

What has been done

Educational programs in soil and water management and conservation farming for Oregon and southwest Washington were conducted. This program provides education and information transfer for producers to understand and implement the conservation requirements of the Farm Bill, administered regionally through the tri-state STEEP Extension program.

Results

Dryland wheat growers became more sustainable and more economically stable. Practices have reduced environmental impacts and improved soil health.

4. Associated Knowledge Areas

KA Code	Knowledge Area
205	Plant Management Systems
111	Conservation and Efficient Use of Water
102	Soil, Plant, Water, Nutrient Relationships

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 Public priorities
- Competing Programmatic Challenges

Brief Explanation

{No Data Entered}

V(I). Planned Program (Evaluation Studies and Data Collection)

1. Evaluation Studies Planned

-

Evaluation Results

{No Data Entered}

Key Items of Evaluation

{No Data Entered}

Program #23

V(A). Planned Program (Summary)

1. Name of the Planned Program

Field Crop Pest Management and Biology

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
211	Insects, Mites, and Other Arthropods Affecting Plants	15%		15%	
212	Pathogens and Nematodes Affecting Plants	15%		15%	
213	Weeds Affecting Plants	40%		40%	
214	Vertebrates, Mollusks, and Other Pests Affecting Plants	10%		10%	
215	Biological Control of Pests Affecting Plants	5%		5%	
216	Integrated Pest Management Systems	15%		15%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

1. Actual amount of professional FTE/SYs expended this Program

Year: 2008	Extension		Research	
	1862	1890	1862	1890
Plan	2.6	0.0	4.5	0.0
Actual	0.1	0.0	2.1	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	95924	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
0	0	733714	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
0	0	1234330	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

- Conduct Research Experiments.
- Conduct trials
- Conduct Workshops, meetings.

- Deliver Services.

- Develop Products, Curriculum, Resources.

- Provide Training.

- Assessments.

- Partnering.

2. Brief description of the target audience

Professional peers and scientific communities
State commodity commissions and grower groups
Natural resource industry clientele – growers, field representatives, grower coops and partnerships, processors and handlers, export companies, importing companies
County, state and federal agencies – Oregon Department of Agriculture, Natural Resource Conservation Service, Soil and Water Conservation Districts, county road managers, fish and wildlife agencies
Undergraduate and graduate students being trained in extension and research activities

V(E). Planned Program (Outputs)

1. Standard output measures

Target for the number of persons (contacts) reached through direct and indirect contact methods

	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	**Target**	**Target**	**Target**	**Target**
Plan	500	5000	50	0
2008	1250	0	0	0

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

Patent Applications Submitted

Year	Target
Plan:	0
2008 :	0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

	Extension	Research	Total
Plan	0	30	
2008	0	11	11

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- SCHOLARLY excellence in referred articles, book chapters, and books; participation on professional boards and panels, as well as science panels.

Not reporting on this Output for this Annual Report

Output #2

Output Measure

- PROVIDE ADDITIONAL UNDERSTANDING FOR PLANT AND ANIMAL PROTECTION FROM DISEASES AND PESTS - assess effectiveness and cropping system interactions for pesticides which control via pesticide trials at lab, growth chamber, greenhouse, small plot and/or field scale levels
    - slugs, symphilids, billbugs and other subsurface insects in seed crop cropping systems
    - grass and broadleaf weeds in seed crop, grain and vegetable systems cereal rust and foot rot pathogen - develop basic knowledge of pests by conducting pest biology trials at lab, growth chamber, greenhouse, small plot and/or field scale levels
    - slugs, symphilids, crane flies, cereal leaf beetle
    - native and invasive grassy and broadleaf weeds including wild oat, brome spp., jointed goatgrass, annual bluegrass, and clover broomrape
    - Sudden oak death and orchardgrass choke pathogens
    - biocontrol of cereal leaf beetle - Work with plant breeding and genetics colleagues to release new crop varieties with herbicide resistance.

Not reporting on this Output for this Annual Report

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O No.	OUTCOME NAME
1	Pest management activiities are shared with peers and end users • New pesticides will be registered; • new pest management systems will be developed and shared with end users; • basic pest biology information will be shared with professional colleagues; • new research methods and discoveries will be published
2	End users adopt new pesticide and pest management systems and strategies for working with invasive pests will be implemented
3	In the long run, • Agricultural producers will realize greater economic return in their enterprises; • Strategies for avoiding invasive pests will be in place

Outcome #1

1. Outcome Measures

Pest management activiities are shared with peers and end users

- New pesticides will be registered;
- new pest management systems will be developed and shared with end users;
- basic pest biology information will be shared with professional colleagues;
- new research methods and discoveries will be published

Not reporting on this Outcome for this Annual Report

Outcome #2

1. Outcome Measures

End users adopt new pesticide and pest management systems and strategies for working with invasive pests will be implemented

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2008	0	5

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

The weed science project provides data essential for use of herbicides for weed control in Oregon. The studies that we conduct help producers apply herbicides at the correct timing and at the correct dose for optimum weed control and crop safety. The data generated are used to obtain new labels for use in Oregon.

What has been done

We have identified herbicide resistant weeds in cropping systems and worked with growers to find alternative weed control methods. Of particular importance is the increase in the number glyphosate resistant Italian ryegrass populations that we confirmed in 2008. We identified imazamox resistant hybrids of jointed goatgrass and Clearfield wheat. These hybrids put the Clearfield wheat system at risk. We will continue to work with extension faculty and growers to address the problem. We are studying the potential for canola to negatively impact the Brassica seed production industry in the Willamette Valley.

Results

Our research is addressing the hybridization between these species that could lead to contamination of the vegetable seeds. We are also studying the potential for canola to become a weed in subsequent crops in the system. We are studying the gene flow from Roundup Ready creeping bentgrass. We have identified hybrids with related species and studied the distance that the gene may move. We have monitored whether mitigation practices were sufficient to find and remove plants carrying the regulated transgene.

4. Associated Knowledge Areas

KA Code	Knowledge Area
215	Biological Control of Pests Affecting Plants
216	Integrated Pest Management Systems
213	Weeds Affecting Plants
214	Vertebrates, Mollusks, and Other Pests Affecting Plants
211	Insects, Mites, and Other Arthropods Affecting Plants
212	Pathogens and Nematodes Affecting Plants

Outcome #3

1. Outcome Measures

In the long run,

- Agricultural producers will realize greater economic return in their enterprises;
- Strategies for avoiding invasive pests will be in place

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2008	0	5

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Nursery crops that harbor pests and pathogens such as Phytophthora ramorum can spread these problems to forests, other native plant communities, and agricultural crops.

What has been done

We are using a new approach to identify sources of contamination in nurseries so that we can give specific recommendations to nursery growers as to how they should change their cultural practices to reduce contamination. The team developed a free online course in English and Spanish to train nursery personnel about the biology, symptoms and cultural control of Phytophthora so that they can manage these diseases more effectively. We also developed online training and testing programs to improve grower education in preventing or managing Phytophthora diseases.

Results

Our results improve the economic viability of Oregon's most valuable agricultural commodity by preventing catastrophic infections by the quarantine pathogen Phytophthora ramorum. Our emphasis on sustainable cultural practices also has favorable environmental consequences. Our systems approach research was the basis for a new nursery certification program established by the Oregon Department of Agriculture, the Grower Assisted Inspection Program, now involving 23 nurseries in Oregon.

4. Associated Knowledge Areas

KA Code	Knowledge Area
216	Integrated Pest Management Systems

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 Public priorities
- Competing Programmatic Challenges
- Populations changes (immigration,new cultural groupings,etc.)

Brief Explanation

{No Data Entered}

V(I). Planned Program (Evaluation Studies and Data Collection)

1. Evaluation Studies Planned

-

Evaluation Results

{No Data Entered}

Key Items of Evaluation

{No Data Entered}

Program #24

V(A). Planned Program (Summary)

1. Name of the Planned Program

Plant and Soil Management in Agricultural Systems

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
102	Soil, Plant, Water, Nutrient Relationships	20%		39%	
205	Plant Management Systems	75%		43%	
511	New and Improved Non-Food Products and Processes	5%		18%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

1. Actual amount of professional FTE/SYs expended this Program

Year: 2008	Extension		Research	
	1862	1890	1862	1890
Plan	6.0	0.0	2.9	0.0
Actual	0.3	0.0	4.8	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	207487	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
0	0	1380535	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
0	0	1258264	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

- Conduct Research Experiments.

- Conduct Workshops, meetings.

- Deliver Services.

- Develop Products, Curriculum, Resources.

- Provide Training.

- Assessments.

- Work with Media.

- Partnering.

- Facilitating.

2. Brief description of the target audience

Professional peers, scientific communities and agricultural representatives
State commodity commissions, grower groups, trade organizations
Natural resource industry clientele – growers, field representatives, grower coops and partnerships, processors and handlers, export companies, importing companies
County, state and federal agencies – Oregon Department of Agriculture, Natural Resource Conservation Service, Soil and Water Conservation Districts, urban biosolid handlers,
Undergraduate and graduate students being trained in extension and research activities

V(E). Planned Program (Outputs)

1. Standard output measures

Target for the number of persons (contacts) reached through direct and indirect contact methods

	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	Target	Target	Target	Target
Plan	750	5000	50	0
2008	5171	0	455	0

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

Patent Applications Submitted

Year	Target
Plan:	0
2008 :	0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

	Extension	Research	Total
Plan	0	26	
2008	6	10	10

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- SCHOLARLY excellence in referred articles, book chapters, and books; participation on professional boards and panels, as well as science panels.

Year	Target	Actual
2008	33	49

Output #2

Output Measure

- DEVELOP IMPROVED ANIMAL AND PLANT PRODUCTION SYSTEMS - A comprehensive understanding of the morphological, physiological and/or genetic basis for plant responses in studied management systems to
  - nutrients
  - temperature, moisture and other abiotic stresses
  - plant growth regulators
  - attack by other organisms - Develop and promote strategies for nitrogen management, growth regulators, abiotic stresses, post-harvest management, and alternative crops for pest and weed management

Year	Target	Actual
2008	0	29

Output #3

Output Measure

- DEVELOP BREEDING PROGRAMS THAT RESULT IN DESIRABLE TRAITS, CULTIVARS AND VARIETIES Work with plant breeding and genetics colleagues to release new varieties for general public and/or licensed release. Information on best management practices for new varieties will be developed

Year	Target	Actual
2008	0	27

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O No.	OUTCOME NAME
1	New management systems will be developed and shared with end users; information will be adapted for use in other areas of the nation or world
2	new management systems will be adopted by end users
3	• Agricultural producers will realize greater economic return in their cropping enterprises; • Plant nutrient and other production input use will be optimized

Outcome #1

1. Outcome Measures

New management systems will be developed and shared with end users;
information will be adapted for use in other areas of the nation or world

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2008	0	5

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Private companies are now continuing agriculture development work and looking toward broader application of grasses and other seed crops as a profitable cropping system and in environmental restoration projects across the world.

What has been done

Previous work done by this team has led to detailed discussions about the development of cooperative research with Nanjing Agriculture University in China.

Results

The result of cooperation with China, Oregon seed growers have sold over 15 million pounds of seed in the last few years to China, who buys more grass from Oregon than anyone else in the world. A very public result was Oregon grass growing in the stadium at the Beijing 2008 Summer Olympics.

4. Associated Knowledge Areas

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships
205	Plant Management Systems

Outcome #2

1. Outcome Measures

new management systems will be adopted by end users

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2008	0	10

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Via integration of fundamental and applied research, this research team work hand-in-hand with their clientele to improve the sustainability of growing economic crops in Oregon and of utilization of plant and soil resources in other venues.

What has been done

The research and extension team has conducted field research trials on a wide spectrum of varietals, testing response of varieties to planting date, irrigation management, harvest management, testing response of varieties to planting date, soil and air temperature, and harvest management. Findings have been shared through grower's meetings, extension publications, conferences, peer-reviewed journals, seminars and field days.

Results

Growers and other end users have been made aware of new research findings. Surveys taken after classes have documented knowledge increased. Data produced by the team is consistently sought after by producers and fieldmen.

4. Associated Knowledge Areas

KA Code	Knowledge Area
205	Plant Management Systems
511	New and Improved Non-Food Products and Processes
102	Soil, Plant, Water, Nutrient Relationships

Outcome #3

1. Outcome Measures

- Agricultural producers will realize greater economic return in their cropping enterprises;
- Plant nutrient and other production input use will be optimized

Not reporting on this Outcome for this Annual Report

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 Public priorities
- Competing Programmatic Challenges
- Populations changes (immigration,new cultural groupings,etc.)

Brief Explanation

{No Data Entered}

V(I). Planned Program (Evaluation Studies and Data Collection)

1. Evaluation Studies Planned

-

Evaluation Results

{No Data Entered}

Key Items of Evaluation

{No Data Entered}

Program #25

V(A). Planned Program (Summary)

1. Name of the Planned Program

Plant Breeding, Genetics, Biotechnology and Crop Quality

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
201	Plant Genome, Genetics, and Genetic Mechanisms	20%		20%	
202	Plant Genetic Resources	10%		10%	
203	Plant Biological Efficiency and Abiotic Stresses Affecting Plants	15%		15%	
204	Plant Product Quality and Utility (Preharvest)	30%		30%	
212	Pathogens and Nematodes Affecting Plants	15%		15%	
213	Weeds Affecting Plants	10%		10%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

1. Actual amount of professional FTE/SYs expended this Program

Year: 2008	Extension		Research	
	1862	1890	1862	1890
Plan	0.8	0.0	12.5	0.0
Actual	1.0	0.0	7.7	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	454969	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
0	0	3341778	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
0	0	480403	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

- Conduct Research Experiments.

- Conduct Workshops, meetings.

- Deliver Services.

- Develop Products, Curriculum, Resources.

- Provide Training.

- Assessments.

- Partnering.

- Facilitating.

2. Brief description of the target audience

Professional peers and scientific communities
State commodity commissions and grower groups
Natural resource industry clientele – growers, field representatives, grower coops and partnerships, processors and handlers, export companies, importing companies
State and federal agencies – Oregon Department of Agriculture, Natural Resource Conservation Service
Undergraduate and graduate students

V(E). Planned Program (Outputs)

1. Standard output measures

Target for the number of persons (contacts) reached through direct and indirect contact methods

	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	**Target**	**Target**	**Target**	**Target**
Plan	0	0	0	0
2008	0	0	0	0

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

Patent Applications Submitted

Year	Target
Plan:	0
2008 :	0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

	Extension	Research	Total
Plan	0	15	
2008	0	21	21

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- SCHOLARLY excellence in referred articles, book chapters, and books; participation on professional boards and panels, as well as science panels.

Year	Target	Actual
2008	21	56

Output #2

Output Measure

- DEVELOP BREEDING PROGRAMS THAT RESULT IN DESIRABLE TRAITS, CULTIVARS AND VARIETIES - breeding programs for barley, meadowfoam, potato, wheat - crop quality work include studies on malt barleys, super soft white wheats, modified wheat starches and proteins, modified potato starches and proteins, assessment of oil quality and quantity in meadowfoam and of glucosinolates in meadowfoam meal.

Year	Target	Actual
2008	1	19

Output #3

Output Measure

- CARRY OUT STUDIES TO DECIPHER GENOMES, GENETICS AND MECHANISMS OF PLANTS AND ANIMALS - characterize genetic diversity in economically important crop plants, - identify novel genes, and - carry out molecular breeding in adapted germplasm

Year	Target	Actual
2008	2	20

Output #4

Output Measure

- DEVELOP BETTER UNDERSTANDING OF BASIC PHYSIOLOGY OF PLANTS AND ANIMALS - understand responses to environmental signals, growth and development pathways

Year	Target	Actual
2008	0	6

Output #5

Output Measure

- PROVIDE ADDITIONAL UNDERSTANDING FOR PLANT AND ANIMAL PROTECTION FROM DISEASES AND PESTS - understand responses to attack by other organisms

Year	Target	Actual
2008	1	7

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O No.	OUTCOME NAME
1	• Understand pollen flow mechanisms between wheat and its wild relative jointed goatgrass • Varieties released (with Plant Variety Protection coverage) for general public and/or licensed release • new research methods and discoveries will be published
2	With the knowlege produced, released varieties will be adopted by growers; new research methods will be adopted by the research community
3	In the long run, • Higher-value niche markets will be established for program-developed crops; • Increased opportunities for rural community marketers and processors will be developed; • Public health will be improved through the use of crops with improved nutritional value

Outcome #1

1. Outcome Measures

- Understand pollen flow mechanisms between wheat and its wild relative jointed goatgrass
- Varieties released (with Plant Variety Protection coverage) for general public and/or licensed release
- new research methods and discoveries will be published

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2008	0	4

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Wheat is the major cereal crop for Oregon with annual production averaging over 55 million bushels from approximately 900,000 acres each year, with gross value of over $250 million/year at the farm-gate. However, due to ever changing disease complexes, management practices, production constraints, and market needs, an ongoing commitment to variety development is needed for stable and economically viable wheat production in Oregon. Addressing management-specific and site-specific production constraints through variety development and applications of modern biotechnologies will contribute to long-term profitability of Oregon wheat producers.

What has been done

Wheat varieties and breeding materials are evaluated under a wide array of environmental and management practices to characterize performance and adaptation. Early generation breeding materials are evaluated through a shuttle between Hyslop and Pendleton to identify broadly adapted, disease resistant selections. Mid-late generation materials, are evaluated in replicated trials at our core nursery sites. In addition, six 'satellite' testing nurseries are used to more rapidly characterize performance of our breeding lines.

Results

New Varieties Released in 2008 include: 1)'Skiles' is a short stature soft white winter wheat with moderately early maturity and high yield potential. Skiles is noted for its superior yield potential and package of traits, including superior winterhardiness, resistance to crown rot and cephalosporium stripe, and superior milling and baking attributes which are complementary to currently grown varieties. 2)'ORCF-103' is a Clearfield soft white winter wheat. The primary advantage of ORCF-103 is improved winter cold-tolerance and tolerance to snow mold. Varieties applied for PVP in 2008 include: 1)'Goetze' Soft White Winter Wheat and 2)'Norwest 553' Hard Red Winter Wheat.

4. Associated Knowledge Areas

KA Code	Knowledge Area
202	Plant Genetic Resources
213	Weeds Affecting Plants
201	Plant Genome, Genetics, and Genetic Mechanisms
203	Plant Biological Efficiency and Abiotic Stresses Affecting Plants

Outcome #2

1. Outcome Measures

With the knowlege produced, released varieties will be adopted by growers; new research methods will be adopted by the research community

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2008	0	9

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Wheat is the major cereal crop for Oregon with annual production averaging over 55 million bushels from approximately 900,000 acres each year, with gross value of over $250 million/year at the farm-gate. Investments in wheat breeding have provided tremendous economic returns to Oregon growers through deployment and production of high-yielding, disease resistance varieties such as 'Stephens', 'Gene', 'Malcolm', 'Tubbs', 'ORCF-101', 'ORCF-102', 'ORCF-103', 'Goetze', 'Norwest 553' and others.

What has been done

A total of nine varieties have been released since 2002, including 'Tubbs' and 'Tubbs 06' which are established as leading varieties in the PNW in terms of both acreage and performance. The OSU CLEARFIELD soft white winter variety 'ORCF-101' and 'ORCF-102' were released to the seed industry in 2003 and 2004 through an innovative non-exclusive licensing agreement.

Results

Twenty-six seed companies are currently licensed to produce and sell seed of these varieties in the Pacific Northwest. Combined acreage of ORCF-101 and ORCF-102 in the PNW are estimated at 330,000 acres for 2005-06, 350,000 acres for 2006-07, 450,000 acres for 2007-08, and approach 450,000 acres for 2008-09. These varieties have returned over $1.1 million in royalties to OSU over the past three years. These funds are used to augment wheat research and associated activities.

4. Associated Knowledge Areas

KA Code	Knowledge Area
202	Plant Genetic Resources
201	Plant Genome, Genetics, and Genetic Mechanisms
203	Plant Biological Efficiency and Abiotic Stresses Affecting Plants
204	Plant Product Quality and Utility (Preharvest)

Outcome #3

1. Outcome Measures

In the long run,

- Higher-value niche markets will be established for program-developed crops;
- Increased opportunities for rural community marketers and processors will be developed;
- Public health will be improved through the use of crops with improved nutritional value

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2008	0	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Americans are increasingly at risk for premature death from both cardiovascular disease and diabetes - due to our increasing weight, elevated cholesterol, high blood pressure, and abnormal blood sugars. Barley is now recognized as an important part of a delicious, heart-healthy lifestyle. Food barley must be high in beta-glucan, which is the primary building block of cell walls in the grains of both barley and oats.

What has been done

We have applied the latest in molecular breeding technology to the very focused development of winter food barley. The technique is called marker-assisted selection (MAS). MAS uses markers (differences in DNA sequence between varieties) to increase the efficiency of selection for target traits. In this application, plants with the correct DNA markers in genes associated with low temperature tolerance and high beta-glucan are selected at the seedling stage in the greenhouse. Plants with the wrong markers are discarded. Thus, only plants with a high probability of being cold tolerant and having high beta-glucan advance to field testing.

Results

We measured beta-glucan content of these lines after harvest in 2008 and advanced over 200 lines selected for high beta-glucan content and agronomic performance to field tests in Oregon and Idaho. We have also crossed these potential winter waxy food barleys to the most cold tolerant varieties from Germany and Nebraska in preparation for future cycles of MAS. The intent is to create a product stream of high beta-glucan winter food barley varieties, waxy and non-waxy, hulled and hulless, 2-row and 6-row. Americans will be looking to barley for health improvements. Thanks to Oregon and Idaho barley assessment dollars and the USDA-CSREES STEEP program, winter food barley varieties are on the horizon.

4. Associated Knowledge Areas

KA Code	Knowledge Area
202	Plant Genetic Resources
203	Plant Biological Efficiency and Abiotic Stresses Affecting Plants
201	Plant Genome, Genetics, and Genetic Mechanisms
204	Plant Product Quality and Utility (Preharvest)

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 Public priorities
- Competing Programmatic Challenges
- Populations changes (immigration,new cultural groupings,etc.)

Brief Explanation

{No Data Entered}

V(I). Planned Program (Evaluation Studies and Data Collection)

1. Evaluation Studies Planned

-

Evaluation Results

{No Data Entered}

Key Items of Evaluation

{No Data Entered}

Program #26

V(A). Planned Program (Summary)

1. Name of the Planned Program

Consumers, Food Marketing, and Business Strategies

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
503	Quality Maintenance in Storing and Marketing Food Products	33%		33%	
602	Business Management, Finance, and Taxation	34%		34%	
603	Market Economics	11%		11%	
606	International Trade and Development	11%		11%	
607	Consumer Economics	11%		11%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

1. Actual amount of professional FTE/SYs expended this Program

Year: 2008	Extension		Research	
	1862	1890	1862	1890
Plan	1.0	0.0	5.0	0.0
Actual	0.1	0.0	1.2	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	55773	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
0	0	357380	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
0	0	59486	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

- Conduct Research Experiments.
- Conduct surveys, focus groups

- Conduct Workshops, meetings.

- Deliver Services.

- Develop Products, Curriculum, Resources.

- Provide Training.

- Provide Counseling.

- Assessments.

- Work with Media.

- Partnering.

- Facilitating.

2. Brief description of the target audience

Small- to medium-sized food processors
New enterprises
Government officials
consumers

V(E). Planned Program (Outputs)

1. Standard output measures

Target for the number of persons (contacts) reached through direct and indirect contact methods

	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	Target	Target	Target	Target
Plan	120	150	0	0
2008	500	150	0	0

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

Patent Applications Submitted

Year	Target
Plan:	0
2008 :	0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

	Extension	Research	Total
Plan	0	20	
2008	0	0	0

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- SCHOLARLY excellence in referred articles, book chapters, and books; participation on professional boards and panels, as well as science panels.

Year	Target	Actual
2008	27	9

Output #2

Output Measure

- PROVIDE ECONOMIC AND MARKETING MODELS AND ANALYSES THAT INFORM DECISION-MAKERS, INDUSTRY, AND PEERS - identify demand and firm strategies

Year	Target	Actual
2008	3	10

Output #3

Output Measure

- PROVIDE TECHNOLOGY, MODELS AND ANALYSES THAT INFORM DECISION-MAKERS, INDUSTRY, AND PEERS REGARDING FOOD PRODUCES - research and extension activities integration between food scientists and business strategists

Year	Target	Actual
2008	1	1

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O No.	OUTCOME NAME
1	Improved knowledge of market conditions and factors is made available to business entrepreneurs • Improved understanding of market conditions and knowledge to determine business choices. • Expanded knowledge base of factors important to distinguish different types of consumers and their food choices in the Portland metropolitan area. • The development of a process map for food business development and planning. • Training of nascent and existing food entrepreneurs in food business management.
2	Target markets are established using new understanding about market factors • Expansion of information and basis for consumer food choice factors to regions beyond Portland metropolitan area. • Provide a valid measure for comparing consumer populations and subpopulations food choice habits for use by northwest food processors and producers to help them establish target markets.
3	Assist new and existing businesses expand: • Enable decision-making regarding choice of marketing practices by food marketers and producers, policy decisions by government officials that affect businesses in the food industry. Save explorers many thousands of dollars, as well as energy and emotional stress by helping them realize early that starting a food business isn't what they need to do. Assist approximately 3-5 companies start their food business through one-on-one counseling and market research. Help 3-5 companies turn their business around and start growing.
4	Improve competitiveness of Pacific Northwest food businesses. • Increased business activity and success in the Northwest food industries. • Sustainable competitive advantage for Northwest food industries that are able to accurately gage consumer demand for their products. Improve the food economy by developing new, stronger, and growing food businesses in the state. Help reduce the state's unemployment through the creation of jobs in these food companies.

Outcome #1

1. Outcome Measures

Improved knowledge of market conditions and factors is made available to business entrepreneurs

- Improved understanding of market conditions and knowledge to determine business choices.
- Expanded knowledge base of factors important to distinguish different types of consumers and their food choices in the Portland metropolitan area.
- The development of a process map for food business development and planning.
- Training of nascent and existing food entrepreneurs in food business management.

Not reporting on this Outcome for this Annual Report

Outcome #2

1. Outcome Measures

Target markets are established using new understanding about market factors

- Expansion of information and basis for consumer food choice factors to regions beyond Portland metropolitan area.
- Provide a valid measure for comparing consumer populations and subpopulations food choice habits for use by northwest food processors and producers to help them establish target markets.

Not reporting on this Outcome for this Annual Report

Outcome #3

1. Outcome Measures

Assist new and existing businesses expand:

- Enable decision-making regarding choice of marketing practices by food marketers and producers, policy decisions by government officials that affect businesses in the food industry. Save explorers many thousands of dollars, as well as energy and emotional stress by helping them realize early that starting a food business isn't what they need to do. Assist approximately 3-5 companies start their food business through one-on-one counseling and market research. Help 3-5 companies turn their business around and start growing.

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2008	0	2

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

According to livestock processors successful outcome of livestock marketing development strategies and job training should provide for new jobs in regional meat processing industry.

What has been done

Undertook a survey to evaluate potential for state livestock inspection and other strategies to reduce the processing bottleneck for producers of livestock in reaching local markets. A working group with producers, processors, governmental and consumer interests has been formed to pursue a variety of strategies for the state's livestock industry. Grant proposals are being developed for research in related areas and identified for rural development.

Results

State Livestock and Processing Inspection Study has led to a resolution being presented by the Oregon Cattleman's Association to the Oregon legislature. The processors survey and further discussion showed strong demand for training in meat butchering and other industry needs these are under consideration at OSU. Successful outcome of livestock marketing strategies development strategies should make Regional livestock producers with new marketing opportunities and a more sustainable economic condition.

4. Associated Knowledge Areas

KA Code	Knowledge Area
503	Quality Maintenance in Storing and Marketing Food Products
606	International Trade and Development
602	Business Management, Finance, and Taxation
603	Market Economics
607	Consumer Economics

Outcome #4

1. Outcome Measures

Improve competitiveness of Pacific Northwest food businesses.

- Increased business activity and success in the Northwest food industries.
- Sustainable competitive advantage for Northwest food industries that are able to accurately gage consumer demand for their products. Improve the food economy by developing new, stronger, and growing food businesses in the state. Help reduce the state's unemployment through the creation of jobs in these food companies.

Not reporting on this Outcome for this Annual Report

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Natural Disasters (drought,weather extremes,etc.)
- Economy
- Competing Public priorities
- Populations changes (immigration,new cultural groupings,etc.)
- Other (experiences of participants)

Brief Explanation

{No Data Entered}

V(I). Planned Program (Evaluation Studies and Data Collection)

1. Evaluation Studies Planned

- Retrospective (post program)
- Time series (multiple points before and after program)
- Case Study
- Other (peer review process)

Evaluation Results

{No Data Entered}

Key Items of Evaluation

{No Data Entered}

Program #27

V(A). Planned Program (Summary)

1. Name of the Planned Program

Basic Plant Biology & Related Topics for Horticulture

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
201	Plant Genome, Genetics, and Genetic Mechanisms			40%	
204	Plant Product Quality and Utility (Preharvest)			20%	
206	Basic Plant Biology			40%	
	Total			100%	

V(C). Planned Program (Inputs)

1. Actual amount of professional FTE/SYs expended this Program

Year: 2008	Extension		Research	
	1862	1890	1862	1890
Plan	0.0	0.0	5.3	0.0
Actual	0.0	0.0	5.3	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	426712	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
0	0	1215582	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
0	0	1396441	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

- Conduct Research Experiments.

- Conduct Workshops, meetings.

- Deliver Services.

- Develop Products, Curriculum, Resources. (including cultivars and pollinizers)- Provide Training.

- Assessments.

- Partnering.

2. Brief description of the target audience

Colleagues in the department, university, and USDA on campus; research peers nationally and internationally; students (undergraduates and graduate students or post-docs); commodity commissions; and potential businesses in Oregon.

V(E). Planned Program (Outputs)

1. Standard output measures

Target for the number of persons (contacts) reached through direct and indirect contact methods

	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	Target	Target	Target	Target
Plan	0	0	0	0
2008	0	0	0	0

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

Patent Applications Submitted

Year	Target
Plan:	2
2008 :	0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

	Extension	Research	Total
Plan	0	20	
2008	0	9	9

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- CARRY OUT STUDIES TO DECIPHER GENOMES, GENETICS AND MECHANISMS OF PLANTS AND ANIMALS - disease resistance - defense pathways - transgenic lines ofr higher tolerances, e.g., freezing, morphology and yields - microarray analysis of genes

Year	Target	Actual
2008	5	2

Output #2

Output Measure

- SCHOLARLY excellence through refereed articles, conference papers, competitive proposals, organizing scientific meetings, serve on scientific panels and national boards.

Year	Target	Actual
2008	20	45

Output #3

Output Measure

- DEVELOP BREEDING PROGRAMS THAT RESULT IN DESIRABLE TRAITS, CULTIVARS AND VARIETIES - hazelnut - beans - snap pea - tomato - apples - broccoli - organic lines

Year	Target	Actual
2008	10	1

Output #4

Output Measure

- DEVELOP BETTER UNDERSTANDING OF BASIC PHYSIOLOGY OF PLANTS AND ANIMALS (percent) - seed development and germination - seed development-associated genes and homologues of these genes

Year	Target	Actual
2008	5	5

Output #5

Output Measure

- DEVELOP IMPROVED ANIMAL AND PLANT PRODUCTION SYSTEMS - precision management systems in vineyards, with nutrition component

Year	Target	Actual
2008	5	0

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O No.	OUTCOME NAME
1	Peers learn about genes and genetic resources for breeding, new sources of resistance
2	Growers learn about new hazelnut cultivars with novel attributes and greatest potential for production in the Pacific Northwest; variety trials published online allow growers to access information quickly
3	Peers are made aware of the antioxidant effects of various carotenoids and flavonoids, and that flavonoids have a significantly greater impact on antioxidant effect compared to carotenoids; while stakeholders are given additional new knowledge about human health benefits, disease resistance, and breeding for organic systems of vegetables.
4	Growers are more aware of issues related to precision horticulture, mineral nutrition, and fundamental aspects of data analysis.
5	Natural resource industry gains basic understanding of restoration processes in Pacific wetlands and riparian habitat, of the ecosystem services associated with these restorations, and of conservation bio-control strategies. Also, the conservation sector is made aware of a user-friendly tool to assess ecosystem services.
6	Adoption of new varietals and cultivars reduce yield losses and expenses, rejuvenate orchards and achieve better productivity and efficiency: Breeders incorporate Botrytis and Sclerotinia resistance genes into crop species via traditional breeding or transgenic plants to reduce yield losses and expenses for chemical fungicides. Growers plant transgenic frost-tolerant potato varieties Growers establish new orchards with plantings of EFB resistant cultivars to reduce production costs and provide environmental benefits (less fungicide applications, etc.), micropropagate instead of grafting and layering to propagate larger numbers of trees in shorter time, and Oregon's hazelnut industry is able to effectively compete on world market with new varieties Commercial processors and fresh market growers, as well as home gardeners, achieve greater production efficiency, more stable productivity, and reduced costs from the use of improved varieties.
7	Conservation bio-control strategies are implemented differently and active restoration strategies occur. Land owners and managers assess ecosystem services provided by their riparian restorations via a user-friendly web tool.
8	Increased potato yield will increase potato farmers' income as well as the stability of potato production of the world. The potential increase from 29,000 acres to as much as 100,000 acres will increase Oregon's market share and economic benefits.
9	Plant disease resistance will lower the amount of pesticide use, resulting in a more healthful environment and reduced exposure of humans to hazardous chemicals.
10	Better ecological methodologies will lead to more social, economic, and environmental benefits and cost effective and sustainable restoration. Improved valuation of ecological services associated with restorations will greatly facilitate market-based conservation practices such as mitigation banking and effluent trading. Better conservation bio-control strategies will decrease the costs associated with insect losses and the use of insecticides.

Outcome #1

1. Outcome Measures

Peers learn about genes and genetic resources for breeding, new sources of resistance

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2008	20	5

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Results from this subprogram will have impacts on the identification of pathogenicity genes which will help in future efforts to control plant pathogens. Researchers are also seeking to improve physiological traits of potatoes, like frost resistance, using genetic engineering.

What has been done

Investigators conducted research involving the plant genome, genetics and genetic mechanisms on vegetable varieties.

Results

Results were shared with peers and stakeholder groups through scientific publications, national and regional conferences, and meetings.

4. Associated Knowledge Areas

KA Code	Knowledge Area
201	Plant Genome, Genetics, and Genetic Mechanisms
206	Basic Plant Biology

Outcome #2

1. Outcome Measures

Growers learn about new hazelnut cultivars with novel attributes and greatest potential for production in the Pacific Northwest; variety trials published online allow growers to access information quickly

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2008	50	5

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

The presence of Eastern filbert blight (EFB) throughout the Willamette Valley has growers keenly interested in new hazelnut cultivars with resistance to this disease. Growers are optimistic that new resistant cultivars will allow the Oregon hazelnut industry to not only remain competitive but to expand.

What has been done

'Lewis', 'Clark', and 'Sacajawea' are new cultivars with quantitative resistance released by the OSU hazelnut breeding program. Recent releases 'Santiam' and 'Yamhill' and advanced selection OSU 703.007 have complete resistance to EFB. Microsatellite loci have been developed and used in germplasm characterization, including the identification of duplicates in the collection.

Results

The planting of these cultivars has allowed the acreage to remain constant at nearly 30,000 acres. 'Yamhill' with its high yields and early nut maturity will allow Oregon to compete on the world kernel market. 'Santiam', released in February 2005, is a suitable pollinizer for 'Yamhill'. OSU 703.007 is well-suited to the in-shell market and growers are enthusiastic about its release. Our understanding of hazelnut genetics continues to improve, as quantitative traits, Mendelian traits, and molecular markers are studied. RAPD markers identified in earlier research are now used by the breeding program in marker-assisted selection for eastern filbert blight (EFB) resistance. Several new sources of EFB resistance have been identified and used as parents in breeding. Micropropagation is being used to rapidly multiply promising new selections.

4. Associated Knowledge Areas

KA Code	Knowledge Area
201	Plant Genome, Genetics, and Genetic Mechanisms
204	Plant Product Quality and Utility (Preharvest)
206	Basic Plant Biology

Outcome #3

1. Outcome Measures

Peers are made aware of the antioxidant effects of various carotenoids and flavonoids, and that flavonoids have a significantly greater impact on antioxidant effect compared to carotenoids; while stakeholders are given additional new knowledge about human health benefits, disease resistance, and breeding for organic systems of vegetables.

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2008	20	5

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Colorful fruits and vegetables are high in anthocyanins, antioxidants that may improve eyesight, resistance to cancers, heart disease and dementia.

What has been done

Researchers are working to manipulate fruit and vegetable varieties through genetic engineering to increase the presence of anthocyanins, the bright colorful pigment.

Results

The genetic control of high anthocyanin tomatoes was recently published in a peer refereed journal as well as being presented in the popular news media. As a result, we have had over 50 requests for seed of our purple fruited tomato lines. More than 700 people attended a field day at which we demonstrated our breeding materials including high anthocyanin (purple fruited) tomatoes, late blight resistant tomatoes and broccoli and tomatoes bred for organic production systems. People who attended the field day came away knowing about the connection between purple pigment and health effects of plant secondary compounds as we as the need to breed crops specifically adapted to the production system in which they are to be grown.

4. Associated Knowledge Areas

KA Code	Knowledge Area
201	Plant Genome, Genetics, and Genetic Mechanisms
206	Basic Plant Biology
204	Plant Product Quality and Utility (Preharvest)

Outcome #4

1. Outcome Measures

Growers are more aware of issues related to precision horticulture, mineral nutrition, and fundamental aspects of data analysis.

Not reporting on this Outcome for this Annual Report

Outcome #5

1. Outcome Measures

Natural resource industry gains basic understanding of restoration processes in Pacific wetlands and riparian habitat, of the ecosystem services associated with these restorations, and of conservation bio-control strategies. Also, the conservation sector is made aware of a user-friendly tool to assess ecosystem services.

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2008	20	2

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Regulation controls and technological mitigation measures have improved water quality, preserved wetlands and protected endangered species, but these approaches are often costly, complicated and contentious to implement. Implementing restoration activities hinges on scientifically valid, consistent and user-friendly protocols to quantify environmental services provided by alternative mitigation measures such as riparian vegetation projects.

What has been done

Researchers are working on development of a user-friendly assessment tool to aid landowners in quantifying the ecological values of riparian restoration projects.

Results

The first prototype of this assessment tool was completed and shared with user groups at four workshops. The workshops helped the research team solicit input from landowners about the assessment tool and identify and understand landowners' needs and preferences for ecosystem services markets.

4. Associated Knowledge Areas

KA Code	Knowledge Area
206	Basic Plant Biology

Outcome #6

1. Outcome Measures

Adoption of new varietals and cultivars reduce yield losses and expenses, rejuvenate orchards and achieve better productivity and efficiency: Breeders incorporate Botrytis and Sclerotinia resistance genes into crop species via traditional breeding or transgenic plants to reduce yield losses and expenses for chemical fungicides. Growers plant transgenic frost-tolerant potato varieties Growers establish new orchards with plantings of EFB resistant cultivars to reduce production costs and provide environmental benefits (less fungicide applications, etc.), micropropagate instead of grafting and layering to propagate larger numbers of trees in shorter time, and Oregon's hazelnut industry is able to effectively compete on world market with new varieties Commercial processors and fresh market growers, as well as home gardeners, achieve greater production efficiency, more stable productivity, and reduced costs from the use of improved varieties.

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2008	10	5

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Results obtained from this research will have impacts on the identification of plant pathogenecity genes, which will help in future efforts to control Botrytis cinerea, a plant pathogen.

What has been done

Researchers developed computational pipelines for Solexa data analysis. These pipelines will allow for analysis of Solexa sequence data.

Results

The first Solexa data that were produced in this laboratory wer genome sequences of four Botrytis cinerea isolates. Data analysis of this project is in its final phase and results describing genome-wide patterns of natural selection on B. cinerea isolates were published.

4. Associated Knowledge Areas

KA Code	Knowledge Area
204	Plant Product Quality and Utility (Preharvest)
206	Basic Plant Biology
201	Plant Genome, Genetics, and Genetic Mechanisms

Outcome #7

1. Outcome Measures

Conservation bio-control strategies are implemented differently and active restoration strategies occur. Land owners and managers assess ecosystem services provided by their riparian restorations via a user-friendly web tool.
Not reporting on this Outcome for this Annual Report

Outcome #8

1. Outcome Measures

Increased potato yield will increase potato farmers' income as well as the stability of potato production of the world. The potential increase from 29,000 acres to as much as 100,000 acres will increase Oregon's market share and economic benefits.

Not reporting on this Outcome for this Annual Report

Outcome #9

1. Outcome Measures

Plant disease resistance will lower the amount of pesticide use, resulting in a more healthful environment and reduced exposure of humans to hazardous chemicals.

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2008	5	5

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Plant disease resistance will lower the amount of pesticide use.

What has been done

Researchers developed a mapping population of 115 lines and placed 133 molecular markers in 11 linkage groups in scarlet runner beans.

Results

We discovered 4 quantitative trait loci (QTL) associated with white mold resistance with two located in areas where white mold QTL in common bean had also been found. Research on the transfer of white mold resistance from scarlet runner bean into common bean was presented at the National Sclerotinia Initiative meeting. Researchers now know that white mold resistance genes are clustering to specific chromosomal regions in bean.

4. Associated Knowledge Areas

KA Code	Knowledge Area
206	Basic Plant Biology
204	Plant Product Quality and Utility (Preharvest)
201	Plant Genome, Genetics, and Genetic Mechanisms

Outcome #10

1. Outcome Measures

Better ecological methodologies will lead to more social, economic, and environmental benefits and cost effective and sustainable restoration. Improved valuation of ecological services associated with restorations will greatly facilitate market-based conservation practices such as mitigation banking and effluent trading. Better conservation bio-control strategies will decrease the costs associated with insect losses and the use of insecticides.
Not reporting on this Outcome for this Annual Report

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Economy
- Appropriations changes
- Public Policy changes
- Competing Public priorities
- Competing Programmatic Challenges

Brief Explanation

{No Data Entered}

V(I). Planned Program (Evaluation Studies and Data Collection)

1. Evaluation Studies Planned

- After Only (post program)
- Retrospective (post program)
- During (during program)
- Case Study
- Comparisons between program participants (individuals,group,organizations) and non-participants
- Comparisons between different groups of individuals or program participants experiencing different levels of program intensity.

Evaluation Results

{No Data Entered}

Key Items of Evaluation

{No Data Entered}

Program #28

V(A). Planned Program (Summary)

1. Name of the Planned Program

Horticultural Management Systems

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
205	Plant Management Systems	65%		65%	
216	Integrated Pest Management Systems	35%		35%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

1. Actual amount of professional FTE/SYs expended this Program

Year: 2008	Extension		Research	
	1862	1890	1862	1890
Plan	24.1	0.0	6.8	0.0
Actual	0.2	0.0	5.4	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	306896	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
0	0	2053784	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
0	0	888828	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

- Conduct Research Experiments.

- Conduct Workshops, meetings.

- Deliver Services.

- Develop Products, Curriculum, Resources.

- Provide Training.

- Provide Counseling.

- Assessments.

- Work with Media.

- Partnering.

- Facilitating.

2. Brief description of the target audience

Farm/crop/landscape managers, professional field representatives, students (undergraduates and graduate students or post-docs); commodity commissions, gardeners/Master Gardeners™; colleagues in the department, university, and USDA on campus; certification groups, NGOs, peers nationally and internationally, and agency personnel. ..(horticulture, woodlots, and animal management with emphasis on pest management and organic practices for local markets)

V(E). Planned Program (Outputs)

1. Standard output measures

Target for the number of persons (contacts) reached through direct and indirect contact methods

	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	Target	Target	Target	Target
Plan	23170	7230250	210	0
2008	11500	10000	0	0

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

Patent Applications Submitted

Year	Target
Plan:	2
2008 :	0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

	Extension	Research	Total
Plan	0	5	
2008	0	14	14

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- SCHOLARLY excellence in referred articles, book chapters, and books; participation on professional boards and panels, as well as science panels.

Year	Target	Actual
2008	10	55

Output #2

Output Measure

- DEVELOP AND ENHANCE VOLUNTEER PROGRAMS FOR BROADER APPLICATION OF RESEARCH AND EXTENSION INFORMATION - Reach Master Gardners (new, past, and current) through MG training programs and materials, websites, and other distance education programs Year Target benchmark 2007 MG Online Training offered 2008 Assortment of web-based modules developed and adapted for Ecampus to enlarge user groups/revenue. 2009 MG program training offered for credit and/or certification 2010 OSU Urban and Community Horticulture Website refined to reach new audiences and access impact. 2011 ‘Green' industry uses plants adapted to specific sites and for specific environmental purposes.

Year	Target	Actual
2008	5000	4

Output #3

Output Measure

- DEVELOP DISTANCE EDUCATION OUTLETS TO FURTHER REACH CLIENTELE. - Develop new databases and 3000 "most asked questions" for eXtension

Not reporting on this Output for this Annual Report

Output #4

Output Measure

- DEVELOP IMPROVED ANIMAL AND PLANT PRODUCTION SYSTEMS - Provide growers with improved production efficiency knowledge and practices regarding: ..mutrient budget recommendations ..chemical controls ..complete feasibility study of community based micro processing centers for agricultural products ..off-season production methods ..grafted stock ..water conservation and recycling ..soil quality parameters - Make known to practioners a variety of improved production practices, such as new cultivars for berries, new rootstocks, information on cold hardiness, disease resistance, chemical control of pests available; improved weed management, nitrogen use, water use, - Develop green or organic practices for industry ..prioritize programs 11..green industry uses plants adapted to specific sites and specific environmental purposes 11..ecological orchard systems evaluated ..complete organic cover cropapplied research - Establish statewide small farms extension program with new positions.

Year	Target	Actual
2008	20	58

Output #5

Output Measure

- PROVIDE ADDITIONAL UNDERSTANDING FOR PLANT AND ANIMAL PROTECTION FROM DISEASES AND PESTS - create, improve or evaluate pest management systems for commodity groups 09..bio-based pest control programs ..disease contained or controled ..weed management with improved herbicides and cultural management

Year	Target	Actual
2008	0	15

Output #6

Output Measure

- PROVIDE ECONOMIC AND MARKETING MODELS AND ANALYSES THAT INFORM DECISION-MAKERS, INDUSTRY, AND PEERS - Complete feasibility study of community based micro processing centers for agricultural products

Not reporting on this Output for this Annual Report

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O No.	OUTCOME NAME
1	Professional turf/landscape managers, nursery retailers, gardeners, and people associated with restoration/conservation projects will learn about sustainable gardening practices (eg. fertilizers, water, and pest management including organic), turf management, horticulture and aboriculture principles and practices, streamside gardening, native plants, invasive species, fire prevention, methods to minimize water runoff and use, wildlife enhancement, conservation and stewardship, and add value and beauty.
2	Practitioners will learn new cultural practices, innovations, pest control, and organic systems to remain competitive. They will also learn marketing approaches for local markets and community food systems. Commercial and non-commercial small farms will regularly utilize a variety of electronic information systems that provide immediate assistance and improve the face to face support when needed.
3	Practitioners will modify current practices to consider sustainable practices and decisions, stewardship of natural resources, and consequences of plants/plant communities in horticultural landscapes, riparian areas, watersheds, and social communities or neighborhoods. Citizens will experience horticultural therapy and health at hospitals, community gardens that feed the poor, recycling of community waste, and projects that engage troubled youth and Master Gardeners™.
4	Growers are expected to adopt improved practices and cultivars Growers are expected to adopt improved, scale-dependent practices selected for various market niches with emphasis on reducing environmental degradation and impact. Commercial small farms will have more diverse and economically viable technologies and production techniques or systems available for their use
5	Ecological landscapes will impact the way Oregonians use and manage plants to create beauty, modify environment, and improve health and well-being of individuals and communities. This program will change the way people use plants to modify their environment such as moderating temperature on buildings, improving water infiltration on surfaces, contributing to ecosystem services at landscape or watershed scales, etc. Environmental change will occur from temperature modifications; enhanced water conservation and wildlife; reduced runoff, fire incidence and pests; improved nutrient use and recycling; and other ecosystem services. Social change will occur through new perceptions of ‘green' technologies and social value or capital of horticultural landscapes to enhance human health, therapy, wellness, and social networks. The economic value of landscapes will increase. Cost and benefit analyses of plants usage to modify environments with ‘green' technologies will reveal positive economic impacts and improved health and wellness from horticultural therapy.

6	Environmental impacts in food/farm systems include reducing surface and/or groundwater or other pollution in the environment, while improving nutrient and water budgets, and organic production systems. New reduced risk, environmentally safer pest control tools will be available that are target pest specific will facilitate the implementation of IPM programs. Environmental quality will be improved: for nurseries, greenhouse, managed turf areas, and berry farms. through enhanced soil health; improved irrigation, nutrient, and pest management; and organic production systems. for vegetable farms with cover crops, soil quality, reduced tillage, while achieving grape quality and rootstock evaluation, although increasing acreages may be seen as degrading oak savannas in Oregon. in tree fruit orchards, including high density orchards, through the release of hazelnut cultivars that resist Eastern Filbert blight and integrated and organic fruit production practices. on small acreage livestock and horticulture farms with adoption of environmentally sound management practices. Social impacts include consumer awareness and appreciation of the abundance of locally grown ornamental plant materials and native species for use in landscapes will increase; also awareness of invasive species. Social change will enhance quality of life in rural areas by improving economic stability of family farms, wineries, wine tasting, and tourism with new practices and cropping systems and/or livestock management practices/systems. Social change will improve economic stability of families and quality of life with improved cropping systems. Worker safety with bio-based pest control and dwarf rootstocks (short ladders) will be improved; farm workers will find other employment with increased mechanization. Local and community markets increase social networking in rural communities. Economic impacts include reduced costs, increased benefits, and production efficiencies from use of water and nutrient budgets in recycled water systems, improved pest management, and diagnosis of plant problems to increase sales of quality products. Costs of regulatory procedures will be reduced with water and nutrient budgets and management systems. Profitability of berry crops in Oregon is expected to improve as new cropping systems, cultivars, practices, and efficiencies are implemented. Machine harvest technologies will be adapted or developed for Oregon to reduce production costs and improve competitiveness in global markets. Profitability of vegetable and specialized seed crops is expected to improve as new cropping systems, cover crops, nitrogen management, reduced tillage, and cultivars are adopted by growers. Communication networks will enable timely communication and utilization of technologies to alert growers of weather related pest incidence, educational events, and practices. Profitability of viticulture in Oregon is expected to improve as new cropping systems, cultivars, practices, and efficiencies are implemented. Niche markets, wine tasting, and tourism are primary outlets for Oregon wines. Profitability of tree fruits and nut crops in Oregon is expected to improve as new cropping systems, cultivars, practices, and efficiencies are implemented. High density orchards are expected to improve production efficiencies and increase markets. Economic viability of farmers markets will be enhanced by utilizing the results of market conducted consumer research. Applied research and education programs and community food systems will be fostered with products produced and sold locally.

Outcome #1

1. Outcome Measures

Professional turf/landscape managers, nursery retailers, gardeners, and people associated with restoration/conservation projects will learn about sustainable gardening practices (eg. fertilizers, water, and pest management including organic), turf management, horticulture and aboriculture principles and practices, streamside gardening, native plants, invasive species, fire prevention, methods to minimize water runoff and use, wildlife enhancement, conservation and stewardship, and add value and beauty.

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2008	1000	100

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

State-wide correct monitoring and control of eriophyid mites could result in an increased production output of at least $1 million if only 1% of crop was saved by timely action.

What has been done

Work towards the development, implementation and refinement of a sustainable integrated pest management and organic program for pears. Practices being evaluated by the OSU team can be classified as 1) integrated systems, 2) conventional chemically based systems, and 3) organically certified systems. Additional research continued on wine grapes and hazelnuts, with added focus on cranberries. We continued to develop an eriophyid mite phenology model as well as monitoring and timing of pesticides. We continued development of an alternative fungicide spray program with the aim to conserve biological control agents. Timing of pesticide sprays for eriophyid mites is optimized through a phenology model.

Results

The research and extension team have developed Integrated Pest Management (IPM) guidelines and training materials for Soft and Organic Pest Management Program based on information gained from research projects locally and regionally. Timing of pesticide sprays for eriophyid mites is optimized through a phenology model. In grapes we have developed a rescue spray program that reduced damage due to eriophyid mites by at least 50%. We have found spray programs that lead to conservation biological control of key natural enemies resulting in reduced dependence on conventional miticides. Dependence on sulfur for fungus control should be reduced by at least 60% in order to protect natural enemies. We developed monitoring protocols for eriophyid mites resulting in reduced use of at least 66 % miticides during the start of the grape growing season, resulting in reduced environmental impact and labor costs.

4. Associated Knowledge Areas

KA Code	Knowledge Area
216	Integrated Pest Management Systems

Outcome #2

1. Outcome Measures

Practitioners will learn new cultural practices, innovations, pest control, and organic systems to remain competitive. They will also learn marketing approaches for local markets and community food systems. Commercial and non-commercial small farms will regularly utilize a variety of electronic information systems that provide immediate assistance and improve the face to face support when needed.

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2008	100	30

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Practioners and farmers are continually looking for new horticultural methods to stay competitive.

What has been done

Knowledge was conveyed to practitioners in various forms: field days, grape pruning workshops, a one-day mini-conference on vineyard disease control, OSU Extension Service publications, newsletters, two websites and presentations at grower meetings. Knowledge was shared with peers via poster presentations at the American Society for Enology and Viticulture and Oregon Wine Industry Symposium, symposia and peer-reviewed papers. A PI serves as chair of the Oregon Viticulture Working Group, providing leadership amongst the faculty in OSU and USDA-ARS that work on winegrape research in Oregon.

Results

Practioners have learned new cultural practices and new, innovative methods of pest control and organic systems management.

4. Associated Knowledge Areas

KA Code	Knowledge Area
205	Plant Management Systems
216	Integrated Pest Management Systems

Outcome #3

1. Outcome Measures

Practitioners will modify current practices to consider sustainable practices and decisions, stewardship of natural resources, and consequences of plants/plant communities in horticultural landscapes, riparian areas, watersheds, and social communities or neighborhoods. Citizens will experience horticultural therapy and health at hospitals, community gardens that feed the poor, recycling of community waste, and projects that engage troubled youth and Master Gardeners™.

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2008	1000	10

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Practioners have looked to the Horticulture Department at OSU for insights and innovations into sustainable practices and having greater stewardship of the natural resources in Oregon.

What has been done

As a means of measuring grower attitudes and response to the project a survey was given to local orchardists to determine their adoption and use of new technology. The survey was based on a similar survey which had been given to growers in 2002 at the end of an earlier project allowing for a good baseline on which to gauge current progress in the implementation of new pest management techniques.

Results

Increased knowledge has led to changes in behavior regarding the controls of various pests in hazelnuts and grapes. In comparing the survey done in 2002 at the conclusion of a previous grant and the survey done in 2008 a number of important changes are apparent. The acreage under mating disruption (MD) has increased by almost 70% in the period from 2002 to 2008, 1874 acres to 3160 acres, which halted a decline in the acreage using MD starting in 2001 and continuing to 2004. It is notable that in 2005 puffers were used on less than 1% of the total acreage and by 2008 puffers were being used on about 40% of the total acreage. Puffer technology was used on approximately three quarters of the acreage under mating disruption in 2008. Particularly encouraging was the fact that two-thirds of the survey respondents planned to increase their use of MD versus 38% in 2002 and, unlike the 2002 survey, none of the respondents planned to decrease their use of MD. Also two-thirds of the respondents did not use any organophosphates in 2008, while in 2002 63% of the respondents were still using organophosphates and were applying organophosphates an average of 2.6 times per season. The use of pyrethroids declined by more than half from 38% in 2002 to just 17% in 2008.

4. Associated Knowledge Areas

KA Code	Knowledge Area
205	Plant Management Systems
216	Integrated Pest Management Systems

Outcome #4

1. Outcome Measures

Growers are expected to adopt improved practices and cultivars Growers are expected to adopt improved, scale-dependent practices selected for various market niches with emphasis on reducing environmental degradation and impact. Commercial small farms will have more diverse and economically viable technologies and production techniques or systems available for their use

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2008	75	4

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

These studies showcase the use of different vineyard floor management practices (tillage, solid sod cover and alternate row tillage/cover). Many vineyards use some of these methods in their vineyard but don't know which would lead to better fruit while reducing vine vegetative vigor. Since research is conducted on farm, the practitioners have 'ownership' of the project and help in disseminating information amongst industry.

What has been done

All of the applied viticulture research is conducted on-farm with grower collaborators. Research plots were visited by industry during three field meetings in the Willamette Valley during the growing season of 2008 to showcase studies on vineyard floor management for increasing vine balance and fruit quality. Another field study is being conducted on early season leaf removal and has been discussed in grower meetings, and the industry was allowed to offer their considerations of timing of leaf removal.

Results

Growers were able to assess research results and to see the sites early, mid and late season and make assessments on vine canopy density, impacts on soil moisture, water stress and rooting patterns of vines. Results were showcased in 2008 Oregon Wine Industry Symposium also. A cover crop survey was also submitted to the statewide industry for input on their current practices for vineyard floor management in both young and producing vineyards. The results are being compiled for review by industry and to allow for ideas in promoting new methods of management for increased vineyard sustainability while increasing fruit quality.

4. Associated Knowledge Areas

KA Code	Knowledge Area
216	Integrated Pest Management Systems
205	Plant Management Systems

Outcome #5

1. Outcome Measures

Ecological landscapes will impact the way Oregonians use and manage plants to create beauty, modify environment, and improve health and well-being of individuals and communities. This program will change the way people use plants to modify their environment such as moderating temperature on buildings, improving water infiltration on surfaces, contributing to ecosystem services at landscape or watershed scales, etc. Environmental change will occur from temperature modifications; enhanced water conservation and wildlife; reduced runoff, fire incidence and pests; improved nutrient use and recycling; and other ecosystem services. Social change will occur through new perceptions of ‘green' technologies and social value or capital of horticultural landscapes to enhance human health, therapy, wellness, and social networks. The economic value of landscapes will increase. Cost and benefit analyses of plants usage to modify environments with ‘green' technologies will reveal positive economic impacts and improved health and wellness from horticultural therapy.

Not reporting on this Outcome for this Annual Report

Outcome #6

1. Outcome Measures

Environmental impacts in food/farm systems include reducing surface and/or groundwater or other pollution in the environment, while improving nutrient and water budgets, and organic production systems. New reduced risk, environmentally safer pest control tools will be available that are target pest specific will facilitate the implementation of IPM programs. Environmental quality will be improved: for nurseries, greenhouse, managed turf areas, and berry farms. through enhanced soil health; improved irrigation, nutrient, and pest management; and organic production systems. for vegetable farms with cover crops, soil quality, reduced tillage, while achieving grape quality and rootstock evaluation, although increasing acreages may be seen as degrading oak savannas in Oregon. in tree fruit orchards, including high density orchards, through the release of hazelnut cultivars that resist Eastern Filbert blight and integrated and organic fruit production practices. on small acreage livestock and horticulture farms with adoption of environmentally sound management practices. Social impacts include consumer awareness and appreciation of the abundance of locally grown ornamental plant materials and native species for use in landscapes will increase; also awareness of invasive species. Social change will enhance quality of life in rural areas by improving economic stability of family farms, wineries, wine tasting, and tourism with new practices and cropping systems and/or livestock management practices/systems. Social change will improve economic stability of families and quality of life with improved cropping systems. Worker safety with bio-based pest control and dwarf rootstocks (short ladders) will be improved; farm workers will find other employment with increased mechanization. Local and community markets increase social networking in rural communities. Economic impacts include reduced costs, increased benefits, and production efficiencies from use of water and nutrient budgets in recycled water systems, improved pest management, and diagnosis of plant problems to increase sales of quality products. Costs of regulatory procedures will be reduced with water and nutrient budgets and management systems. Profitability of berry crops in Oregon is expected to improve as new cropping systems, cultivars, practices, and efficiencies are implemented. Machine harvest technologies will be adapted or developed for Oregon to reduce production costs and improve competitiveness in global markets. Profitability of vegetable and specialized seed crops is expected to improve as new cropping systems, cover crops, nitrogen management, reduced tillage, and cultivars are adopted by growers. Communication networks will enable timely communication and utilization of technologies to alert growers of weather related pest incidence, educational events, and practices. Profitability of viticulture in Oregon is expected to improve as new cropping systems, cultivars, practices, and efficiencies are implemented. Niche markets, wine tasting, and tourism are primary outlets for Oregon wines. Profitability of tree fruits and nut crops in Oregon is expected to improve as new cropping systems, cultivars, practices, and efficiencies are implemented. High density orchards are expected to improve production efficiencies and increase markets. Economic viability of farmers markets will be enhanced by utilizing the results of market conducted consumer research. Applied research and education programs and community food systems will be fostered with products produced and sold locally.

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2008	1500	10

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

The interest of sustainable practices on vineyards is two-fold: increase fruit quality and decrease environmental impact. Currently, vineyards have increasing interest in adopting practices for increased sustainability. Over 90% of industry polled in a cover crop survey indicates interest in better understanding cover cropping methods/management for manipulating vine nutrition, vegetative/reproductive growth and overall fruit quality. Increased interest and membership of vineyards in organic and sustainable certified programs is testament to the need and interst in sustainable production practices. Furthermore, the Oregon Wine Industry is launching an 'Oregon Certified Sustainable' certification process to encompass all vineyards with sustainable and environmentally responsible farming practices while maintaining a level of high quality fruit and wines.

What has been done

A cover crop trial has begun in a newly planted vineyard to determine the impacts of cover crop management on soil moisture, vine nutrition and vine growth in the establishment years.

Results

Research and Extension efforts in sustainable vineyard production indicate significant savings and environmental impact. With the cover crop study, there can be a reduction of tillage in vineyards without causing water stress to vines. Irrigation was not found to be needed and has impact on water savings. Having the cover crop in place year round reduces soil erosion and protects water quality of waterways. In addition, a vineyard can save $140/acre by reducing tillage (reduced fuel costs and herbide costs) by implementing a permanent sod cover while reducing vine vigor and increasing fruit quality by an estimated 5-10%. A new cover crop study indicates the potential to decrease soil erosion on newly planted vineyards by showing that clean cultivation is not needed; furthermore, proper cover crops can provide both weed control and nutrition (reducing inputs of herbicide and synthetic fertilizers). The defoliation trial will effectively reduce disease incidence and also increase spray coverage in the vine to prevent early infection of botrytis bunch rot, which can decrease fruit quality later in the season.

4. Associated Knowledge Areas

KA Code	Knowledge Area
216	Integrated Pest Management Systems
205	Plant Management Systems

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 Public priorities
- Competing Programmatic Challenges
- Populations changes (immigration,new cultural groupings,etc.)
- Other (university/college policies)

Brief Explanation

{No Data Entered}

V(I). Planned Program (Evaluation Studies and Data Collection)

1. Evaluation Studies Planned

- Retrospective (post program)
- During (during program)

Evaluation Results

{No Data Entered}

Key Items of Evaluation

{No Data Entered}

Program #29

V(A). Planned Program (Summary)

1. Name of the Planned Program

Integrated Production Systems

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
102	Soil, Plant, Water, Nutrient Relationships	10%		10%	
111	Conservation and Efficient Use of Water	10%		10%	
121	Management of Range Resources	4%		4%	
203	Plant Biological Efficiency and Abiotic Stresses Affecting Plants	1%		1%	
204	Plant Product Quality and Utility (Preharvest)	10%		10%	
205	Plant Management Systems	40%		40%	
216	Integrated Pest Management Systems	25%		25%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

1. Actual amount of professional FTE/SYs expended this Program

Year: 2008	Extension		Research	
	1862	1890	1862	1890
Plan	0.0	0.0	4.0	0.0
Actual	0.1	0.0	1.2	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	117264	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
0	0	793320	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
0	0	198929	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

- - Conduct Research Experiments.

- Conduct Workshops, Meetings.

- Deliver Services.

- Develop Products, Curriculum, Resources.

- Provide Training.
  - Provide Demonstrations

- Provide Counseling.

- Assessments.

- Work with Media.

- Partnering.

- Facilitating.

2. Brief description of the target audience

- growers
  - community leaders
  - extension educators.

- commercial producers.

- policy makers.

V(E). Planned Program (Outputs)

1. Standard output measures

Target for the number of persons (contacts) reached through direct and indirect contact methods

	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	Target	Target	Target	Target
Plan	100	100	0	0
2008	0	100	0	0

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

Patent Applications Submitted

Year	Target
Plan:	0
2008 :	0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

	Extension	Research	Total
Plan	0	4	
2008	0	8	8

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- PROVIDE ADDITIONAL UNDERSTANDING FOR PLANT AND ANIMAL PROTECTION FROM DISEASES AND PESTS TO GROWERS AND PEERS - herbicides that can be safely and efficaciously used in different crops - knowledge about the biology of yellow nutsedge under local conditions - innovations that mitigates the detrimental effect of Verticillium wilt, probably the most limiting disease of potato in the Treasure Valley.

Year	Target	Actual
2008	10	5

Output #2

Output Measure

- DEVELOP BREEDING PROGRAMS THAT RESULT IN DESIRABLE TRAITS, CULTIVARS AND VARIETIES - onion germplasm for year-round marketing. - OSU and ARS breeding program partnership develops at least one varietal selection for potato adaptation to the Treasure Valley. Selections at the Malheur Experiment Station, including colored flesh potato varieties, may have special market opportunities. - alkaline tolerant poplar tree varieties developed for saw log production on poor and sloping soils with the aid of drip irrigation.

Year	Target	Actual
2008	2	4

Output #3

Output Measure

- SCHOLARLY excellence through papers and reports, book chapters, presentations, service, on boards/panels and to local clientele, awards and honors

Year	Target	Actual
2008	4	47

Output #4

Output Measure

- Develop improved animal and plant production systems for growers: - subsurface drip irrigation or different bed conformation works with potatoes. - automated systems use soil moisture monitoring to override fixed schedule drip irrigation systems when the soil was too wet avoiding leaching water and nitrate to groundwater. - efficient use of soil nitrate and the other available N sources

Year	Target	Actual
2008	10	2

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O No.	OUTCOME NAME
1	Growers become aware of issues related to managing yellow nutsedge, including - level of management required to deal with yellow nutsedge - risks associated with this pest in areas where it is just now becoming established - factors affecting metham sodium activity against yellow nutsedge.
2	Growers are made aware that environmentally friendly drip and micro sprinkler irrigation systems produce increased crop yield and crop quality and that less nitrogen is required when crops are irrigated than with furrow and regular sprinkler irrigation.
3	The station has proved to growers and public sector that micro irrigation can achieve environmental benefits if made economically feasible through reductions in other costs not related to the added costs of the micro irrigation system and improvements in crop yield or quality.
4	Growers apply metham sodium when environmental conditions are more favorable for effective activity against yellow nutsedge.
5	Growers implement drip irrigation and produce more marketable yields of onions, potatoes, and poplar trees than with furrow or sprinkler irrigation. and achieve efficient use of soil nitrate and the other available N sources under drip irrigation.
6	Through appropriate application of herbicides, producers reduce 50% of the yellow nutsedge tubers they must manage in following crops.
7	Micro irrigation reduces percentage of water use, leaving more water in streams and reservoirs, and reduces surface water contamination of streams and groundwater contamination by nitrate and pesticides

Outcome #1

1. Outcome Measures

Growers become aware of issues related to managing yellow nutsedge, including - level of management required to deal with yellow nutsedge - risks associated with this pest in areas where it is just now becoming established - factors affecting metham sodium activity against yellow nutsedge.

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2008	0	2

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Sustainable control of weeds, such as yellow nutsedge, continues to be an emphasis of the Malheur Experiment Station. Appropriate herbicides, soil fumigants and crop rotation systems for weed control are urgently needed to reduce production costs and to keep onion production viable.

What has been done

Investigators have identified herbicides and soil fumigants that can be safely used to manage weeds like yellow nutsedge, a threat to onion crops.

Results

Results have supported use of timely application of soil fumigants on yellow nutsedge as an important control of this pest. Results were disseminated to growers through publications, grower meetings, regional conferences and personal contact.

4. Associated Knowledge Areas

KA Code	Knowledge Area
205	Plant Management Systems
216	Integrated Pest Management Systems

Outcome #2

1. Outcome Measures

Growers are made aware that environmentally friendly drip and micro sprinkler irrigation systems produce increased crop yield and crop quality and that less nitrogen is required when crops are irrigated than with furrow and regular sprinkler irrigation.

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2008	2	2

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Farmers would like to optimize irrigation scheduling for ideal crop yield and quality performance. Drip irrigation of onion leaves more water in streams and reservoirs. Water contamination of streams and groundwater can be less with drip irrigation.

What has been done

The team seeks irrigation criteria to optimize productivity and quality by minimizing plant stress according to each specific plant species' needs. They have evaluated and calibrated soil moisture sensors so that these sensors can be used by growers as effective tools in irrigation scheduling to meet crop water needs.

Results

Drip-irrigated onion has reduced N inputs compared to furrow irrigated onion with no associated irrigation-induced erosion and associated pollutant runoff. Thirty to 40 percent less water was required using subsurface drip irrigation (SDI). Given the relatively better commercial onion performance under drip irrigation observed by growers, the acreage of drip-irrigated onion has continued to expand and the acreage of furrow irrigated onion has contracted. Onion growers' records showed that growers used 115 kg/ha less fertilizer N when irrigating with SDI than with furrow irrigation. Growers became aware that where less nitrogen fertilizer (112 kg/ha) was applied, onions (grown with 9 different irrigation system-criteria combinations) were actually more productive than the higher N rates (224 kg/ha).

4. Associated Knowledge Areas

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships
205	Plant Management Systems
204	Plant Product Quality and Utility (Preharvest)
203	Plant Biological Efficiency and Abiotic Stresses Affecting Plants
111	Conservation and Efficient Use of Water

Outcome #3

1. Outcome Measures

The station has proved to growers and public sector that micro irrigation can achieve environmental benefits if made economically feasible through reductions in other costs not related to the added costs of the micro irrigation system and improvements in crop yield or quality.

Not reporting on this Outcome for this Annual Report

Outcome #4

1. Outcome Measures

Growers apply metham sodium when environmental conditions are more favorable for effective activity against yellow nutsedge.

Not reporting on this Outcome for this Annual Report

Outcome #5

1. Outcome Measures

Growers implement drip irrigation and produce more marketable yields of onions, potatoes, and poplar trees than with furrow or sprinkler irrigation. and achieve efficient use of soil nitrate and the other available N sources under drip irrigation.

2. Associated Institution Types

•1862 Research

3a. Outcome Type:
Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2008	2	3

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Appropriate irrigation schedules are needed for sustainable agriculture production in Malheur County, Oregon to preserve natural resources and to reduce production inputs.

What has been done

Developed drip and sprinkler irrigation options so that water applications closely match crop needs and furrow irrigation can be replaced with more efficient methods. Developed sustainable crop fertilization practices so that nutrients both meet plant needs and remain on site, neither washing off farm nor leaching into groundwater.

Results

Growers became aware that subsurface drip irrigation was successfully used for native wildflower seed production. Poplars grown with drip irrigation were more productive than poplar grown with sprinkler irrigation.

4. Associated Knowledge Areas

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships
111	Conservation and Efficient Use of Water
204	Plant Product Quality and Utility (Preharvest)
205	Plant Management Systems

Outcome #6

1. Outcome Measures
Through appropriate application of herbicides, producers reduce 50% of the yellow nutsedge tubers they must manage in following crops.

2. Associated Institution Types

•1862 Research

3a. Outcome Type:
Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2008	0	2

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Control of yellow nutsedge in fields is of highest priority in the region. Appropriate herbicides and application schedules are urgently needed for control of this weed.

What has been done

Weed project data was used to register Dual Magnum (special local needs Section 24C) for fall plow down treatments in onions. Data was also used to register Starane herbicide for weed and volunteer potato control in onions. We have confirmed that yellow nutsedge is capable of emerging from 18-inch depth under local growing conditions and environment.

Results

Growers now know that short crop rotations exacerbate and perpetuate yellow nutsedge infestations. Use of Dual Magnum fall plow down will contribute positively to lower yellow nutsedge tubers. Also, overall field sanitation (watching closely movement of farm equipments between fields) plays a big role in preventing new infestations

4. Associated Knowledge Areas

KA Code	Knowledge Area
216	Integrated Pest Management Systems
205	Plant Management Systems

Outcome #7

1. Outcome Measures

Micro irrigation reduces percentage of water use, leaving more water in streams and reservoirs, and reduces surface water contamination of streams and groundwater contamination by nitrate and pesticides

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2008	0	2

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Irrigation management is essential for sound economic and sustainable production systems.

What has been done

Carefully consider irrigation management to minimize off site effects. Reduce irrigation-induced erosion that transports sediment and nutrients to streams and lakes by developing PAM, straw mulch, and irrigation options.

Results

Growers became aware that native wildflower seed production was successful using subsurface drip irrigation with little applied water (< or = to 200mm). Oregon DEQ has recently recognized that the groundwater quality in Northeastern Malheur County is improving due to the adoption of better nitrogen management practices and irrigation management practices, practices directly derived from the research outputs from this project.

4. Associated Knowledge Areas

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships
111	Conservation and Efficient Use of Water

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 Public priorities
- Populations changes (immigration,new cultural groupings,etc.)

Brief Explanation

{No Data Entered}

V(I). Planned Program (Evaluation Studies and Data Collection)

1. Evaluation Studies Planned

-

Evaluation Results

{No Data Entered}

Key Items of Evaluation

{No Data Entered}

Program #30

V(A). Planned Program (Summary)

1. Name of the Planned Program

Sustainable Agricultural Systems for Eastern Oregon

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
121	Management of Range Resources	10%		10%	
122	Management and Control of Forest and Range Fires	10%		10%	
123	Management and Sustainability of Forest Resources	10%		10%	
131	Alternative Uses of Land	10%		10%	
135	Aquatic and Terrestrial Wildlife	10%		10%	
136	Conservation of Biological Diversity	10%		10%	
302	Nutrient Utilization in Animals	10%		10%	
307	Animal Management Systems	10%		10%	
601	Economics of Agricultural Production and Farm Management	10%		10%	
605	Natural Resource and Environmental Economics	10%		10%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

1. Actual amount of professional FTE/SYs expended this Program

Year: 2008	Extension		Research	
	1862	1890	1862	1890
Plan	0.0	0.0	12.0	0.0
Actual	0.1	0.0	0.5	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	56522	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
0	0	145186	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
0	0	45648	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

- Conduct Research Experiments
- Deliver services
- Develop Products, Curriculum, Resources
- Assessments
- Partnering

2. Brief description of the target audience

As reflected by the multidisciplinary team of scientists in this plan of work, our target audience will be diverse.To obtain the full potential of this research we will need to reach out to a multitude of audiences.Our audiences will include:

- private and public range managers
- small woodland and timber company managers
- public land agencies (BLM, USDA FS, State Forestry)
- State & Federal Conservation Agencies (Oregon Department of Agriculture, SWCD, USDA NRCS)
- Beef Producers and Managers
- Wildlife Management Agencies (ODF&W, USF&W, NOAA)
- Nonprofit Conservation Groups (TNC)
- Scientific Community

o Ecologists

§ Range, Forest, Wildlife

o Animal Scientists

o Economists

- The General Public

V(E). Planned Program (Outputs)

1. Standard output measures

Target for the number of persons (contacts) reached through direct and indirect contact methods

	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	**Target**	**Target**	**Target**	**Target**
Plan	500	5000	0	0
2008	0	0	0	0

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

Patent Applications Submitted

Year	Target
Plan:	0
2008 :	{No Data Entered}

Patents listed

{No Data Entered}

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

	Extension	Research	Total
Plan	4	14	
2008	{No Data Entered}	{No Data Entered}	0

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- EFFECTS ON AND PROTECTION OF ENVIRONMENTAL HEALTH AND ECOLOGY Evaluate fire and mechanical treatments on restoration of Sagebrush and Western Juniper Woodlands Compare sage grouse response to fire treatments Evaluate fire and fire surrogate treatments across multiple research sites, fuel loads and scales, including entomological and animals response Characterize food webs in rangelands Analyze food web response to stocking rates Analyze riparian vegetation effects on avian species Analyze fire and fire surrogate treatements on avian populations Develop policy alternatives for fire and fire surrogate management

Year	Target	Actual
2008	6	0

Output #2

Output Measure

- DEVELOP IMPROVED ANIMAL AND PLANT PRODUCTION SYSTEMS Evaluate grazing distribution and use of riparian pastures Analyze forest fuel reduction/burning and stocking rate effects on cattle diets in mixed conifer rangelands Analyze competition between deer, elk, and cattle in grazing impacts Identify influence of season on cattle resource selection on mixed conifer rangelands Investigate influence of early weaning on cattle distribution and use of late season mixed conifer forests Evaluate influence of overstory management on understory forage quality of stocking rates

Year	Target	Actual
2008	3	0

Output #3

Output Measure

- DEVELOP BETTER UNDERSTANDING OF BASIC PHYSIOLOGY OF PLANTS AND ANIMALS Identify ways to minimize toxic effects of high alkaloid tall fescue straw Evaluate knapweed as protein supplement to low-quality forage Evaluate protein supplement of cool versus warm season forage

Year	Target	Actual
2008	1	0

Output #4

Output Measure

- PROVIDE ECONOMIC AND MARKETING MODELS AND ANALYSES THAT INFORM DECISION-MAKERS, INDUSTRY, AND PEERS Assess land ownership fragmentation and economic assessment impacts Develop ranch economic models Identify policy alternatives for fire and fire surrogate management Evaluate use of rangeland website Develop framework to integrate economic, social, and ecological aspects of rangeland sustainability

Year	Target	Actual
2008	2	0

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O No.	OUTCOME NAME
1	Learning, awareness, knowledge, skills, motivations Information exchange - Peers gain new information regarding the beef production systems that may provide alternatives that are more sustainable in terms of economics and ecology. - Peers gain detailed knowledge about how land use practices influence the habitat requirements of wildlife and native vegetation - Peers gain new information on research techniques to assess sustainable natural resource management and biodiversity Improved technologies and practices - Beef cattle producers and land managers learn new approaches/tools to sustainable land management to promote rangeland health and biodiversity.
2	Action such as behavior, practices, decision-making, policies Best Practices - Beef producers get to evaluate benefits from alternative management tools that may improve the economic competitive advantage and/or evaluate strategies to improve the ecological sustainability of production systems. Products and services - Our research will be packaged for a variety of audiences including beef producers, land managers, policy-making, mid-level professions, and scientists. The research will be summarized for popular press, extension, and refereed publications. - The research will be used for private and public land management protocols and will be used in public land management policy decisions.
3	Change in social, economic, environmental, and civic conditions - Beef producers in the Intermountain and Great Basin areas remain completive on a regional, national, and global basis. Our research will be useful in these production directions over a extended time period. - Management of public and private rangelands will sustain and improve ecological values as desired by the public and the rural communities that depend on the natural resources. - The public has access to a ongoing research data base that allows for natural resource/land management decisions to have a fundamental basis in science.

Outcome #1

1. Outcome Measures

Learning, awareness, knowledge, skills, motivations Information exchange - Peers gain new information regarding the beef production systems that may provide alternatives that are more sustainable in terms of economics and ecology. - Peers gain detailed knowledge about how land use practices influence the habitat requirements of wildlife and native vegetation - Peers gain new information on research techniques to assess sustainable natural resource management and biodiversity Improved technologies and practices - Beef cattle producers and land managers learn new approaches/tools to sustainable land management to promote rangeland health and biodiversity.

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2008	1	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

{No Data Entered}

What has been done

{No Data Entered}

Results

{No Data Entered}

4. Associated Knowledge Areas

KA Code	Knowledge Area
605	Natural Resource and Environmental Economics
136	Conservation of Biological Diversity
123	Management and Sustainability of Forest Resources
122	Management and Control of Forest and Range Fires
121	Management of Range Resources
302	Nutrient Utilization in Animals
601	Economics of Agricultural Production and Farm Management
135	Aquatic and Terrestrial Wildlife
307	Animal Management Systems
131	Alternative Uses of Land

Outcome #2

1. Outcome Measures

Action such as behavior, practices, decision-making, policies Best Practices - Beef producers get to evaluate benefits from alternative management tools that may improve the economic competitive advantage and/or evaluate strategies to improve the ecological sustainability of production systems. Products and services - Our research will be packaged for a variety of audiences including beef producers, land managers, policy-making, mid-level professions, and scientists. The research will be summarized for popular press, extension, and refereed publications. - The research will be used for private and public land management protocols and will be used in public land management policy decisions.

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2008	0	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

{No Data Entered}

What has been done

{No Data Entered}

Results

{No Data Entered}

4. Associated Knowledge Areas

KA Code	Knowledge Area
135	Aquatic and Terrestrial Wildlife
302	Nutrient Utilization in Animals
605	Natural Resource and Environmental Economics
307	Animal Management Systems
121	Management of Range Resources
136	Conservation of Biological Diversity
131	Alternative Uses of Land
601	Economics of Agricultural Production and Farm Management
123	Management and Sustainability of Forest Resources

Outcome #3

1. Outcome Measures

Change in social, economic, environmental, and civic conditions - Beef producers in the Intermountain and Great Basin areas remain completive on a regional, national, and global basis. Our research will be useful in these production directions over a extended time period. - Management of public and private rangelands will sustain and improve ecological values as desired by the public and the rural communities that depend on the natural resources. - The public has access to a ongoing research data base that allows for natural resource/land management decisions to have a fundamental basis in science.

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2008	0	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

{No Data Entered}

What has been done

{No Data Entered}

Results

{No Data Entered}

4. Associated Knowledge Areas

KA Code	Knowledge Area
307	Animal Management Systems
122	Management and Control of Forest and Range Fires
121	Management of Range Resources
605	Natural Resource and Environmental Economics
123	Management and Sustainability of Forest Resources
135	Aquatic and Terrestrial Wildlife
601	Economics of Agricultural Production and Farm Management
131	Alternative Uses of Land
302	Nutrient Utilization in Animals
136	Conservation of Biological Diversity

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Economy
- Appropriations changes
- Public Policy changes
- Government Regulations
- Competing Public priorities
- Competing Programmatic Challenges
- Populations changes (immigration,new cultural groupings,etc.)

Brief Explanation

{No Data Entered}

V(I). Planned Program (Evaluation Studies and Data Collection)

1. Evaluation Studies Planned

-

Evaluation Results

{No Data Entered}

Key Items of Evaluation

{No Data Entered}

Program #31

V(A). Planned Program (Summary)

1. Name of the Planned Program

Integrating Science Into High School Agricultural Education Programs

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
803	Sociological and Technological Change Affecting Individuals, Families and Communities			30%	
903	Communication, Education, and Information Delivery			70%	
	Total			100%	

V(C). Planned Program (Inputs)

1. Actual amount of professional FTE/SYs expended this Program

Year: 2008	Extension		Research	
	1862	1890	1862	1890
Plan	0.0	0.0	0.2	0.0
Actual	0.0	0.0	0.2	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	6289	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
0	0	45169	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
0	0	2828	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

Instruments will be developed and surveys will be conducted to determine agriculture and science teachers' perceptions of integrating science into agriculture programs. Administrators and other stakeholders will also be surveyed to determine their perceptions of integrating science into agriculture programs. Comparisons will be made to determine differences and similarities in perceptions. The results will be analyzed and conclusions drawn and reported to stakeholders.

2. Brief description of the target audience

teachers; decision-makers

V(E). Planned Program (Outputs)

1. Standard output measures

Target for the number of persons (contacts) reached through direct and indirect contact methods

	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	Target	Target	Target	Target
Plan	50	50	30	0
2008	0	0	0	0

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

Patent Applications Submitted

Year	Target
Plan:	0
2008 :	{No Data Entered}

Patents listed

{No Data Entered}

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

	Extension	Research	Total
Plan	0	0	
2008	{No Data Entered}	{No Data Entered}	0

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- SCHOLARLY excellence in referred articles, book chapters, and books; participation on professional boards and panels, as well as science panels.

Year	Target	Actual
2008	0	0

Output #2

Output Measure

- DEVELOP EDUCATIONAL STRATEGIES AND DISTANCE EDUCATION OUTLETS TO FURTHER REACH CLIENTELE. - compare perceptions of science teachers and agriculture teachers on integrating science into the agriculture curriculum

Year	Target	Actual
2008	1	0

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O No.	OUTCOME NAME
1	Informed decision-makers and citizenry and Information exchanged with peers regarding the opportunities to integrate agricultural education into high school curriculums

Outcome #1

1. Outcome Measures

Informed decision-makers and citizenry and Information exchanged with peers regarding the opportunities to integrate agricultural education into high school curriculums

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2008	0	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

{No Data Entered}

What has been done

{No Data Entered}

Results

{No Data Entered}

4. Associated Knowledge Areas

KA Code	Knowledge Area
903	Communication, Education, and Information Delivery
803	Sociological and Technological Change Affecting Individuals, Families and Communities

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Economy
- Appropriations changes
- Public Policy changes
- Competing Public priorities
- Populations changes (immigration,new cultural groupings,etc.)

Brief Explanation

{No Data Entered}

V(I). Planned Program (Evaluation Studies and Data Collection)

1. Evaluation Studies Planned

-

Evaluation Results

{No Data Entered}

Key Items of Evaluation

{No Data Entered}

Program #32

V(A). Planned Program (Summary)

1. Name of the Planned Program

Families, Youth, and Communities

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
802	Human Development and Family Well-Being	70%		70%	
804	Human Environmental Issues Concerning Apparel, Textiles, and Residential and Commercial Structures	30%		30%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

1. Actual amount of professional FTE/SYs expended this Program

Year: 2008	Extension		Research	
	1862	1890	1862	1890
Plan	0.2	0.0	1.1	0.0
Actual	0.1	0.0	0.1	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	22483	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
0	0	69807	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
0	0	5072	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

- Conduct Research Experiments.

- Develop Products, Curriculum, Resources.

- Provide Training.

- Assessments.

- Partnering.

2. Brief description of the target audience

- extension educators.

- commercial producers.

- youth aged 13-18.

- elderly residents
- rural residents
- Latino populations

- economists.

- policy makers.

V(E). Planned Program (Outputs)

1. Standard output measures

Target for the number of persons (contacts) reached through direct and indirect contact methods

	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	**Target**	**Target**	**Target**	**Target**
Plan	150	500	0	0
2008	0	0	0	0

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

Patent Applications Submitted

Year	Target
Plan:	0
2008 :	{No Data Entered}

Patents listed
{No Data Entered}

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

	Extension	Research	Total
Plan	0	4	
2008	{No Data Entered}	{No Data Entered}	0

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- SCHOLARLY excellence in referred articles, book chapters, and books; participation on professional boards and panels, as well as science panels.

Not reporting on this Output for this Annual Report

Output #2

Output Measure

- EFFECTS ON AND PROTECTION OF HUMAN HEALTH
    - Data set of community contextual variables created from identified secondary sources
    - Primary data set created from three waves of qualitative and quantitative data, resulting in the most comprehensive data set on low-income rural family well being available in the U.S.
    - Ph.D. trained researchers from four states who understand rural low-income families and complex research projects. Characterize and assess the fibers' chemical, physical and performance properties that are relevant to textile thermal insulation applications. The thermal insulation capability of comforters made of poplar seed hair fibers has been found to outperform those made of wool, down, or other synthetic fibers, and therefore, it is expected that the results of this project would demonstrate that poplar seed hair fibers possess properties are suitable for textile thermal insulation applications.

Not reporting on this Output for this Annual Report

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O No.	OUTCOME NAME
1	Information exchange • Data set of community contextual variables and the most comprehensive data set on low-income rural family well being available in the U.S. • Doctoral researchers from four states who understand rural low-income families and complex research projects. • Better-trained scholars who are adept at using qualitative and quantitative data and have experiences in producing research outcomes that are qualitative and/or quantitative, and based in a context of policy. • Better-trained extension educators to meet needs of rural low-income families through the development of programs based on the findings within the context of policy.
2	Models • Development of conceptual model to promote understanding of the processes that account for physical activity and the associated health outcomes among youth across ethnic and class boundaries in the context changing rural communities
3	Products and services • Poplar fibers are demonstrated to be promising as a high-end bulk thermal insulation material • Introduction of a natural, presumably non-toxic, biodegradable, and sustainable resource for textile thermal insulation
4	Informed policy-making and management Improved welfare policy at the federal level that addresses the needs of rural families and communities Improved welfare policy at the state level that takes into account the needs of rural families and communities Improved outreach, education, and professional practice in serving the needs of rural low-income families Improved well-being and functioning of rural low-income families based on findings from a project that considered policy context in the original design Development of programmatic interventions that reduce the physical inactivity and promote well being
5	In the long run: • Improved well being of lower-income and ethnic minority youth across rural America • Use of poplar seed fibers will positively impact the economic value of this U.S. agricultural industry

Outcome #1

1. **Outcome Measures**

Information exchange

- Data set of community contextual variables and the most comprehensive data set on low-income rural family well being available in the U.S.
- Doctoral researchers from four states who understand rural low-income families and complex research projects.
- Better-trained scholars who are adept at using qualitative and quantitative data and have experiences in producing research outcomes that are qualitative and/or quantitative, and based in a context of policy.
- Better-trained extension educators to meet needs of rural low-income families through the development of programs based on the findings within the context of policy.

Not reporting on this Outcome for this Annual Report

Outcome #2

1. **Outcome Measures**

Models

- Development of conceptual model to promote understanding of the processes that account for physical activity and the associated health outcomes among youth across ethnic and class boundaries in the context changing rural communities

Not reporting on this Outcome for this Annual Report

Outcome #3

1. **Outcome Measures**

Products and services

- Poplar fibers are demonstrated to be promising as a high-end bulk thermal insulation material
- Introduction of a natural, presumably non-toxic, biodegradable, and sustainable resource for textile thermal insulation

Not reporting on this Outcome for this Annual Report

Outcome #4

1. **Outcome Measures**

Informed policy-making and management Improved welfare policy at the federal level that addresses the needs of rural families and communities Improved welfare policy at the state level that takes into account the needs of rural families and communities Improved outreach, education, and professional practice in serving the needs of rural low-income families Improved well-being and functioning of rural low-income families based on findings from a project that considered policy context in the original design Development of programmatic interventions that reduce the physical inactivity and promote well being

Not reporting on this Outcome for this Annual Report

Outcome #5

1. **Outcome Measures**

In the long run:

- Improved well being of lower-income and ethnic minority youth across rural America
- Use of poplar seed fibers will positively impact the economic value of this U.S. agricultural industry

Not reporting on this Outcome for this Annual Report

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Economy
- Populations changes (immigration,new cultural groupings,etc.)

Brief Explanation

{No Data Entered}

V(I). Planned Program (Evaluation Studies and Data Collection)

1. Evaluation Studies Planned

-

Evaluation Results

{No Data Entered}

Key Items of Evaluation

{No Data Entered}

Program #33

V(A). Planned Program (Summary)

1. Name of the Planned Program

Social Change in the Marketplace: Producers, Retailers and Consumers

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
607	Consumer Economics			20%	
803	Sociological and Technological Change Affecting Individuals, Families and Communities			80%	
	Total			100%	

V(C). Planned Program (Inputs)

1. Actual amount of professional FTE/SYs expended this Program

Year: 2008	Extension		Research	
	1862	1890	1862	1890
Plan	0.0	0.0	0.3	0.0
Actual	{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}

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

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}
1862 Matching	1890 Matching	1862 Matching	1890 Matching
{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}
1862 All Other	1890 All Other	1862 All Other	1890 All Other
{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}

V(D). Planned Program (Activity)

1. Brief description of the Activity

- Conduct Research Experiments.

- Conduct Workshops, meetings.

- Develop Products, Curriculum, Resources.

- Assessments.

- Partnering.

- Facilitating.

2. Brief description of the target audience

Rural retailers will be the major target audiences as well as consumers in the changing marketplace. The outcomes of the multi-state project will provide practical and actionable information for rural retailers to improve their economic competitiveness. In addition, the outcomes of the project further provide the information that can be used to improve the well-being of consumers.

V(E). Planned Program (Outputs)

1. Standard output measures

Target for the number of persons (contacts) reached through direct and indirect contact methods

	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	Target	Target	Target	Target
Plan	50	0	0	0
2008	0	0	0	0

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

Patent Applications Submitted

Year	Target
Plan:	0
2008 :	{No Data Entered}

Patents listed

{No Data Entered}

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

	Extension	Research	Total
Plan	0	3	
2008	{No Data Entered}	{No Data Entered}	0

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- SCHOLARLY excellence in referred articles, book chapters, and books; participation on professional boards and panels, as well as science panels.

Not reporting on this Output for this Annual Report

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O No.	OUTCOME NAME
1	Information Exchange: • Forum provides scientists with a resource to tap for fundable ideas for research relating to Social Change in the Marketplace. • Exchange of information regarding research strategies and empirical techniques. • Suggestions regarding strategies not previously considered
2	Collaborations: • Partnerships and mutual interests result in new collaborative research efforts. Input from a variety of scientists with expertise in multiple research strategies and empirical techniques will raise the level of the work.
3	In the long run, Collaborations result in more and better ideas and projects

Outcome #1

1. **Outcome Measures**

Information Exchange:

- Forum provides scientists with a resource to tap for fundable ideas for research relating to Social Change in the Marketplace.
- Exchange of information regarding research strategies and empirical techniques.
- Suggestions regarding strategies not previously considered

Not reporting on this Outcome for this Annual Report

Outcome #2

1. **Outcome Measures**

Collaborations:

- Partnerships and mutual interests result in new collaborative research efforts. Input from a variety of scientists with expertise in multiple research strategies and empirical techniques will raise the level of the work.

Not reporting on this Outcome for this Annual Report

Outcome #3

1. **Outcome Measures**

In the long run, Collaborations result in more and better ideas and projects

Not reporting on this Outcome for this Annual Report

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Competing Public priorities
- Competing Programmatic Challenges

Brief Explanation

{No Data Entered}

V(I). Planned Program (Evaluation Studies and Data Collection)

1. **Evaluation Studies Planned**
   - Other ()

Evaluation Results

{No Data Entered}

Key Items of Evaluation

{No Data Entered}

Program #34

V(A). Planned Program (Summary)

1. Name of the Planned Program

Improving Agribusiness & Food Marketing Decisions in the Pacific NorthWest

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
602	Business Management, Finance, and Taxation			10%	
604	Marketing and Distribution Practices			80%	
607	Consumer Economics			10%	
	Total			100%	

V(C). Planned Program (Inputs)

1. Actual amount of professional FTE/SYs expended this Program

Year: 2008	Extension		Research	
	1862	1890	1862	1890
Plan	0.0	0.0	1.0	0.0
Actual	{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}

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

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}
1862 Matching	1890 Matching	1862 Matching	1890 Matching
{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}
1862 All Other	1890 All Other	1862 All Other	1890 All Other
{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}

V(D). Planned Program (Activity)

1. Brief description of the Activity

Conduct Research Experiments.

- Conduct Workshops, meetings.

- Deliver Services.

- Develop Products, Curriculum, Resources.

- Provide Training.

- Provide Counseling.

- Assessments.

- Partnering.

2. Brief description of the target audience

- food and agri-business owners
- marketing managers
- managers in distribution and retail
- entrepreneurs with start-up ideas
- stakeholders in agri-tourism
- stakeholders in banks, trusts, foundations
- stakeholders in industry associations

V(E). Planned Program (Outputs)

1. Standard output measures

Target for the number of persons (contacts) reached through direct and indirect contact methods

	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	Target	Target	Target	Target
Plan	300	1000	0	0
2008	0	0	0	0

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

Patent Applications Submitted

Year	Target
Plan:	0
2008 :	{No Data Entered}

Patents listed

{No Data Entered}

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

	Extension	Research	Total
Plan	0	10	
2008	{No Data Entered}	{No Data Entered}	0

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- SCHOLARLY excellence in referred articles, book chapters, and books; participation on professional boards and panels, as well as science panels.

Not reporting on this Output for this Annual Report

Output #2

Output Measure

- PROVIDE ECONOMIC AND MARKETING MODELS AND ANALYSES THAT INFORM DECISION-MAKERS, INDUSTRY, AND PEERS - studies to provide results that link packaging design elements to the brand impressions formed by consumers. - studies will examine dimensions of place (e.g., region) equity in terms of benefits consumer desire in various food products. - comparative analysis of how consumers perceive family and non-family businesses, along with an investigation of how this perception extends to relevant concepts such as trust, satisfaction and loyalty. - studies on how to make visiting virtual stores a most stimulating and pleasing experience that actually generates sales.

Not reporting on this Output for this Annual Report

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O No.	OUTCOME NAME
1	marketers learn value of customized and actionable marketing research and on which design elements in the package design process to consider for creating specific consumer brand impressions (Packaging as a low-cost point-of-sales stimulus); awareness of research program and its benefits increases; marketers acquire knowledge and skills for identifying and coping with opportunities and challenges
2	Communication improve between marketing executives and their creative counterparts, and between food brands and the consumers that they serve; marketing behavior in food and agri-businesses changes; marketing practices become more market-oriented and market-driven.
3	improved marketing understanding increases economic viability of food and agri-businesses and overall quality of life

Outcome #1

1. **Outcome Measures**

marketers learn value of customized and actionable marketing research and on which design elements in the package design process to consider for creating specific consumer brand impressions (Packaging as a low-cost point-of-sales stimulus); awareness of research program and its benefits increases; marketers acquire knowledge and skills for identifying and coping with opportunities and challenges

Not reporting on this Outcome for this Annual Report

Outcome #2

1. **Outcome Measures**

Communication improve between marketing executives and their creative counterparts, and between food brands and the consumers that they serve; marketing behavior in food and agri-businesses changes; marketing practices become more market-oriented and market-driven.

Not reporting on this Outcome for this Annual Report

Outcome #3

1. **Outcome Measures**

improved marketing understanding increases economic viability of food and agri-businesses and overall quality of life

Not reporting on this Outcome for this Annual Report

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Economy
- Public Policy changes
- Government Regulations
- Competing Public priorities
- Populations changes (immigration,new cultural groupings,etc.)

Brief Explanation

{No Data Entered}

V(I). Planned Program (Evaluation Studies and Data Collection)

1. **Evaluation Studies Planned**

-

Evaluation Results

{No Data Entered}

Key Items of Evaluation

{No Data Entered}