2008 Oregon State University Research Plan of Work

I. Plan Overview

1. Brief Summary about Plan Of Work

The Oregon Agricultural Experiment Station (OAES) has developed 34 programmatic projects to address the nine topical areas under the strategic plan of the U.S. Department of Agriculture. Ten major state output measures were defined along with three outcome measures.

Program foci cover food systems, sustainable natural resources (both terrestrial and marine), resource and technology economics, community health and sustainability, and environmental toxicology.

Research results will be shared through refereed journal articles, abstracts, books and book chapters; theses, local, regional, national and international meetings, symposia and workshops; GIS climate, geophysical and plant maps; and an array of web pages of an array of types.

All units in the Oregon Agricultural Experiment Station conduct annual performance evaluation of their faculty members. These reviews are conducted based on goals established during the previous year's reviews. Since all faculty members with OAES FTE are required to establish their station projects, annual performance evaluation serves a good vehicle to assess our progress toward the goals in our plan of work.

Estimated Number of Professional FTEs/SYs total in the State.

Year	Extension		Research	
	1862	1890	1862	1890
2008	43.4	0.0	160.6	0.0
2009	43.4	0.0	166.5	0.0
2010	43.4	0.0	166.5	0.0
2011	43.4	0.0	166.5	0.0
2012	0.0	0.0	166.5	0.0

II. Merit Review Process

1. The Merit Review Process that will be Employed during the 5-Year POW Cycle

- Internal University Panel
- External Non-University Panel
- Expert Peer Review

2. Brief Explanation

All projects conducted by the OAES are subjected to a peer review process. Each department or branch station is responsible for completing a peer review (guidance for conducting the review is contained in a policy and procedural manual, available to all faculty and unit leaders) for all OAES projects submitted for support by state and federal funds. The Director or his designate oversees the process for rigor, objectivity, and thoroughness. The Director or his desingate must approve all proposals that are submitted by faculty through the OAES.

III. Evaluation of Multis & Joint Activities

1. How will the planned programs address the critical issues of strategic importance, including those identified by the stakeholders?

The Oregon Agricultural Experiment Station (OAES) developed 33 programmatic projects to address the nine

topical areas under the strategic plan of the U.S. Department of Agriculture (USDA). Program foci cover food systems, sustainable natural resources (both terrestrial and marine), resource and technology economics, community health and sustainability, and environmental toxicology. Annual evaluations of outputs and outcomes will provide input into the development of new or revised plans of work that better target USDA priorities and portfolios.

2. How will the planned programs address the needs of under-served and under-represented populations of the State(s)?

The important issues and topics of today are typically complex and multi-faceted. Addressing them often requires intellectual resources from multiple disciplines and multiple perspectives. The College will place high priority on building connections among its component units and with other units within and outside the University where that is appropriate to advance education or research goals.
Partnerships are an effective means to greater "reach" for the College's programs. We will continue to work (and look for opportunities to expand our relationships) with non-governmental organizations, businesses, and local, state, and federal agencies. Joint programming through cooperative agreements with federal agencies can be especially effective.
Our Extension offices are a front line connection to the myriad sectors in the state and they assist in identifying special needs or under-served populations. The annual development of unit and individual plans of work bring individual observations to the attention of the College and departmental administrations.

3. How will the planned programs describe the expected outcomes and impacts?

As a publicly invested institution, we are expected to measure our productivity and assess its value. We must scrutinize our enrollment trends, research productivity, and the consequences of our outreach education, unit by unit, program by program. We must assure that what we undertake has consequences sufficient to justify the investment and, if not, then be bold enough to prune away that for which need has diminished or productivity has declined, and reinvest where the need or opportunity is greater.
Faculty are expected to report annually on their accomplishments and programmatic outcomes. Their reports are edited and posted on Oregon Invests!, a searchable, web-based database which is accessible to the public. Faculty with research appointments in the Agricultural Experiment Station also annually report their accomplishments in CRIS and NIMSS.

4. How will the planned programs result in improved program effectiveness and/or efficiency?

The portfolio approach taken with the 2008-2012 plan of work encourages the development of partnerships and collaboration on integrated questions or like activities. Over the next few years, the College also anticipates consolidating efforts across department and branch experiment stations. These multi-disciplinary activities should produce greater impacts over the years.

IV. Stakeholder Input

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

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

Brief explanation.

At Oregon, the College of Agricultural Sciences (CAS) uses several formal and informal avenues to solicit stakeholder input on programs conducted and changes in program direction. Formal bodies convened by the college, departmental or branch stations meet fairly regularly to aid in the direction and guidance of our programs. State University

CAS and OAES also utilize a stakeholder workshop every other year to gather input directly. Invitees range from industry, government agencies, nonprofits, consumer groups, and faculty (research, teaching, and extension). They come from a cross-section of diverse food systems and natural resources across the state.

Additionally, several websites operated by CAS, the departments and branch stations also provide opportunities to receive comments and questions from the public, and well as post responses and changes in programs in response to stakeholder input.

2(A). A brief statement of the process that will be 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 Internal Focus Groups
- Use Advisory Committees
- Use External Focus Groups
- Needs Assessments
- Open Listening Sessions
- Use Surveys

Brief explanation.

At Oregon State University, the College of Agricultural Sciences (CAS) uses several formal and informal avenues to solicit stakeholder input on programs conducted and changes in program direction. Formal bodies meet fairly regularly to aid in the direction and guidance of our programs. These include:

1. Dean's Advisory Council – this small advisory council is composed of industry, consumer, and environmental representatives
2. Advisory Councils of each department and branch station – these include membership drawn from the discipline or relevant region
3. Advisory Councils of each county extension office – these are more broadly based and relate to extension program areas in a county or region. Agriculture is the largest of the Extension program areas in Oregon.

In, 2006, the College invited about 60 external stakeholders for a two-day exchange about stakeholder needs and expectations, education and research programs, and an update on the College's budgets. More than 40 external stakeholders and current OSu student stakeholders accepted the invitation and were able to attend the Corvallis session. They were a cross-section of diverse food systems and natural resources across the state.CAS administrators posed questions and listened to what attendees had to say, then compiled these stakeholders' comments, observations, and suggestions. The summary was posted on the CAS website and points were incorporated into the CAS Action Plan.

OSU/CAS has and continues to solicit and receive thoughtful critiques and sometimes views that differ from its own. Responses are prepared in a timely fashion.

Research, extension and education faculty within the College of Agricultural Sciences (CAS) represent a wide array of disciplines at Oregon State University (OSU). Their scope of impact reaches stakeholders at the local, state and national levels. In an effort to solicit input from these stakeholders, there are several levels of participation which directly result in opportunities for discussion necessary for continual advancement toward recommended program goals.

2(B). A brief statement of the process that will be 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

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

Brief explanation

At Oregon State University College of Agricultural Sciences (CAS), there are several formal avenues for soliciting stakeholder contributions. These groups meet fairly regularly to aid in the direction and guidance of our programs. These include:

1. Dean's Advisory Council – this small advisory council is composed of industry, consumer, and environmental representatives
2. Advisory Councils of each department and branch station – these include membership drawn from the discipline or relevant region
3. Advisory Councils of each county extension office – these are more broadly based and relate to extension program areas in a county or region. Agriculture is one of the Extension program areas in Oregon.

Research, extension and education faculty within the College of Agricultural Sciences (CAS) represent a wide array of disciplines at Oregon State University (OSU). Their scope of impact reaches stakeholders at the local, state and national levels. In an effort to solicit input from these stakeholders, there are several levels of participation which directly result in opportunities for discussion necessary for continual advancement toward recommended program goals.

Further, in 2006, CAS leaders also met with a number of Oregonians who work in agricultural, natural resource, and bioenergy industries and organizations for two days of discussions in March, 2006. Over 60 external stakeholders were invited to the meeting with CAS administrators and faculty and select University administrators. CAS and OSU administrators posed questions and listened to what attendees had to say, then compiled these stakeholders' comments, observations, and suggestions.
The meeting's objectives were to:
a. conduct a forum with the College of Agricultural Sciences and its stakeholders to share and discuss the College's Strategic Plan, budget information, proposed Policy Option Packages, and other University issues related to the College
b. seek stakeholders' views, opinions, insights, and recommendations relating to the College's overall direction and priorities for the future
c. seek stakeholders' views of the issues facing them in their livelihood or professional pursuits
d. seek stakeholders' views of what they expect from the University

3. A statement of how the input will be considered

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

Brief explanation.

Determining our strategic direction is an on-going, shared responsibility, especially in a College as diverse as this. The power of our planning derives from the process. As noted above, that process includes our continuing dialog with Oregonians and the inevitable distillation of their needs. It also includes matching of faculty strengths with opportunities for outside funding, consistent with our mission. Much of the critical decision-making is at the unit level. Because responsibility is shared between College administration and the units, our strategic planning documents are best seen as a reference for subsequent and continuing conversations between College administration and the individual units. Such conversations will be a regular part of

how we operate. Our strategic Intent statement is intended also to be useful as the College takes part in the University's OSU 2007 process, a five-year change initiative. In addition, it is relevant to budget reductions made necessary by declining state revenues in 2002, and to reinvestment and reallocation of resources over the next several years.

At stakeholder workshops CAS administrators pose questions and listen to what attendees have to say, then compile these stakeholders' comments, observations, and suggestions. The summaries are posted on the CAS website and points are incorporated into the CAS Action Plan.

OSU/CAS has and continues to solicit and receive thoughtful critiques and sometimes views that differ from its own. Responses are prepared in a timely fashion and posted either to the particular individual or on webpages or in newletters maintained by CAS and its units.

V. Planned Program Table of Content

27	Plant Genome, Genetics, and Genetic Mechanisms
28	Rangeland Ecology and Management
29	Reproductive Performance of Animals
30	Social Change in the Marketplace: Producers, Retailers and Consumers
31	Soil and Water Resource Conservation, Management and Engineering
32	Soil, Water, and Environmental Systems
33	Sustainable Agricultural Systems for Eastern Oregon
34	Sustainable Animal Production Systems

V(A). Planned Program (Summary)

1. Name of the Planned Program

Agricultural and Emerging Chemicals: Fate, Effect & Exposure

2. Brief summary about Planned Program

The Program described herein represents the subprograms designed and managed by seven faculty members of the Department of Environmental and Molecular Toxicology at Oregon State University. The breadth of the proposed Program captures the diverse scientific expertise of faculty whose training and specialization ranges from ecotoxicology, human medicine, to environmental chemistry. The proposed Program includes the following four objectives:
To identify, develop, and/or validate trace analytical method for agricultural chemicals and other contaminants as well as biomarkers.
To characterize abiotic and biotic reaction pathways, transformation rates, and fate in agricultural and natural ecosystems.
To determine adverse impacts on cells, organisms, and ecosystems due to contaminant exposure.
Develop technologies that mitigate adverse human and environmental impacts.

A variety of subprograms are represented in this Program and include subprograms that focus on the analytical methods development for pesticides and emerging contaminants (fluorochemicals); bioavailability of contaminants to aquatic organisms; biomarkers of contaminant exposure in fish; understanding pesticide exposure and risk to aquatic and terrestrial arthropods, other aquatic organisms, and humans; and atmospheric transport and deposition of pesticides. 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.

3. Program existence : Intermediate (One to five years)

4. Program duration : Long-Term (More than five years)

5. Expending formula funds or state-matching funds : Yes

6. Expending other than formula funds or state-matching funds : Yes

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

- 133 20% Pollution Prevention and Mitigation
- 135 10% Aquatic and Terrestrial Wildlife
- 306 10% Environmental Stress in Animals
- 314 10% Toxic Chemicals, Poisonous Plants, Naturally Occuring Toxins, and Other Hazards Affecting Animals
- 711 20% Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources.
- 723 30% Hazards to Human Health and Safety

V(C). Planned Program (Situation and Scope)

1. Situation and priorities

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. A mechanistic approach will allow for development of novel physical and biological analytical techniques to assist in ascertaining fate and effects. 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.
The U.S. EPA has estimated that almost 1.0 billion pounds of conventional agricultural chemicals (active ingredient) were used annually in the US in 1995. Use on agricultural cropland accounts for over three-quarters of the agricultural chemicals used annually in this country, with herbicides representing the largest (83%) percentage used in crop production. Agricultural chemicals are initially distributed in the environment at application, with the intent of maximizing efficacy while minimizing off-site movement. The Food Quality Protection Act

(FQPA) has de-emphasized efficacy and set stricter standards for acceptable risks to human and environmental health. Consequently, a better understanding of initial distribution and redistribution via airborne loss, run-off and leaching is necessary to adequately characterize both human occupational and non-occupational exposure, and assess risks to biota in surrounding ecosystems.
Responsible use of soil, air and water resources for the production of food, feed and fiber must be balanced with the need to minimize impacts on human health, and preserve natural ecosystems and the biodiversity they support. As agricultural chemicals remain a cornerstone of pest management in U.S. agriculture, there is a continuing need to critically evaluate environmental transport processes and factors influencing fate in assessing risk and in the development of mitigation strategies. Research is needed which provides a mechanistic understanding of fate and effects, beginning at the molecular level, and including systems analysis of agroecosystems. Such efforts will allow to a greater degree science-based decision making as a basis for policy regarding the use of agricultural chemicals in U. S. agriculture.
As no production system will be appropriate for every situation, farmers need a variety of sustainable production options. The ecological risks associated with the use of agricultural chemicals must be evaluated. The adoption of risk assessment and risk management strategies by state and federal regulatory agencies has resulted in more general recognition of the reality of unintentional and unavoidable agrochemical exposures by handlers, harvesters, and bystanders. Measurement of the extent of human agrochemical exposure is critical to evaluation of work practices, handling and application technologies, personal protective equipment, clothing, and strategies to reduce or minimize human exposure.
Available models for the estimation of human exposure rely almost exclusively upon environmental monitoring data and human passive dosimetry. Those data are woefully inadequate due to the number of default assumptions which must be invoked to estimate or index absorbed dosage for improved risk management and risk communication.

2. Scope of the Program

- In-State Extension
- In-State Research
- Integrated Research and Extension
- Multistate Extension
- Multistate Integrated Research and Extension
- Multistate Research

V(D). Planned Program (Assumptions and Goals)

1. Assumptions made for the Program

A goal of the Oregon State University College of Agricultural Sciences is to advance fundamental knowledge about the environment and natural resources, and foster economic growth and sustainability in a manner that is protective of human and environmental health. Practices that result in a healthy environment will result in products that range from sustainable timber and forage supplies to productive agricultural land and cities with clean air and water. How Oregon's resources are managed to assure food is available, affordable, safe, and produced in a manner that sustains the health of people and the environment depends, in part, on improved understanding of the potential for adverse impacts of practices employed in agriculture and related industries. This program will focus on appropriate research strategies for evaluating the fate and effects of agrochemicals and other contaminants that will aid in minimizing adverse impacts to humans and the environment. This multidisciplinary effort will enable technology transfer and opportunities for the study of complex environmental fate and effects issues that are beyond the scope of a single researcher. The outcomes of the program are deliverables that can be utilized by regulatory agencies, growers, chemical applicators, agricultural commodity groups, and related industries for making prudent chemical use decisions, and aid the citizens of Oregon in evaluating whether management choices will maintain or improve their health and the health of the environment.

2. Ultimate goal(s) of this Program

The ultimate goal of the program is to inform the public and policy makers about risks and benefits of agricultural and emerging chemical uses. This entails robust analyses of data deriving from research of these investigators and that available from work within the broader scientific community.

Program Objectives and associated investigators

Objective 1: Identify, develop, and/or validate trace analytical methods for agricultural chemicals and other contaminants, as well as biomarkers.
Investigators: Kim Anderson, Larry Curtis, Jennifer Field, Jeff Jenkins, Staci Simonich and Dan Sudakin

Objective 2: Characterize abiotic and biotic reaction pathways, transformation rates, and fate in agricultural and natural ecosystems.
Investigators: Kim Anderson, Jennifer Field, Jeff Jenkins, Paul Jepson and Staci Simonich

Objective 3: Determine adverse impacts from contaminant exposure to cells, organisms, and ecosystems.
Investigators: Kim Anderson, Larry Curtis, Jennifer Field, Jeff Jenkins, Paul Jepson, Staci Simonich, and Dan Sudakin

Objective 4: Develop technologies that mitigate adverse human and environmental impacts.
Investigators: Jennifer Field, Jeff Jenkins, and Dan Sudakin

V(E). Planned Program (Inputs)

1. Estimated Number of professional FTE/SYs to be budgeted for this Program

Year	Extension		Research	
	1862	1890	1862	1890
2008	1.1	0.0	3.8	0.0
2009	1.1	0.0	3.8	0.0
2010	1.1	0.0	3.8	0.0
2011	1.1	0.0	3.8	0.0
2012	1.1	0.0	3.8	0.0

V(F). Planned Program (Activity)

1. Activity for the Program

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. Type(s) of methods to be used to reach direct and indirect contacts

Extension	
Direct Methods	Indirect Methods
• Other 1 (seminar) • Group Discussion • Workshop • Education Class • Other 2 (professional publications)	• Web sites • Other 1 (Advisory Council) • Newsletters

3. Description of targeted 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.

V(G). Planned Program (Outputs)

1. Standard output measures

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

	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	Target	Target	Target	Target
2008	4750	21700	250	3000
2009	4750	21700	250	3000
2010	4750	21700	250	3000
2011	4750	21700	250	3000
2012	4750	21700	250	0

2. (Standard Research Target) Number of Patents

Expected Patents

2008 :0 **2009 :**0 **2010 :**0 **2011 :**0 **2012 :**0

3. Expected Peer Review Publications

Year	Research Target	Extension Target
2008	8	0
2009	7	0
2010	8	0
2011	1	0
2012	4	0

V(H). State Defined Outputs

1. Output Target

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

2008 :12 **2009 :**10 **2010 :**11 **2011 :**11 **2012 :**10

- 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

2008 :5 **2009 :**5 **2010 :**5 **2011 :**5 **2012 :**5

- 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.

2008 :5 **2009 :**5 **2010 :** 5 **2011 :**5 **2012 :**5

V(I). State Defined Outcome

1. Outcome Target

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. Outcome Type : Change in Knowledge Outcome Measure

2008 :5 **2009 :** 5 **2010 :** 5 **2011 :**5 **2012 :** 5

3. Associated Knowledge Area(s)

- 133 - Pollution Prevention and Mitigation
- 314 - Toxic Chemicals, Poisonous Plants, Naturally Occuring Toxins, and Other Hazards Affecting Animals
- 711 - Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources.
- 723 - Hazards to Human Health and Safety

1. Outcome Target

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. Outcome Type : Change in Knowledge Outcome Measure

2008 :3 **2009 :** 3 **2010 :** 3 **2011 :**3 **2012 :** 3

3. Associated Knowledge Area(s)

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

1. Outcome Target

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. Outcome Type : Change in Action Outcome Measure

2008 :	2009 :	2010 :	2011 :	2012 :
0	1	0	2	2

3. Associated Knowledge Area(s)

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

1. Outcome Target

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. Outcome Type : Change in Condition Outcome Measure

2008 :	2009 :	2010 :	2011 :	2012 :
0	0	0	0	2

3. Associated Knowledge Area(s)

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

V(J). Planned Program (External Factors)

1. External Factors which may affect Outcomes

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

Description

This program focuses on increasing understanding transfer, fate, and effects of environmental contaminants, including pesticides. It considers food quality and safety, water quality, and sustainability of ecosystem structure and organization that provides society beneficial uses.

Multiple external factors inform decisions regarding priorities for research and extension activities. Agricultural commodity groups, state natural resource agencies, Native American Tribes, and environmental interest groups influence allocation of state funds through the legislative process. They also sponsor research directly. Scientific peer review panels are especially important in directing federal support for research and extension. Public opinion is also a powerful force in determining both state and federal resource commitments necessary to sustain this program.

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

1. Evaluation Studies Planned

- Other (peer reviewed)

Description

Program evaluation is carefully collecting information about a program or some aspect of a program in order to make necessary decisions about the program. The complexity of an evaluation plan is unique to each sub-program and will be evaluated based on the sub-program goals. As well, the program as a whole will undergo regular evaluation. The evaluation process will assess project planning, project implementation and project outcomes. Data collection timeframes will be longer term (e.g. bi-annually), in accordance with the expected outcomes timeframes. A simplified evaluation plan would be used in a progress evaluation. For example the following type of assessment form will be used for evaluation, see figure above.

Reactions of peer review panels to grant applications is the primary means for evaluation of research initiatives. The department records each submission and our accounting system track awards. Reviews of total intramural and extramural funding occurs on a quarterly basis. Two evaluations involve face-to-face meetings of the investigators and the external advisory committee members. The committees provide written evaluation after each meeting. These yield time series analysis during the program period.

2. Data Collection Methods

- {NO DATA ENTERED}

Description

{NO DATA ENTERED}

V(A). Planned Program (Summary)

1. Name of the Planned Program

Alternative Energy Systems and Bioproducts

2. Brief summary about Planned Program

Program will improve the biological production of hydrogen from sunlight and agricultural feedstocks and will develop improved microbial feedstocks for biodiesel production. Program also will develop improved methods to convert waste organic materials to electricity or to hydrogen in microbial fuel cells or in bioelectrochemically assisted microbial reactors.

3. Program existence : Intermediate (One to five years)

4. Program duration : Long-Term (More than five years)

5. Expending formula funds or state-matching funds : Yes

6. Expending other than formula funds or state-matching funds : Yes

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

- 511 100% New and Improved Non-Food Products and Processes

V(C). Planned Program (Situation and Scope)

1. Situation and priorities

Worldwide energy demand is expected to rise from 404 quads/yr in 2001 to about 640 in 2025, with nearly 86% to be met by oil and other carbonaceous materials, and generating more than 11 billion tons of CO2. But with nearly two-thirds of the world's proven oil reserves located beneath Saudi Arabia and its neighbors, the U.S. and other nations must rely increasingly on the politically volatile Middle East for oil. Also, as the economies of China, India, and other populous countries grow, competition for oil will increase, potentially accompanied by rising geopolitical tensions. Clearly, clean, safe, and sustainable sources of energy are needed in order to meet large, projected increases in demand, to provide energy and economic security for the U.S. and other nations, and to relieve environmental stresses related to fossil fuel use, including global climate change.

The program goals are the biological production of H2 from sunlight and agricultural feedstocks, and the development of improved microbial feedstocks for biodiesel production. Both program goals have great appeal environmentally sustainable, long-term means to meet large, projected increases in demand, to provide energy and economic security for the U.S. and other nations, and to relieve environmental stresses related to fossil fuel use.

2. Scope of the Program

- In-State Extension
- In-State Research
- Integrated Research and Extension
- Multistate Research

V(D). Planned Program (Assumptions and Goals)

1. Assumptions made for the Program

Clean, safe, and sustainable sources of energy are needed in order to meet large, projected increases in demand, to provide energy and economic security for the U.S. and other nations, and to relieve environmental stresses related to fossil fuel use, including global climate change. Technological solutions are available.

2. Ultimate goal(s) of this Program

Program goals are the biological production of H2 from sunlight and agricultural feedstocks, and the development of improved microbial feedstocks for biodiesel production.
The program objectives are

1. to improve hydrogen production in Synechosystis sp. through metabolic engineering and other approaches (Ely, Liu),
2. to improve hydrogen production from agricultural and other cellulosic feedstocks (Liu, Chaplen, Ely), and the

3. to engineer aquatic species for improved lipid production (Ely, Chaplen, Liu)

V(E). Planned Program (Inputs)

1. Estimated Number of professional FTE/SYs to be budgeted for this Program

Year	Extension		Research	
	1862	1890	1862	1890
2008	0.0	0.0	5.1	0.0
2009	0.0	0.0	5.1	0.0
2010	0.0	0.0	5.1	0.0
2011	0.0	0.0	5.1	0.0
2012	0.0	0.0	5.1	0.0

V(F). Planned Program (Activity)

1. Activity for the Program

- 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. Type(s) of methods to be used to reach direct and indirect contacts

Extension	
Direct Methods	Indirect Methods
• One-on-One Intervention • Other 1 (journal publication) • Other 2 (seminars)	• Web sites

3. Description of targeted audience

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

V(G). Planned Program (Outputs)

1. Standard output measures

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

	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	Target	Target	Target	Target
2008	600	6000	60	60
2009	600	6000	60	60
2010	600	6000	60	60
2011	600	6000	60	60
2012	600	6000	60	60

2. (Standard Research Target) Number of Patents

Expected Patents

2008 :0 **2009 :**2 **2010 :** 0 **2011 :** 1 **2012 :** 0

3. Expected Peer Review Publications

Year	Research Target	Extension Target
2008	7	0
2009	7	0
2010	7	0
2011	7	0
2012	7	0

V(H). State Defined Outputs

1. Output Target

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

  2008 :9 **2009 :**9 **2010 :** 9 **2011 :**9 **2012 :**9

- 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

  2008 :1 **2009 :**1 **2010 :** 1 **2011 :**1 **2012 :**1

V(I). State Defined Outcome

1. Outcome Target

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. Outcome Type : Change in Knowledge Outcome Measure

2008 :	2009 :	2010 :	2011 :	2012 :
0	5	5	5	5

3. Associated Knowledge Area(s)

- 511 - New and Improved Non-Food Products and Processes

1. Outcome Target

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. Outcome Type : Change in Action Outcome Measure

2008 :	2009 :	2010 :	2011 :	2012 :
0	0	0	0	1

3. Associated Knowledge Area(s)

- 511 - New and Improved Non-Food Products and Processes

V(J). Planned Program (External Factors)

1. External Factors which may affect Outcomes

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

Description

World energy use increases faster than production can occur my spur technological development. But changes in appropriations, economy, and public priorities may reduce research funding availability.

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

1. Evaluation Studies Planned

- {NO DATA ENTERED}

Description

{NO DATA ENTERED}

2. Data Collection Methods

- {NO DATA ENTERED}

Description

{NO DATA ENTERED}

V(A). Planned Program (Summary)

1. Name of the Planned Program

Animal and Human Health and Well Being through Nutrition

2. Brief summary about Planned Program

There is increasing interest by livestock, dairy and poultry producers in enhancing animal health and well being and animal survivability with the use of nutrition and nutrigenomics. Related to this in the Pacific Northwest is an increasing interest in organic milk, egg and meat production and the use of animal products to provide nutraceuticals in the human diet. The research thrusts identified in this program area address these issues. Specific goals of this research is: (1) to investigate fatty acid metabolism as a tool to enhance hatchability of chicken eggs; (2) develop value-added poultry foods; (3) to evaluate whether natural products have ability to augment development of titer following immunization with a Pfizer J5 E. coli vaccine; and (4) to evaluate effects of natural products on specific markers of immunity (e.g., L-selectin, interleukin-8 receptor and interleukin converting enzyme (ICE).

3. Program existence : Intermediate (One to five years)

4. Program duration : Long-Term (More than five years)

5. Expending formula funds or state-matching funds : Yes

6. Expending other than formula funds or state-matching funds : Yes

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

- 308 20% Improved Animal Products (Before Harvest)
- 311 70% Animal Diseases
- 315 10% Animal Welfare/Well-Being and Protection

V(C). Planned Program (Situation and Scope)

1. Situation and priorities

Dairy, livestock and poultry producers are interested in finding natural products that will enhance animal health without having to rely on antibiotics or other pharmaceuticals. Twenty percent (20%) of Oregon's dairy industry is involved in organic milk production. The largest branded beef cooperative in the Pacific Northwest is a natural product and does not allow the use of pharmaceuticals in the production of their product. Approximately 10 % of the Oregon beef industry is producing natural or organic beef. The human population is also utilizing nutrition more and more to supply neutraceuticals such as the interest in omega-3 fatty acids through animal products. Therefore producers have a need for nutritional strategies and for organic natural products that will enhance animal health and production and still allow the animal products they produce to qualify as natural and/or organic.

These producer and consumer groups are demanding that research and outreach at Oregon State University be designed to address their needs. We have a unique blend of scientists to provide this support. The scientists involved are leaders in the United State and the world in fatty acid requirements in the bird, enhancing the immune response in livestock and in the transition cow. Their specific project descriptions review the state of knowledge and provide literature reviews for their various approaches.

2. Scope of the Program

- In-State Research
- Integrated Research and Extension
- Multistate Research

V(D). Planned Program (Assumptions and Goals)

1. Assumptions made for the Program

Stakeholders are interested in organic animal products and products that yield greater nutrition and nutreceuticals in the human diet. Also, animal health and survivability is also a concern. Consumer preference, availability, and low cost, makes poultry products a major source of animal food protein in the US. Fatty acids, especially long chain n-3 fatty acids and conjugated linoleic acid (CLA) have received considerable attention for their anticarcinogenic, antiatherogenic, immune modulating and hypocholesterolemic properties. The current consumption of these fatty acids in the US diet does not meet the recommended guidelines suggested by nutritional scientists.

2. Ultimate goal(s) of this Program

To enhance human and animal health, well-being, and survivability with the use of nutrition and nutrigenomics and development of organic production.

Two programmatic goals are:

a) to contribute to a better understanding of the fundamental relationship between dietary lipids and fatty acid metabolism in poultry during embryogenesis and growth, and

b) to evaluate mechanisms by which feed supplements are able to augment innate and acquired immunity in domestic animals.

Program Objectives and associated investigators

Objective 1: To investigate fatty acid metabolism as a tool to enhance hatchability of chicken eggs. (Cherian)

Objective 2: Developing value-added poultry foods. (Cherian)

Objective 3: To evaluate whether natural products have ability to augment development of titer following immunization with a Pfizer J5 E. coli vaccine. (Forsberg)

Objective 4: To evaluate effects of natural products on specific markers of immunity (e.g., L-selectin, interleukin-8 receptor and interleukin converting enzyme (ICE). (Forsberg)

Objective 5: Work toward identifying the factors that cause the depression in feed intake observed before and after calving in dairy cows. (French)

Objective 6: Develop economically viable nutritional products that minimize this depression in feed intake. (French)

Objective 7: Provide producers and their consultants with educational materials that will help them formulate rations and other strategies that mitigate metabolic disease in early lactation. (French)

V(E). Planned Program (Inputs)

1. Estimated Number of professional FTE/SYs to be budgeted for this Program

Year	Extension		Research	
	1862	1890	1862	1890
2008	0.0	0.0	1.0	0.0
2009	0.0	0.0	1.0	0.0
2010	0.0	0.0	1.0	0.0
2011	0.0	0.0	1.0	0.0
2012	0.0	0.0	1.0	0.0

V(F). Planned Program (Activity)

1. Activity for the Program

- Conduct Research Experiments.- Conduct Workshops, meetings.- Deliver Services.- Develop Products, Curriculum, Resources.- Provide Training.- Provide Counseling.- Assessments.

2. Type(s) of methods to be used to reach direct and indirect contacts

Extension	
Direct Methods	**Indirect Methods**
• One-on-One Intervention • Workshop • Demonstrations • Education Class	• Other 2 (professional journals) • Web sites • Other 1 (newspaper articles)

3. Description of targeted 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(G). Planned Program (Outputs)

1. Standard output measures

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

	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	Target	Target	Target	Target
2008	50	0	0	0
2009	75	0	0	0
2010	125	0	0	0
2011	150	0	0	0
2012	120	0	0	0

2. (Standard Research Target) Number of Patents

Expected Patents

2008 :0 **2009 :**0 **2010 :** 1 **2011 :**0 **2012 :**0

3. Expected Peer Review Publications

Year	Research Target	Extension Target
2008	4	0
2009	4	0
2010	4	0
2011	4	0
2012	4	0

V(H). State Defined Outputs

1. Output Target

- 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.

2008 : 3 **2009 :** 0 **2010 :** 3 **2011 :** 0 **2012 :** 3

- 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

2008 : 0 **2009 :** 0 **2010 :** 0 **2011 :** 10 **2012 :** 10

- 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.

2008 : 0 **2009 :** 0 **2010 :** 0 **2011 :** 10 **2012 :** 10

V(I). State Defined Outcome

1. Outcome Target

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. Outcome Type : Change in Knowledge Outcome Measure

2008 : 0 **2009 :** 10 **2010 :** 10 **2011 :** 15 **2012 :** 10

3. Associated Knowledge Area(s)

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

1. Outcome Target

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. Outcome Type : Change in Action Outcome Measure

2008 : 0 **2009 :** 0 **2010 :** 0 **2011 :** 0 **2012 :** 10

3. Associated Knowledge Area(s)

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

1. Outcome Target

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. Outcome Type : Change in Condition Outcome Measure

2008 :	2009 :	2010 :	2011 :	2012 :
0	0	0	0	10

3. Associated Knowledge Area(s)

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

V(J). Planned Program (External Factors)

1. External Factors which may affect Outcomes

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

Description

These programs have been identified by stakeholders as priority research and Extension areas. There is considerable interest among producers for these programs.

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

1. Evaluation Studies Planned

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

Description

Most evaluation will be retrospective. Publications, survey documents to assess adoption and Oregon Ag Invests will be utilized in evaluation.

2. Data Collection Methods

- {NO DATA ENTERED}

Description

{NO DATA ENTERED}

V(A). Planned Program (Summary)

1. Name of the Planned Program

Animal Health and Disease

2. Brief summary about Planned Program

This program addresses important animal disease aspects of agriculture. Herpes virus is present in all vertebrates, and the consequences of disease have severe implications, both economic and of public health. The patch developed in this college is important both for humans and animals, as a way to stop severe bleeding. Chlamydia infection is a significant cause of economic impact in the swine industry, as well as other industries. The antibiotic resistance now identified in Chlamydia, isolated from pigs, is of serious concern. Influenza infection is a significant cause of mortality to many animal species. The establishment of animal models to study anti-influenza therapy, as well as mechanisms of disease, is quite important. Vibrio parahaemolyticus is of increasing importance as an oyster pathogen. Although a very important cause of economic loss for farmers, not much is known about clostridium infections in livestock. Johne's disease is a significant cause of economic loss in cattle. There is no treatment available, and the development of an effective vaccine will depend on the improved knowledge about the pathogenesis of the infection.

3. Program existence : Intermediate (One to five years)

4. Program duration : Long-Term (More than five years)

5. Expending formula funds or state-matching funds : Yes

6. Expending other than formula funds or state-matching funds : Yes

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

- 307 5% Animal Management Systems
- 311 40% Animal Diseases
- 502 5% New and Improved Food Products
- 712 20% Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occuring Toxins
- 722 10% Zoonotic Diseases and Parasites Affecting Humans
- 723 20% Hazards to Human Health and Safety

V(C). Planned Program (Situation and Scope)

1. Situation and priorities

The consequences of disease have severe implications, both on the economics of agriculture as well as on public health. The identification of disease mechanisms, animal models, vaccines, and antibiotic resistance can bring much needed development to agriculture.
An unprecedented epizootic avian influenza A (H5N1) virus that is highly pathogenic has crossed the species barrier in Asia and Middle East to cause many human fatalities and poses an increasing pandemic threat (Hoffmann et al, 2000). Widespread infections of poultry with highly pathogenic avian influenza (HPAI) H5N1 viruses in Asia have caused increasing concern that this subtype may achieve human-to-human spread and establish interspecies transmission. Pigs can act as a potential intermediate host for human influenza viruses, so it is considered urgent to determine whether the circulating H5N1 virus could be permissive to infection in pigs.
Furthermore, generation of recombinant vaccine for H5N1 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.

Understanding the genetic difference in bovine viral diarrhea viruses (BVDV) from persistent infected animal will help us develop strategies to detect and control the BVDV persistent infection in cattle and alpaca. BVDV also have the greatest economic impact, causing $20 to $57 million per million calvings in ruminant populations. These losses have remained steadily high over the past 4 decades despite the availability of over 140 federally licensed vaccines against BVDV.

Chitosan-based bandages have great applicability in veterinary as well as human medicine and surgery, as the leading cause of death for trauma patients is uncontrolled hemorrhage. Advanced hemorrhage control bandages can also inhibit bacterial growth and may decrease the risk of infection in the face of contamination. Chitosan is a ubiquitous and highly biocompatible material. Based on promising results in swine models and in human trauma, chitosan materials are being developed for internal implantation. However, purity of the source material for bandages of designed for external use is variable and may have an adverse effect on biocompatibility.

Tetracycline (TET) is a very important antibiotic in veterinary medical cases of chlamydial infection, so the emergence of Tet resistant chlamydiae, in either human or animal populations, is of great concern.
The United States produces more than 27 million pounds of oysters each year and pathogens associated with oysters are perceived as a major concern of food safety for the industries and consumers.

2. Scope of the Program

- In-State Research
- Integrated Research and Extension
- Multistate Research

V(D). Planned Program (Assumptions and Goals)

1. Assumptions made for the Program

The consequences of disease have severe implications, both economic and of public health. Influenza infection is a significant cause of mortality to many animal species; the establishment of animal models to study anti-influenza therapy, as well as mechanisms of disease, is quite important. The development of effective vaccines will depend on the improved knowledge about the pathogenesis of the infection. Large scale production of effective vaccines in short timeframe is essential to eliminate the danger of virulent pathogens. Antibiotic resistance now identified in many pathogens is of serious concern.

2. Ultimate goal(s) of this Program

To mitigate the impact of animal diseases on the economics of agriculture and on public health. Program objectives are:
To develop a recombinant vaccine using alpha-herpes virus as a vector for type A influenza virus to allow large production of flu virus antigen in a short timeframe.
To determine the genetic difference between alpaca BVDV and bovine BVDV.
To determine the efficacy and biocompatibility of various forms of chitosans in controlling hemorrhages.
To develop conditions under which the Chlamydia suis genomic island that carries a tetracycline resistance gene can be used as a tool for transformation of chlamydia
To identify the various proteins of Vibrio parahaemolyticus that are expressed during association of the bacteria with oysters as part of an effort to develop novel targeted intervention strategies to increase seafood safety and reduce occurrence of seafood-borne illnesses.
To replicate highly pathogenic avian influenza H5N1 viruses in pigs in a long-term effort to study the molecular bases of a virus's ability to spread among a range of hosts and the pathogenicity of influenza viruses.
To define the role of a sensorhistidine kinase, Spo0A in sporulation-regulated Clostridium perfringens enterotoxin (CPE) synthesis.
To identify bacterial genes involved in early stages of infection, or entry of the intestinal mucosa, by Mycobacterium paratuberculosis.

V(E). Planned Program (Inputs)

1. Estimated Number of professional FTE/SYs to be budgeted for this Program

Year	Extension		Research	
	1862	1890	1862	1890
2008	0.0	0.0	2.3	0.0
2009	0.0	0.0	2.3	0.0
2010	0.0	0.0	2.3	0.0
2011	0.0	0.0	2.3	0.0
2012	0.0	0.0	203.0	0.0

V(F). Planned Program (Activity)

1. Activity for the Program

- Conduct Research Experiments.- Assessments.- Develop Products, Resources.

2. Type(s) of methods to be used to reach direct and indirect contacts

Extension	
Direct Methods	**Indirect Methods**
• Group Discussion • Other 2 (conferences) • Other 1 (journals) • One-on-One Intervention	• Web sites • Other 1 (journals)

3. Description of targeted audience

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

V(G). Planned Program (Outputs)

1. Standard output measures

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

	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	Target	Target	Target	Target
2008	1000	0	0	0
2009	1000	0	0	0
2010	1000	0	0	0
2011	1000	0	0	0
2012	1000	0	0	0

2. (Standard Research Target) Number of Patents

Expected Patents

2008 : 0 **2009 :** 1 **2010 :** 0 **2011 :** 1 **2012 :** 0

3. Expected Peer Review Publications

Year	Research Target	Extension Target
2008	15	0
2009	15	0
2010	15	0
2011	15	0
2012	15	0

V(H). State Defined Outputs

1. Output Target

- 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

2008 : 4 **2009 :** 4 **2010 :** 4 **2011 :** 4 **2012 :** 4

- 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.

2008 : 2 **2009 :** 2 **2010 :** 2 **2011 :** 2 **2012 :** 2

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

2008 : 1 **2009 :** 1 **2010 :** 1 **2011 :** 1 **2012 :** 1

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

2008 : 30 **2009 :** 30 **2010 :** 30 **2011 :** 30 **2012 :** 30

V(I). State Defined Outcome

1. Outcome Target

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. Outcome Type : Change in Knowledge Outcome Measure

2008 : 5 **2009 :** 5 **2010 :** 5 **2011 :** 5 **2012 :** 5

3. Associated Knowledge Area(s)

- 311 - Animal Diseases
- 712 - Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occuring Toxins
- 722 - Zoonotic Diseases and Parasites Affecting Humans
- 723 - Hazards to Human Health and Safety

1. Outcome Target

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. Outcome Type : Change in Knowledge Outcome Measure

2008 :	2009 :	2010 :	2011 :	2012 :
2	2	2	2	2

3. Associated Knowledge Area(s)

- 311 - Animal Diseases

1. Outcome Target

Medical personnel learn about merits of chitosan bandages

2. Outcome Type : Change in Knowledge Outcome Measure

2008 :	2009 :	2010 :	2011 :	2012 :
5	5	10	10	10

3. Associated Knowledge Area(s)

- 723 - Hazards to Human Health and Safety

1. Outcome Target

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. Outcome Type : Change in Action Outcome Measure

2008 :	2009 :	2010 :	2011 :	2012 :
0	0	1	2	2

3. Associated Knowledge Area(s)

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

1. Outcome Target

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. Outcome Type : Change in Action Outcome Measure

2008 :	2009 :	2010 :	2011 :	2012 :
5	5	10	10	10

3. Associated Knowledge Area(s)

- 307 - Animal Management Systems
- 311 - Animal Diseases
- 712 - Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occuring Toxins
- 722 - Zoonotic Diseases and Parasites Affecting Humans

- 723 - Hazards to Human Health and Safety

1. Outcome Target

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. Outcome Type : Change in Condition Outcome Measure

2008 : 0	**2009 :** 0	**2010 :** 0	**2011 :** 0	**2012 :** 10

3. Associated Knowledge Area(s)

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

1. Outcome Target

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. Outcome Type : Change in Condition Outcome Measure

2008 : 0	**2009 :** 0	**2010 :** 0	**2011 :** 0	**2012 :** 0

3. Associated Knowledge Area(s)

- 307 - Animal Management Systems
- 311 - Animal Diseases
- 723 - Hazards to Human Health and Safety

V(J). Planned Program (External Factors)

1. External Factors which may affect Outcomes

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

Description

Natural disasters can exacerbate disease distribution and intensity. Competing public priorities and a tight economy could change external funding priorities and thus appropriation foci, a mainstay leveraged in this program. Public policy changes could also affect research directions and level of support,

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

1. Evaluation Studies Planned

- {NO DATA ENTERED}

Description

{NO DATA ENTERED}

2. Data Collection Methods

- {NO DATA ENTERED}

Description

{NO DATA ENTERED}

V(A). Planned Program (Summary)

1. Name of the Planned Program

Basic Plant Biology & Related Topics for Horticulture

2. Brief summary about Planned Program

Research in the Department of Horticulture includes breeding programs for vegetables and hazelnuts, and research projects in plant genetics, germplasm characterization, disease resistance, biotechnology, cold tolerance, seed biology, plant nutrition, and plant ecology. The program seeks knowledge within three working groups, ie., genetics (KA 201), molecular processes (KA 206), and quality and utility (KA 204) of hazelnuts and vegetables. Sub-objectives explore molecular processes of disease resistance, plant stress, and characterization of genetic resources. Information is intended to improve breeding programs and horticultural management systems of crops and landscapes in Oregon and neighboring states. When fully staffed, we expect to have a minimum of three scientists in each working group to create a critical mass of activity.

3. Program existence : New (One year or less)

4. Program duration : Long-Term (More than five years)

5. Expending formula funds or state-matching funds : Yes

6. Expending other than formula funds or state-matching funds : Yes

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

- 201 40% Plant Genome, Genetics, and Genetic Mechanisms
- 204 20% Plant Product Quality and Utility (Preharvest)
- 206 40% Basic Plant Biology

V(C). Planned Program (Situation and Scope)

1. Situation and priorities

Oregon's maritime climate and agriculture provides a unique horticultural environment for crops, landscapes, and use of plants to enhance our economy, human health or well-being, and ecosystem. Horticultural enterprises contribute an estimated $12 billion to Oregon's economy in products, jobs, and services provided that includes landscapes and golf or turf management. Crops such as hazelnuts and blue lake bush beans are unique products of Oregon while the nursery industry dominates agricultural enterprises in the Pacific Northwest. Health conscious consumers are demanding crops such as blueberries, wine grapes, and other fruits and vegetables or landscapes and use of plant that enhance human health and healthy lifestyles. As a result, horticultural managers actively seek new cultivars, technologies, and practices to compete within distant markets while sustaining natural resources, the environment, and ecosystem.

Research success has identified enzyme regulation of plant hormones, molecular control of genes for disease resistance, plant stress, and plant development, and genetic selection of improved cultivars for Oregon's hazelnut and vegetable industries. This plan describes a central theme of basic plant biology (KA 206) to understand plant development, genetic function, and plant community dynamics in landscape ecosystems. Complementing this work will be groups of three or more researchers focusing on plant genomes, genetics, and genetic mechanisms (KA 201) and plant product quality (KA 204). Sub-objectives include disease resistance (KA 212), genetic resources (KA 202) and understanding plant stress (KA 203).

2. Scope of the Program

- In-State Research
- Integrated Research and Extension
- Multistate Research

V(D). Planned Program (Assumptions and Goals)

1. Assumptions made for the Program

Research faculty balance priorities between securing grants, contributing to the scientific body of knowledge, and discovering something useful that may impact local systems. They follow the literature, develop hypotheses, write grant proposals, and seek funding to supplement modest funds provided by the College of Agricultural Sciences. Researchers assume that ideas will compete successfully and projects will be

funded.

2. Ultimate goal(s) of this Program

A basic goal of this research is to understand plant genomes, genetics, genetic mechanisms, and genetic resources to improve plant product quality and utility. A second goal is to understand plants and plant ecology to improve biological efficiencies and reduced abiotic stresses, disease resistance, and/or the way plants function within landscape ecosystems.

Objective 1: Plant Genome, Genetics, and Genetic Mechanisms (KA 201)

Develop a basic understanding of plant genomes, genetics, and mechanisms of horticultural plants and develop or adapt methods to improve breeding, selection, or management of horticultural crops in Oregon (Chen, Stotz)

Objective 2: Plant Product Quality and Utility (KA 204)

Improve horticultural crop quality or utility through breeding, selection, or management of hazelnuts, vegetables, and tree or vine crops (Mehlenbacher, Myers).

Objective 3: Basic Plant Biology (KA 206)

Understand basic plant physiology and genetic regulation of seed development and germination, plant nutrition, and plants and plant communities within large-scale ecosystems (Lambrinos, Nonogaki, Righetti).

V(E). Planned Program (Inputs)

1. Estimated Number of professional FTE/SYs to be budgeted for this Program

Year	Extension		Research	
	1862	1890	1862	1890
2008	0.0	0.0	5.3	0.0
2009	0.0	0.0	6.0	0.0
2010	0.0	0.0	6.0	0.0
2011	0.0	0.0	6.0	0.0
2012	0.0	0.0	6.0	0.0

V(F). Planned Program (Activity)

1. Activity for the Program

- Conduct Research Experiments.- Conduct Workshops, meetings.- Deliver Services.- Develop Products, Curriculum, Resources. (including cultivars and pollinizers)- Provide Training.- Assessments.- Partnering.

2. Type(s) of methods to be used to reach direct and indirect contacts

Extension	
Direct Methods	Indirect Methods
• Education Class • Workshop • Group Discussion	• Web sites • Other 1 (newspaper articles)

3. Description of targeted 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(G). Planned Program (Outputs)

1. Standard output measures

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

	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	Target	Target	Target	Target
2008	0	0	0	0
2009	0	0	0	0
2010	0	0	0	0
2011	0	0	0	0
2012	0	0	0	0

2. (Standard Research Target) Number of Patents

Expected Patents

2008 :2 **2009 :**2 **2010 :** 2 **2011 :**2 **2012 :**2

3. Expected Peer Review Publications

Year	Research Target	Extension Target
2008	20	0
2009	20	0
2010	20	0
2011	20	0
2012	20	0

V(H). State Defined Outputs

1. Output Target

- 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

2008 :5 **2009 :**5 **2010 :** 8 **2011 :**5 **2012 :**5

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

2008 :20 **2009 :**20 **2010 :** 20 **2011 :**20 **2012 :**20

- DEVELOP BREEDING PROGRAMS THAT RESULT IN DESIRABLE TRAITS, CULTIVARS AND VARIETIES
  - hazelnut
  - beans

- snap pea
- tomato
- apples
- broccoli
- organic lines

2008 : 10 **2009 :** 6 **2010 :** 4 **2011 :** 5 **2012 :** 4

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

2008 : 5 **2009 :** 5 **2010 :** 5 **2011 :** 5 **2012 :** 5

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

2008 : 5 **2009 :** 5 **2010 :** 5 **2011 :** 5 **2012 :** 5

V(I). State Defined Outcome

1. Outcome Target

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

2. Outcome Type : Change in Knowledge Outcome Measure

2008 : 20 **2009 :** 20 **2010 :** 20 **2011 :** 20 **2012 :** 20

3. Associated Knowledge Area(s)

- 201 - Plant Genome, Genetics, and Genetic Mechanisms
- 206 - Basic Plant Biology

1. Outcome Target

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. Outcome Type : Change in Knowledge Outcome Measure

2008 : 50 **2009 :** 50 **2010 :** 50 **2011 :** 50 **2012 :** 50

3. Associated Knowledge Area(s)

- 201 - Plant Genome, Genetics, and Genetic Mechanisms
- 204 - Plant Product Quality and Utility (Preharvest)
- 206 - Basic Plant Biology

1. Outcome Target

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. Outcome Type : Change in Knowledge Outcome Measure

2008 : 20 **2009 :** 20 **2010 :** 20 **2011 :** 20 **2012 :** 20

3. Associated Knowledge Area(s)

- 201 - Plant Genome, Genetics, and Genetic Mechanisms
- 204 - Plant Product Quality and Utility (Preharvest)
- 206 - Basic Plant Biology

1. Outcome Target

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

2. Outcome Type : Change in Knowledge Outcome Measure

2008 : 5	**2009 :** 5	**2010 :** 5	**2011 :** 5	**2012 :** 5

3. Associated Knowledge Area(s)

- 204 - Plant Product Quality and Utility (Preharvest)
- 206 - Basic Plant Biology

1. Outcome Target

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. Outcome Type : Change in Knowledge Outcome Measure

2008 : 20	**2009 :** 20	**2010 :** 20	**2011 :** 20	**2012 :** 20

3. Associated Knowledge Area(s)

- 206 - Basic Plant Biology

1. Outcome Target

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. Outcome Type : Change in Action Outcome Measure

2008 : 10	**2009 :** 10	**2010 :** 10	**2011 :** 10	**2012 :** 10

3. Associated Knowledge Area(s)

- 201 - Plant Genome, Genetics, and Genetic Mechanisms
- 204 - Plant Product Quality and Utility (Preharvest)
- 206 - Basic Plant Biology

1. Outcome Target

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.

2. Outcome Type : Change in Action Outcome Measure

2008 :	**2009 :**	**2010 :**	**2011 :**	**2012 :**
10	15	20	25	0

3. Associated Knowledge Area(s)

- 206 - Basic Plant Biology

1. Outcome Target

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.

2. Outcome Type : Change in Condition Outcome Measure

2008 :	**2009 :**	**2010 :**	**2011 :**	**2012 :**
10	10	10	15	0

3. Associated Knowledge Area(s)

- 204 - Plant Product Quality and Utility (Preharvest)

1. Outcome Target

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. Outcome Type : Change in Condition Outcome Measure

2008 :	**2009 :**	**2010 :**	**2011 :**	**2012 :**
5	5	5	5	0

3. Associated Knowledge Area(s)

- 201 - Plant Genome, Genetics, and Genetic Mechanisms
- 204 - Plant Product Quality and Utility (Preharvest)
- 206 - Basic Plant Biology

1. Outcome Target

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.

2. Outcome Type : Change in Condition Outcome Measure

2008 :	**2009 :**	**2010 :**	**2011 :**	**2012 :**
5	10	15	15	0

3. Associated Knowledge Area(s)

- 201 - Plant Genome, Genetics, and Genetic Mechanisms
- 206 - Basic Plant Biology

V(J). Planned Program (External Factors)

1. External Factors which may affect Outcomes

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

Description

External factors critical to the success of this plan include monetary support from grants and contracts. Newly hired faculty must compete for support dollars in areas of dwindling resources. An alternative might be to consider ways that horticultural research programs can qualify for DOE or NIH funds, but relationships must be developed.

Senior researchers express concern for new faculty hired at 0.75FTE with expectations that they supplement their salary with grant funds. A significant consequence of this policy is that fewer graduate students, post-docs, or technicians will be hired to do the research resulting in unequal achievements by faculty.

V(K). 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.

Description

Since research faculty routinely measure progress, outcomes indicators will be added as measures of performance using the "logic model" as a common framework of evaluation. This seamless evaluation model asks questions designed to improve the research program while gathering evidence of outcomes-based performance. Scientists describe novel ideas and successes with a purpose to identify what worked, what might be improved. Queries add evidence that research objectives were addressed followed by the "logic" that learning precedes changes in behavior/practice followed by economic, environment, or social impacts. Seamless evaluation asks questions important to researchers and in ways that attribute to progress and performance and that can be accessed in individual reports as well as aggregated for the departmental, college, and national programs. An outline of the process follows:

· Research objectives addressed including evidence of novel ideas, successes, discoveries, and program improvement.
· Activities planned/reported, ie., number of projects, publications, students, seminars, conferences, papers published, grants received, etc.
· Results expected/reported (outcomes)
o Learning or knowledge (intentional learning activities such as one-minute drawings, post-then pre scales, post assessment of learning objectives, etc)
§ Learning/skills developed/implemented within research project.
§ Students assess learning in classes, skills learned by grad students, progress toward graduation requirements, etc.
§ Colleagues/peers attend seminars, response/questions following presentation or number people who discuss poster at professional meetings, number of people attend poster literature citations/web hits, news stories, etc.
§ Discoveries published, literature citations, invited papers, etc.
o Change in behavior or practice (cards ask peers about novel ideas learned and possible use of idea/insight, evidence that peers used information or discovery, commodity commissions report acres planted to new cultivar, new businesses started, ecosystem services measured, individuals report health or healthy lifestyles improved, etc)
§ Methods changed/improved within research project.
§ Colleagues/peers report changes/improvements in their research programs either local or other institutions/business enterprises.
§ New practices/cultivars released/used by public.
o Impacts or long-term change (impact indicators attribute progress toward achieving project/program goals such as costs reduced, resistance genes reduce disease incidence and improve environmental impact, molecular or genomics used by peers to develop new cultivar, plants provide ecosystem services to reduce heat load in urban environments, etc)
§ Economic impact/estimates/evidence that your successes were used to reduce costs, improve markets, change livelihoods.
§

2. Data Collection Methods

- Sampling
- Mail
- On-Site
- Structured
- Unstructured
- Case Study
- Observation

Description
{NO DATA ENTERED}

V(A). Planned Program (Summary)

1. Name of the Planned Program

Biological Control of Pests Affecting Plants

2. Brief summary about Planned Program

Biological control has become a feasible component of integrated management programs. As a management strategy in the control of fireblight disease of pear, invasive weed species, and diseases of wheat, use of bacterial antagonists, natural enemies, and genetic diversity will significantly impact Oregon agriculture. Understanding the epidemiology of these diseases enables biological and other novel control approaches to be established for these and other diseases of agricultural importance, thereby reducing reliance on more conventional economically and environmentally sensitive and unsustainable practices.

3. Program existence : Mature (More then five years)

4. Program duration : Long-Term (More than five years)

5. Expending formula funds or state-matching funds : Yes

6. Expending other than formula funds or state-matching funds : Yes

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

- 215 100% Biological Control of Pests Affecting Plants

V(C). Planned Program (Situation and Scope)

1. Situation and priorities

Biological control has become a feasible component of integrated management programs. As a management strategy in the control of fireblight disease of pear, invasive weed species, and diseases of wheat, use of bacterial antagonists, natural enemies, and genetic diversity will significantly impact Oregon agriculture. Understanding the epidemiology of these diseases enables biological and other novel control approaches to be established for these and other diseases of agricultural importance, thereby reducing reliance on more conventional economically and environmentally sensitive and unsustainable practices.

1. Epidemiology and control of diseases of fruit crops in western Oregon (Ken Johnson) A commonality among fruit commodities grown in western Oregon is that all are susceptible to infectious diseases caused by fungal and bacterial pathogens. Over the next five years, fire blight will continue to be the primary focus of this project. Blackberry rust, a disease first observed in Oregon is 2005, will also be investigated.

2. Biological control of weeds (Peter McEvoy)
The use of natural enemies to control pest species, or biological control, has brought enormous benefit to the Pacific Northwest region and beyond. The predators, parasites, and diseases of pests which we use in biological control are a large component of the world's biodiversity. Natural enemies can be instrumental in regulating populations of plants and plant-feeding organisms, increasing the coexistence of many species and conserving biodiversity by preventing any single species from becoming superabundant. Natural enemies are of enormous value to sustainable agriculture, where they often replace the need for pesticide use. They are also of value to the control of invasive alien species which threaten natural ecosystems. Alien weeds, such as ragwort (Senecio jacobaea) and purple loosestrife (Lythrum salicaria), pose some of the most serious threats to biological diversity, and many are amenable to biological control.

3. Dispersive Epidemic Waves: Disease Management and Source Strength (Chris Mundt)
On a local level, genotypic mixtures of crop plant species are being used increasingly as a method to control plant disease. Simply put, the abundance of a plant species or genotype present in a given area may influence disease levels. Traveling waves have been used to describe the spatiotemporal spread of a range of organisms and diseases, and are based on the assumption of a constant velocity of spread. Traveling waves have been applied to the spread of plant diseases in diverse host populations, though questions about the appropriateness of this model of spread have since arisen. Indeed, epidemic velocity would increase in time and space if spread instead follows the pattern of a dispersive epidemic wave. From a practical standpoint, velocities of managed versus unmanaged epidemics would be constant with respect to time and space for traveling waves, but would diverge with respect to time and space for a dispersive wave. Thus, disease control practices may be more effective when deployed at larger spatial scales. Wheat stripe rust is used as the model for investigations.

2. Scope of the Program

- In-State Research
- Multistate Research

V(D). Planned Program (Assumptions and Goals)

1. Assumptions made for the Program

The research literature provides a solid background for this program. Growers, crop consultants, extension faculty and researchers in agriculture as a whole, and the pear and wheat industries in particular, and ecologists and managers of natural ecosystems are resources for the needs in each of these areas of research. Significant change and benefits will result from the stated outcomes in each of the following;
control of fireblight in pear
control of plant diseases
control of invasive weeds

2. Ultimate goal(s) of this Program

To enable biological and other novel control approaches to be established for diseases of agricultural importance, thereby reducing reliance on more conventional economically and environmentally sensitive and unsustainable practices.

Program Objectives and associated investigators

1. Epidemiology and control of diseases of fruit crops in western Oregon (Ken Johnson)
1. Improve control of fire blight of pear and apple. 2. Evaluate the risk of movement of the fire blight pathogen in association with pear fruit. 3. Enhance knowledge of the biology and management of blackberry rust in the Pacific Northwest.

2. Biological control of weeds (Peter McEvoy)
A. Measure the contribution of plant dormancy and insect dispersal to regulation of low-level populations of ragwort Senecio jacobaea. B. Monitor weed biocontrol organisms for increase, spread, and impact on purple loosestrife Lythrum salicaria. C. Measure ecological impacts of invasive plants on native plant and animal communities. D. Monitor weed biocontrol organisms for establishment, performance and impact on non-target organisms. E. Release, establish, and redistribute natural enemies.

3. Dispersive Epidemic Waves: Disease Management and Source Strength (Chris Mundt)
1. Determine if host abundance, heterogeneity, and spatial structure influence the spatiotemporal spread of plant disease. 2. Determine if increased focus size speeds the onset of epidemic velocity increase over time.3. Determine if disease spread and effects of landscape variables are similar at different spatial scales.

V(E). Planned Program (Inputs)

1. Estimated Number of professional FTE/SYs to be budgeted for this Program

Year	Extension		Research	
	1862	1890	1862	1890
2008	0.0	0.0	4.2	0.0
2009	0.0	0.0	4.2	0.0
2010	0.0	0.0	4.2	0.0
2011	0.0	0.0	4.2	0.0
2012	0.0	0.0	4.2	0.0

V(F). Planned Program (Activity)

1. Activity for the Program

- Conduct Research Experiments.- Develop Products, Curriculum, Resources.- Provide Training.

2. Type(s) of methods to be used to reach direct and indirect contacts

Extension	
Direct Methods	**Indirect Methods**
• Education Class • One-on-One Intervention • Workshop • Other 2 (professional publications) • Group Discussion • Other 1 (presentations) • Demonstrations	• Newsletters • Public Service Announcement • Web sites

3. Description of targeted 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(G). Planned Program (Outputs)

1. Standard output measures

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

	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	Target	Target	Target	Target
2008	1100	1000	10	0
2009	120	1000	20	0
2010	1400	1000	40	0
2011	1800	1000	80	0
2012	1800	1000	80	0

2. (Standard Research Target) Number of Patents

Expected Patents

2008 :0 **2009 :**0 **2010 :** 0 **2011 :**0 **2012 :**0

3. Expected Peer Review Publications

Year	Research Target	Extension Target
2008	3	0
2009	3	0
2010	3	0
2011	2	0
2012	2	0

V(H). State Defined Outputs

1. Output Target

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

2008 :5 **2009 :**5 **2010 :** 5 **2011 :**4 **2012 :**4

- 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.

2008 :15 **2009 :**15 **2010 :** 15 **2011 :**15 **2012 :**15

V(I). State Defined Outcome

1. Outcome Target

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. Outcome Type : Change in Knowledge Outcome Measure

2008 :2 **2009 :** 2 **2010 :** 2 **2011 :**2 **2012 :** 5

3. Associated Knowledge Area(s)

- 215 - Biological Control of Pests Affecting Plants

1. Outcome Target

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.

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2. Outcome Type : Change in Knowledge Outcome Measure

2008 :3 **2009 :** 3 **2010 :** 3 **2011 :**3 **2012 :** 3

3. Associated Knowledge Area(s)

- 215 - Biological Control of Pests Affecting Plants

1. Outcome Target

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. Outcome Type : Change in Knowledge Outcome Measure

2008 : 5	**2009 :** 5	**2010 :** 5	**2011 :** 5	**2012 :** 5

3. Associated Knowledge Area(s)

- 215 - Biological Control of Pests Affecting Plants

1. Outcome Target

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. Outcome Type : Change in Action Outcome Measure

2008 : 1	**2009 :** 1	**2010 :** 1	**2011 :** 1	**2012 :** 1

3. Associated Knowledge Area(s)

- 215 - Biological Control of Pests Affecting Plants

1. Outcome Target

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. Outcome Type : Change in Condition Outcome Measure

2008 : 0	**2009 :** 5	**2010 :** 5	**2011 :** 5	**2012 :** 5

3. Associated Knowledge Area(s)

- 215 - Biological Control of Pests Affecting Plants

V(J). Planned Program (External Factors)

1. External Factors which may affect Outcomes

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

Description

{NO DATA ENTERED}

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

1. Evaluation Studies Planned

- Before-After (before and after program)

Description

{NO DATA ENTERED}

2. Data Collection Methods

- Tests

Description

{NO DATA ENTERED}

V(A). Planned Program (Summary)

1. Name of the Planned Program

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

2. Brief summary about Planned Program

The primary objective of the project is to analyze the comparative advantage of US agricultural and food industries, and their counterparts in Oregon. Within this objective, two activities are planned. The first is the role of productivity growth in changing comparative advantage among major agricultural producers and exporters. While many studies show the important role of productivity in explaining comparative advantage, few have explored the causes and consequences of narrowing productivity gap among nations. This activity will identify the role of trade and investment flows as channels of knowledge spillovers, and address welfare consequences of the narrowing productivity-gap for leaders and followers. The second activity is to assess how global climate change will affect the location of agricultural production and patterns of trade. There exists much research regarding how climatic variability and extreme events may affect crop yields and agricultural output in the U.S. and the rest of the world. Current research is directed at linking climate models to large-scale, highly disaggregated, multi-commodity economic models in order to make detailed predictions for individual regions. However, relatively little attention has been given to the role of international trade and comparative advantage as it relates to climate change. This activity will identify the role of international trade in making the transitions and alleviating the costs associated with climate change. Both research activities focus on the role of public sector in alleviating the likely market failures in aiding productivity growth, conserving natural resources and the environment, and opening global markets for US products.

3. Program existence : Intermediate (One to five years)

4. Program duration : Long-Term (More than five years)

5. Expending formula funds or state-matching funds : Yes

6. Expending other than formula funds or state-matching funds : Yes

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

- 606 90% International Trade and Development
- 609 10% Economic Theory and Methods

V(C). Planned Program (Situation and Scope)

1. Situation and priorities

Agriculture and processed food industries in the United Statesand Oregonhave played an important role in past and current economic growth and development. Factors contributing to this role include abundant natural resources, investment in productive physical capital and more importantly, technological change. Since 1947, productivity growth including technological change has accounted for over 80 and 40 percent of the growth in real output of agriculture and processed food industries, respectively. Consequences of the growth of these industries are improvements in the welfare of farm and rural communities, a positive trade balance offsetting aggregate UStrade deficits and benefits to consumers in the form of lower food prices. The fact that US consumers spend less than 15 percent of their income on food (well below the average for the world) in conjunction with the fact that this share has been falling since 1947 is related to the transfer of productivity gains from these industries to the broader economy.

In recent years, demands on agriculture and processed food industries have become multidimensional in nature. In addition to providing cheaper food to consumers, these industries have been asked to provide better stewardship for natural resources and the environment, and improved food quality, variety and safety. Simultaneously, these industries have faced increasing global competition evidenced in their declining trade balance and increased multinational activity within US borders. Thus, the need for economic input in policy decisions affecting the comparative advantage of USagriculture and processed food industries, and more specifically, their Pacific Northwestcounterparts continues to be important.

The public sector has an important role in aiding productivity growth, conserving natural resources and the environment, and opening global markets for US products because markets fail either partially or completely in these contexts. Individual agricultural producers or processed food firms do not necessarily have the incentives to invest in these goals. The role of the economist, then, is to understand issues of interest to society, identify reasons why current incentives do not achieve socially-desirable outcomes, and then suggest ways in which policymakers can change these incentives to achieve better outcomes. The economist can also evaluate alternative policies to achieve the

target and their divergent consequences.

The researchers, Gopinath and Reimer, have considerable experience working on important questions dealing with the comparative advantage of agriculture and processed food industries. Gopinath has worked on several projects aimed at understanding the causes and consequences of productivity growth, multinational activities and the role of public policies. Reimer's work has contributed to understanding how comparative advantage relates to intermediate input trade and the role of consumer preferences in international trade.

2. Scope of the Program

- In-State Research
- Multistate Research

V(D). Planned Program (Assumptions and Goals)

1. Assumptions made for the Program

A key assumption in this research project is that policymakers recognize the impact that economic behavior has in social decisions aiding productivity growth, conserving natural resources and the environment, and opening global markets for US products. These policymakers also value economic analysis when addressing issues related to the comparative advantage of US agriculture and food industries.

2. Ultimate goal(s) of this Program

To analyze the comparative advantage of U.S. agricultural and food industries, and their counterparts in Oregon.

Specific objectives are:

1. To analyze factors contributing to changing global trade patterns in agriculture and processed food industries with emphasis on technological change and convergence. (Gopinath)
2. To assess the impact of climate change on agricultural production and trade. (Reimer)

V(E). Planned Program (Inputs)

1. Estimated Number of professional FTE/SYs to be budgeted for this Program

Year	Extension		Research	
	1862	1890	1862	1890
2008	0.0	0.0	0.9	0.0
2009	0.0	0.0	0.9	0.0
2010	0.0	0.0	0.9	0.0
2011	0.0	0.0	0.9	0.0
2012	0.0	0.0	0.1	0.0

V(F). Planned Program (Activity)

1. Activity for the Program

Conduct Research Experiments to test hypothesesUse 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. Type(s) of methods to be used to reach direct and indirect contacts

Extension	
Direct Methods	**Indirect Methods**
• One-on-One Intervention • Education Class • Other 1 (professional journals) • Group Discussion	• Other 1 (popular/nontechnical)

3. Description of targeted audience

Policymakers
Agricultural and processed food industries

V(G). Planned Program (Outputs)

1. Standard output measures

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

	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	Target	Target	Target	Target
2008	20	200	0	0
2009	30	300	0	0
2010	40	400	0	0
2011	100	500	0	0
2012	100	500	0	0

2. (Standard Research Target) Number of Patents

Expected Patents

2008 :0 **2009 :**0 **2010 :** 0 **2011 :**0 **2012 :**0

3. Expected Peer Review Publications

Year	Research Target	Extension Target
2008	0	0
2009	0	0
2010	0	0
2011	4	0
2012	4	0

V(H). State Defined Outputs

1. Output Target

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

2008 :0 **2009 :**0 **2010 :** 0 **2011 :**4 **2012 :**0

- 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.

2008 :2 **2009 :**2 **2010 :** 2 **2011 :**2 **2012 :**2

V(I). State Defined Outcome

1. Outcome Target

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

2. Outcome Type : Change in Knowledge Outcome Measure

2008 :0 **2009 :** 0 **2010 :** 0 **2011 :**10 **2012 :** 0

3. Associated Knowledge Area(s)

- 606 - International Trade and Development
- 609 - Economic Theory and Methods

1. Outcome Target

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. Outcome Type : Change in Knowledge Outcome Measure

2008 :0 **2009 :** 0 **2010 :** 0 **2011 :**10 **2012 :** 0

3. Associated Knowledge Area(s)

- 606 - International Trade and Development
- 609 - Economic Theory and Methods

1. Outcome Target

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. Outcome Type : Change in Action Outcome Measure

2008 :	2009 :	2010 :	2011 :	2012 :
0	0	0	0	0

3. Associated Knowledge Area(s)

- 606 - International Trade and Development
- 609 - Economic Theory and Methods

1. Outcome Target

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.

2. Outcome Type : Change in Action Outcome Measure

2008 :	2009 :	2010 :	2011 :	2012 :
0	0	0	0	0

3. Associated Knowledge Area(s)

- 606 - International Trade and Development
- 609 - Economic Theory and Methods

V(J). Planned Program (External Factors)

1. External Factors which may affect Outcomes

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

Description

The international trade program was offered jointly with the Department of Economics recently. The discontinuation of the joint program has made training students in this area an in-house activity. Declining federal and state support also places increasing pressures on obtaining grants and contracts, which have become increasingly competitive.

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

1. Evaluation Studies Planned

- Before-After (before and after program)

Description

Much of the professional output from the program would qualify as scholarship implying a peer review process, validation and publication in journals.

2. Data Collection Methods

- Other (peer review process)

Description

{NO DATA ENTERED}

V(A). Planned Program (Summary)

1. Name of the Planned Program

Conservation and Restoration of Aquatic, Marine and Terrestrial Ecosystems

2. Brief summary about Planned Program

This Program represents subprograms designed and managed by 11 faculty members of the Department of Fisheries and Wildlife at Oregon State University. The proposed Program encompasses diverse scientific expertise of faculty whose training and specialization ranges from ecological modeling to population and community ecology. The proposed Program includes the following eight objectives:

1. Develop ecological community models that predict community response to perturbations and disease pathogens.
2. Investigate the function of stream ecosystems and assess the response of these ecosystems to restoration practices.
4. Examine the effects of habitat fragmentation on small populations of salmonids and develop watershed restoration planning and prioritization methods that can be used by different multi-stakeholder groups.
5. Investigate factors and mechanisms that cause difference between hatchery and wild fish.
6. Evaluate influences of habitat change on populations and communities of vertebrates.
7. Develop and assess techniques and strategies for wetland restoration and management.
8. Assess habitat use and species interactions in nearshore and estuarine marine communities.
9. Evaluate the impacts of restoration efforts using individual physiology, population viability, and community structure as response variables.

A variety of subprograms are represented in this Program and include subprograms that focus on development of models of community-level responses to perturbations, population dynamics and habitat management for individual aquatic and terrestrial species, and development of methods for monitoring ecosystem changes. 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 ecosystem restoration policy decisions and to the continued development of the theoretical understanding of processes affecting aquatic and terrestrial organisms and ecosystem function.

3. Program existence : Intermediate (One to five years)

4. Program duration : Long-Term (More than five years)

5. Expending formula funds or state-matching funds : Yes

6. Expending other than formula funds or state-matching funds : Yes

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

- 112 10% Watershed Protection and Management
- 135 60% Aquatic and Terrestrial Wildlife
- 136 30% Conservation of Biological Diversity

V(C). Planned Program (Situation and Scope)

1. Situation and priorities

The Department of Fisheries & Wildlife will develop an integrated Research & Extension Project in Conservation and Restoration Ecology. The state, region, nation, and world face enormous challenges in conserving intact and functioning resources and in restoring species and resources that are declining. Oregon is addressing issues related to the Endangered Species Act through many programs, including the Oregon Plan for Salmon and Watersheds. The public has shown consistent support for the ESA and it is a central tool in creating a livable environment for the future. Local resource managers are also expected to understand the status of the state=s resources and identify trends in their abundance.

Most resource issues are deeply embedded in the condition of the overall landscape. It is essential for professionals to understand how the

structure and function of landscapes have changed. Historical conditions can be reconstructed from existing information and used as a context for directing future landscape management. In addition, the state has attempted to identify plausible alternative futures (Willamette River Basin, Coastal Landscape and Management Study, Willamette River Basin Conservation Strategy). These analyses of future options require innovative, multidisciplinary programs to create a landscape context for conservation and management.

The desire of Oregonians (individuals, households, groups, communities, and society in general) to restore altered resources and systems requires information at many spatial and social scales. Conservation and restoration actions must be designed at scales ranging from local habitats to stream reaches, stands, watersheds, ecoregions, the state of Oregon, and the Pacific Northwest. Any restoration attempt must determine the degree to which human intervention is needed to accomplish the desired future conditions and explicitly identify the risks associated with either active or passive restoration. All management actions must decide whether it would be most effective to restore processes, physical structure, populations, or community structure.

The Department of Fisheries & Wildlife has identified several specific focal areas for a Conservation Biology and Restoration Ecology Research and Extension Program. A critical area is the dynamics of populations and natural resources in decline. The risk of extinction increases when population sizes are small, in part because changes in abundance or distribution become less predictable. Ecological processes may become highly variable and unstable when they approach low levels. The composition of communities may shift dramatically and interactions between species change at low abundances.

2. Scope of the Program

- In-State Extension
- In-State Research
- Integrated Research and Extension

V(D). Planned Program (Assumptions and Goals)

1. Assumptions made for the Program

A goal of the Oregon State University College of Agricultural Sciences is to advance fundamental knowledge about the environment and natural resources, and foster economic growth and sustainability in a manner that is protective of human and environmental health. Maintaining and restoring ecosystem function and processes are key to sustainable food production and use of natural resources. How these resources are managed depends, in part, on improved understanding of the role humans play in modifying ecosystem structure and function. Oregonians from individuals to communities seek ways to use natural resources in a sustainable manner. We assume that this multidisciplinary effort will develop knowledge of complex ecosystem relationships and restoration technologies that are beyond the scope of a single researcher. The outcomes of the program are deliverables that can be used by individuals, communities, regulatory and management agencies, and natural resources users to maintain or improve ecosystem health. We assume this knowledge will enable citizens and policy makes to make informed decisions and management choices that allow sustainable use of natural resources.

2. Ultimate goal(s) of this Program

The goal of this program is to inform the public and policy makers about changes in ecosystem function and processes that result from natural resources use and to identify ways to minimize negative consequences and develop knowledge and technologies that enable ecosystem restoration. This entails robust analyses of data deriving from research of these investigators and that available from work within the broader scientific community. The proposed Program encompasses diverse scientific expertise of faculty whose training and specialization ranges from ecological modeling to population and community ecology.

The proposed Program includes the following eight objectives:

1. Develop ecological community models that predict community response to perturbations and disease pathogens.
2. Investigate the function of stream ecosystems and assess the response of these ecosystems to restoration practices.
4. Examine the effects of habitat fragmentation on small populations of salmonids and develop watershed restoration planning and prioritization methods that can be used by different multi-stakeholder groups.
5. Investigate factors and mechanisms that cause difference between hatchery and wild fish.
6. Evaluate influences of habitat change on populations and communities of vertebrates.
7. Develop and assess techniques and strategies for wetland restoration and management.
8. Assess habitat use and species interactions in nearshore and estuarine marine communities.
9. Evaluate the impacts of restoration efforts using individual physiology, population viability, and community structure as response variables.

V(E). Planned Program (Inputs)

1. Estimated Number of professional FTE/SYs to be budgeted for this Program

Year	Extension		Research	
	1862	1890	1862	1890
2008	0.6	0.0	4.5	0.0
2009	0.6	0.0	4.5	0.0
2010	0.6	0.0	4.5	0.0
2011	0.6	0.0	4.5	0.0
2012	0.6	0.0	4.5	0.0

V(F). Planned Program (Activity)

1. Activity for the Program

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. Type(s) of methods to be used to reach direct and indirect contacts

Extension	
Direct Methods	Indirect Methods
• Education Class • Workshop	• Other 1 (professional journals) • Web sites

3. Description of targeted 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(G). Planned Program (Outputs)

1. Standard output measures

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

	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	Target	Target	Target	Target
2008	3000	5000	500	2000
2009	3000	5000	500	2000
2010	3000	5000	500	2000
2011	3000	5000	500	2000
2012	3000	5000	500	2000

2. (Standard Research Target) Number of Patents

Expected Patents

2008 :0 **2009 :**0 **2010 :** 0 **2011 :**0 **2012 :**0

3. Expected Peer Review Publications

Year	Research Target	Extension Target
2008	35	0
2009	35	0
2010	35	0
2011	35	0
2012	35	0

V(H). State Defined Outputs

1. Output Target

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

2008 :45 **2009 :**45 **2010 :** 45 **2011 :**45 **2012 :**45

V(I). State Defined Outcome

1. Outcome Target

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. Outcome Type : Change in Knowledge Outcome Measure

2008 :10500 **2009 :** 10500 **2010 :** 10500 **2011 :**10500 **2012 :** 10500

3. Associated Knowledge Area(s)

- 112 - Watershed Protection and Management
- 135 - Aquatic and Terrestrial Wildlife
- 136 - Conservation of Biological Diversity

1. Outcome Target

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. Outcome Type : Change in Action Outcome Measure

2008 : 0	**2009 :** 100	**2010 :** 150	**2011 :** 200	**2012 :** 200

3. Associated Knowledge Area(s)

- 112 - Watershed Protection and Management
- 135 - Aquatic and Terrestrial Wildlife
- 136 - Conservation of Biological Diversity

1. Outcome Target

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

2. Outcome Type : Change in Condition Outcome Measure

2008 : 0	**2009 :** 0	**2010 :** 0	**2011 :** 0	**2012 :** 0

3. Associated Knowledge Area(s)

- 112 - Watershed Protection and Management
- 135 - Aquatic and Terrestrial Wildlife
- 136 - Conservation of Biological Diversity

V(J). Planned Program (External Factors)

1. External Factors which may affect Outcomes

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

Description

This program focuses on increasing understanding and knowledge of ecosystem function and processes and how to restore degraded systems. Multiple external factors inform decisions regarding priorities for research and extension activities. Agricultural commodity groups, state natural resource agencies, Native American Tribes, and environmental interest groups influence allocation of state and federal funds through the legislative process. They also sponsor research directly. Scientific peer review panels are especially important in directing federal support for research and extension. Public opinion is also a powerful force in determining both state and federal resource commitments necessary to sustain this program.

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

1. Evaluation Studies Planned

- {NO DATA ENTERED}

Description

Program evaluation is carefully collecting information about a program or some aspect of a program in order to make necessary decisions about the program. The complexity of an evaluation plan is unique to each sub-program and will be evaluated based on the sub-program

goals. As well, the program as a whole will undergo regular evaluation. The evaluation process will assess project planning, project implementation and project outcomes. Data collection will occur annually in accordance with the expected outcomes. For example, number of manuscripts will be tabulated, and numbers of theses will be tabulated for the program. Reactions of peer review panels to grant applications is the primary means for evaluation of research initiatives. The department records each submission and our accounting system track awards. Reviews of total intramural and extramural funding occurs on a quarterly basis.

2. Data Collection Methods

- {NO DATA ENTERED}

Description
{NO DATA ENTERED}

V(A). Planned Program (Summary)

1. Name of the Planned Program

Consumers, Food Marketing, and Business Strategies

2. Brief summary about Planned Program

In conjunction with the Food Innovation Center, this project is intended to support an integrated program of research, educational programs, and technical services designed to enhance regional capability for innovation in food processing and marketing. This project enables the expansion and sustains agricultural and food businesses in the Northwest through business, market and consumer research that contributes to the value-added component of agricultural products. The research team will conduct investigations on consumer perceptions of food product quality and value, food business and marketing strategies and entrepreneurship. These studies will improve the ability of new and existing food producers and processors to satisfy and adapt to changes in consumer and market demand and thereby achieve success through business and marketing strategies suitable to the small and medium sized firms of the Northwest. As part of this effort the research team will work jointly to develop protocols for product introduction and train entrepreneurs in their use.

3. Program existence : Intermediate (One to five years)

4. Program duration : Long-Term (More than five years)

5. Expending formula funds or state-matching funds : Yes

6. Expending other than formula funds or state-matching funds : No

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

- 503 33% Quality Maintenance in Storing and Marketing Food Products
- 602 34% Business Management, Finance, and Taxation
- 603 11% Market Economics
- 606 11% International Trade and Development
- 607 11% Consumer Economics

V(C). Planned Program (Situation and Scope)

1. Situation and priorities

Value-added processing or further manufacturing and marketing of agricultural-based products offer considerable potential for expansion, economic growth and job creation in the region. In the past ten years, value-added food processing and manufacturing in Oregon has contributed economic returns of about 60 percent of the gross farm gate receipts in the state; by comparison, nation-wide contributions have averaged nearly 70 percent. These statistics indicate that Oregon exports relatively more of its agricultural products in raw or unprocessed form than the national average. Potential economic benefits to the State are lost. Expanding economic growth in the food-manufacturing sector by just ten percent holds potential to increase contributions to the State economy of $130 million annually.

Competitive pressures that have structured the agriculture industry in the Northwest are driven to large degree by the relative remoteness of the region in comparison to the major consumer regions along the East Coast. In recent years the gains from expanded trade in world markets have been accelerated and presented cause for examining the comparative advantage of the Northwest as a food processor and manufacturer in the larger global economy. The spatial relationships that place Oregon and the Northwest at some disadvantage relative to most major American markets became distinct advantages in positioning for international trade in food and agricultural products.

However, international markets have become more competitive as new players enter the field. While the Northwest has previously enjoyed a relatively stable comparative advantage in the production of certain raw agricultural products, due to a long investment in agricultural research, economic conditions have made it vulnerable in recent years. The situation is similar in international value-added food manufacturing. Economic conditions including the strong dollar and weaker Asian markets, and the expansion of international production of Northwest agricultural commodities into other countries has constrained the expansion of international markets for Northwest products. At present greater attention to marketing value added products that address increased consumer interest in product quality and variation, production characteristics, and nutrition is of greater value.

The investment costs required for a successful new product introduction, or expansion of an existing product, into a new market are significant. In the same way, adoption of new production and marketing strategies to improve consumer product valuation is costly. Businesses may be unwilling to undertake these ventures in the face of lack of information and perceived high risk. To the extent that such risks are the result of market and regulatory uncertainty and or unknown consumer acceptance; applied research can be brought to bear on common problems. Such research would increase the success and sustainability of Oregon and Northwest food-manufacturing sector in

domestic and international markets. In turn, this is expected to increase economic value added by the agricultural industry to state and local economies in the Northwest region.

2. Scope of the Program

- In-State Extension
- In-State Research
- Integrated Research and Extension
- Multistate Extension
- Multistate Integrated Research and Extension
- Multistate Research

V(D). Planned Program (Assumptions and Goals)

1. Assumptions made for the Program

Oregon and other states of the Northwest produce have a particularly diversified agricultural production base with few crops that can be produced efficiently for the commodity market. This situation drives a need for value-added and niche market products to accomplish economic sustainability for agricultural producers and food processors.
The research premise is that advanced science and technologies are key components of industry and market leadership in furthering the economic contributions of an industry. A guiding principle for research selection is its applicability to Northwest food products and market situation. While there are many issues facing northwest food businesses, there is a great demand on the Food Innovation Center to assist market entrepreneurs and existing business in bringing new or improved products to market and to assess the value of products as a whole in their packaging, credence, and quality aspects as well as for the fundamental product itself.
Research and outreach will be oriented in two ways: (1) research that addresses specific issues or questions in marketing and business that currently face food businesses, and (2) research to evaluate and develop strategies and techniques that will enhance the success of existing food business and entrants. These may be marketing and consumer or business management strategies. In each case outreach and education will take place to transmit the findings of the research projects to industry members.

2. Ultimate goal(s) of this Program

To improve the success and profitability of Northwest food producing, marketing and processing industries through research and education. This comes under National Goal 1: An agricultural system that is highly competitive in the global economy. The food marketing and business strategy group will contribute in this area by undertaking research that provides educational or industry assistance for value-added food business.
Program Objectives and associated investigators
Consumer Economics and Marketing Strategies (Catherine A. Durham)
to enhance the competitiveness and the success of the US food processors and producers by providing the industry with a better understanding of the marketing conditions they face and marketing strategies they may employ.
Sensory and Consumer Research (Anna B. Marin)
to provide agricultural producers and processors with direct access to information from consumers on their opinions and attitudes about food products they choose to consume.
Food Business Strategies and Management (Aaron J. Johnson)
to build the body of strategic and marketing management knowledge base in a manner that will help new and small- to medium-sized food enterprises meet with greater success, both in terms of longevity and performance.

V(E). Planned Program (Inputs)

1. Estimated Number of professional FTE/SYs to be budgeted for this Program

Year	Extension		Research	
	1862	1890	1862	1890
2008	1.0	0.0	5.0	0.0
2009	1.0	0.0	5.0	0.0
2010	1.0	0.0	5.0	0.0
2011	1.0	0.0	5.0	0.0
2012	1.0	0.0	5.0	0.0

V(F). Planned Program (Activity)

1. Activity for the Program

- 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. Type(s) of methods to be used to reach direct and indirect contacts

Extension	
Direct Methods	Indirect Methods
• Education Class • Workshop • Other 1 (professional journals) • Group Discussion • One-on-One Intervention	• Web sites • Other 1 (trade press articles) • Other 2 (Extension bulletins) • Public Service Announcement

3. Description of targeted audience

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

V(G). Planned Program (Outputs)

1. Standard output measures

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

	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	Target	Target	Target	Target
2008	120	150	0	0
2009	120	150	0	0
2010	120	150	0	0
2011	120	150	0	0
2012	120	150	0	0

2. (Standard Research Target) Number of Patents

Expected Patents

2008 :0 **2009 :**0 **2010 :** 0 **2011 :**0 **2012 :**0

3. Expected Peer Review Publications

Year	Research Target	Extension Target
2008	20	0
2009	20	0
2010	20	0
2011	20	0
2012	20	0

V(H). State Defined Outputs

1. Output Target

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

2008 :27 **2009 :**27 **2010 :** 27 **2011 :**27 **2012 :**27

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

2008 :3 **2009 :**2 **2010 :** 4 **2011 :**3 **2012 :**3

- 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

2008 :1 **2009 :**1 **2010 :** 1 **2011 :**1 **2012 :**1

V(I). State Defined Outcome

1. Outcome Target

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. Outcome Type : Change in Knowledge Outcome Measure

2008 :5 **2009 :** 10 **2010 :** 10 **2011 :**10 **2012 :** 10

3. Associated Knowledge Area(s)

- 602 - Business Management, Finance, and Taxation
- 603 - Market Economics

- 607 - Consumer Economics

1. Outcome Target

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.

2. Outcome Type : Change in Action Outcome Measure

2008 : 0	**2009 :** 0	**2010 :** 2	**2011 :** 2	**2012 :** 2

3. Associated Knowledge Area(s)

- 602 - Business Management, Finance, and Taxation
- 603 - Market Economics
- 606 - International Trade and Development
- 607 - Consumer Economics

1. Outcome Target

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. Outcome Type : Change in Action Outcome Measure

2008 : 0	**2009 :** 0	**2010 :** 0	**2011 :** 10	**2012 :** 5

3. Associated Knowledge Area(s)

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

1. Outcome Target

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.

2. Outcome Type : Change in Condition Outcome Measure

2008 : 0	**2009 :** 0	**2010 :** 0	**2011 :** 0	**2012 :** 5

3. Associated Knowledge Area(s)

- 503 - Quality Maintenance in Storing and Marketing Food Products
- 602 - Business Management, Finance, and Taxation

- 603 - Market Economics
- 606 - International Trade and Development
- 607 - Consumer Economics

V(J). Planned Program (External Factors)

1. External Factors which may affect Outcomes

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

Description

Factors that will influence the outcome of this program are the economic conditions that face the region as well as the domestic versus international economy. As discussed earlier the food products industry is fiercely competitive constraining the ability of existing firms and new entrants to succeed with new products and strategies. Financing, background of participants, and the willingness of retailers to test and introduce new products will impact the ability of program participants to succeed.

Cultural environment, Climate, Economic structure, Housing patterns, Demographic patterns, Political environment, Background and experiences of participants, Media influences, Changing policies and priorities)

V(K). 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)

Description

Subprogram 1

Program will be evaluated based on peer-reviewed publications, letters from industry and government contacts, and observation. When appropriate a RETROSPECTIVE will be undertaken in which users of projects produced for direct use by industry will be surveyed.

Subprogram 2

Program success will be evaluated by peer-reviewed publication of results of identifying and comparing consumer segments, and by food industry response to consumer information provided through workshops, reports and presentations. Food industry response will be assessed through evaluation letters on services and information provided.

Subprogram 3

TIME SERIES evaluation is employed in assessing the education series. Participants in the new food businesses education series are given the opportunity to fill in a survey before the introductory workshop and an evaluation form after the workshop. They are also contacted by phone 6 months to a year after their last class. This follow-up interview is designed to determine how valuable the workshop(s) was(were) and measure the impact realized as a result of their participation.

2. Data Collection Methods

- Sampling
- Other (letters, workshops)

Description

{NO DATA ENTERED}

V(A). Planned Program (Summary)

1. Name of the Planned Program

Dryland Cropping Systems

2. Brief summary about Planned Program

Dryland crop production systems in Oregon are based primarily on winter wheat grown in rotation with tillage-based summer fallow. This system has evolved and proven to be economically successful for more than 100 years. However, tillage based fallow leads to increased soil erosion and adversely affects soil biological, chemical and physical properties and increased cost for inputs is making the system less economically viable. Pests, such as diseases, nematodes and weeds, continue to extract an economic, environmental, and social cost. By utilizing contemporary research tools in agronomy, soil science, plant nutrition and pest management this program will develop improved practices for dryland cropping systems that will enhance the potential use of alternative crops, reduce soil erosion, reduce the economic, social, and environmental costs of crop pests, maintain or increase soil biological, chemical and physical properties. Our ultimate goal is to make significant contributions toward providing a stable, sustainable, and healthy supply of food, fuel, and fiber for the nation while strengthening Oregon's rural communities and conserving the soil and water resources.

3. Program existence : Mature (More then five years)

4. Program duration : Long-Term (More than five years)

5. Expending formula funds or state-matching funds : Yes

6. Expending other than formula funds or state-matching funds : Yes

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

- 102 20% Soil, Plant, Water, Nutrient Relationships
- 111 20% Conservation and Efficient Use of Water
- 205 20% Plant Management Systems
- 212 20% Pathogens and Nematodes Affecting Plants
- 213 20% Weeds Affecting Plants

V(C). Planned Program (Situation and Scope)

1. Situation and priorities

The dryland cropping area in north central and northeastern Oregon comprises more than 2 million acres. The region is characterized by wide variations in soils, precipitation, elevation, and topography; six distinct agronomic zones are identified based on soil depth, precipitation, and growing season length. Winter wheat is grown in rotation with tillage-based summer fallow on 85% or more of this land; non tillage-based fallow is practiced on less than 20% of the land. Spring wheat and winter and spring barley account for most of the remaining crops. Upwards of 90% of the wheat is exported, primarily to countries in the Pacific Rim. Total farm gate value of the cereal crops produced exceeds $200 million annually.

The typical production system is characterized by winter wheat seeded in September or October and harvested in July. The soil is fallowed the remainder of the two year crop cycle to control diseases, weeds, and other pests, to increase the release of plant nutrients from soil organic matter, and to capture and store precipitation; fallow typically consists of standing stubble for up to 8 to 9 months after harvest. During the final 4 months of the fallow period, the fallow is cultivated and maintained free of living plants.

Winter wheat-summer fallow is the only economically viable crop production system in much of the dryland cropping area. This great dependence on one crop has several adverse consequences including: increasing grower exposure to economic risk due to wheat price fluctuations; increasing the potential for widespread pest problems including weeds, diseases, nematodes and insects; and reducing grower flexibility when designing whole farm management plans. Identification and development of a successful alternative crop to wheat and other cereals has been a goal of researchers and farmers since the early 1900's.

The Pendleton Station of CBARC is the site of the oldest continuous cropping experiments in the western US. These trials are a unique resource that permit scientists to examine the effects of various tillage, residue management, fertility, and crop rotations on soil biological, chemical, and physical properties. Data from these trials shows that winter wheat-summer fallow cropping system reduces soil organic matter, increases soil erosion, and is not biologically sustainable. Increasing input costs and static wheat prices indicate that the economic

sustainability of winter wheat-summer fallow system is in jeopardy. Issues studied include:

Soil-borne plant-pathogenic fungi and plant-parasitic nematodes cause chronic and sometimes acute constraints to optimal yields of wheat. Effective weed management must include both the crop and the fallow phase as well as limiting the development of herbicide resistant weeds. Direct-seeding of dryland winter wheat continues to attract the attention of growers; with "chemical fallow"(herbicides) rather than tillage to control weeds.
Traditional conservation farming systems which rely on maintaining crop residue on the soil surface are widely used in the region, but are energy input intensive.
The identification of the individual components of more sustainable cropping systems, the development of more sustainable systems comprised of these components; and the dissemination of this information to farmers and other stakeholders is the overarching goal for our research and Extension programs at CBARC. The successful development of more sustainable cropping systems is critical to the long term viability of dryland cropping in eastern Oregon and the continued vitality of the rural Oregon economy.

2. Scope of the Program

- In-State Extension
- In-State Research
- Integrated Research and Extension
- Multistate Extension
- Multistate Integrated Research and Extension
- Multistate Research

V(D). Planned Program (Assumptions and Goals)

1. Assumptions made for the Program

OSU faculty members at CBARC effectively collaborate with professional peers on the OSU campus, university and ARS scientists in the region, the country and the world. They work in cooperation with peers in state, regional and federal agencies. They work with county extension faculty and with commodity commission and grower association leaders. They converse directly with end users of their products. They are members of successful regional and national competitive grant consortia. Through this array of contacts they have a keen awareness of local, state, regional, national and international research needs in crop production practices, pest management, and alternative crops.

2. Ultimate goal(s) of this Program

The goal of this program is utilize existing research and Extension tools and to develop and apply improved tools of agronomy, plant pathology, soil science, and weed science and biology to address the challenges facing Oregon's dryland crop producers. Improved production practices are needed to provide a sustainable supply of food, feed, and fuel while maintaining the viability of Oregon's rural communities.

Program Objectives and Associated Investigators

(1) Agronomy Sub-Program. Identify suitable alternative crops and sustainable cropping dryland cropping systems. Stephen Machado

(2) Plant Pathology Sub-Program. Improve wheat production efficiency by integrating genetic resistance and/or tolerance into existing cultural management strategies for crown rot diseases and plant-parasitic nematodes that limit wheat yields in Oregon. Richard Smiley

(3) Weed science program. Improve effectiveness of weed management systems for dryland cereals while improving sustainability of direct-seed systems and minimizing development of herbicide resistant weed populations.

(4) Soil and Water Management Sup-Program. Develop improved soil and water management practices that protect the soil resource and maintain or increase crop yields. Don Wysocki

(5) Soil Fertility and Nutrient Management Sub-Program. Develop improved nutrient management recommendations for existing soft white winter wheat and alternative cereal crops. Steve Petrie

V(E). Planned Program (Inputs)

1. Estimated Number of professional FTE/SYs to be budgeted for this Program

Year	Extension		Research	
	1862	1890	1862	1890
2008	1.2	0.0	8.2	0.0
2009	1.2	0.0	8.2	0.0
2010	1.2	0.0	8.2	0.0
2011	1.2	0.0	8.2	0.0
2012	1.2	0.0	8.2	0.0

V(F). Planned Program (Activity)

1. Activity for the Program

- Conduct Research Experiments.- Construct Research Facilities.- Conduct Workshops, meetings.- Deliver Services.- Develop Products, Curriculum, Resources.- Provide Training.- Assessments.- Partnering.

2. Type(s) of methods to be used to reach direct and indirect contacts

Extension	
Direct Methods	Indirect Methods
• Other 1 (peer publications) • Demonstrations • One-on-One Intervention • Group Discussion • Workshop • Other 2 (reports, meetings) • Education Class	• Web sites • Newsletters

3. Description of targeted 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(G). Planned Program (Outputs)

1. Standard output measures

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

	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	Target	Target	Target	Target
2008	5000	15000	250	1000
2009	5000	15000	250	1000
2010	5000	15000	250	1000
2011	5000	15000	250	1000
2012	5000	15000	250	1000

2. (Standard Research Target) Number of Patents

Expected Patents

2008 :0 **2009 :**0 **2010 :** 0 **2011 :**0 **2012 :**0

3. Expected Peer Review Publications

Year	Research Target	Extension Target
2008	5	0
2009	5	0
2010	5	0
2011	5	0
2012	5	0

V(H). State Defined Outputs

1. Output Target

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

2008 :8 **2009 :**8 **2010 :** 8 **2011 :**8 **2012 :**8

- 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

2008 :20 **2009 :**20 **2010 :** 20 **2011 :**20 **2012 :**20

- 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.

2008 : 10 **2009 :** 10 **2010 :** 10 **2011 :** 10 **2012 :** 10

- 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

2008 : 5 **2009 :** 5 **2010 :** 5 **2011 :** 5 **2012 :** 5

V(I). State Defined Outcome

1. Outcome Target

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. Outcome Type : Change in Knowledge Outcome Measure

2008 : 5 **2009 :** 5 **2010 :** 5 **2011 :** 5 **2012 :** 5

3. Associated Knowledge Area(s)

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

1. Outcome Target

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. Outcome Type : Change in Action Outcome Measure

2008 : 0 **2009 :** 2 **2010 :** 2 **2011 :** 0 **2012 :** 2

3. Associated Knowledge Area(s)

- 102 - Soil, Plant, Water, Nutrient Relationships

- 111 - Conservation and Efficient Use of Water
- 205 - Plant Management Systems
- 213 - Weeds Affecting Plants

1. Outcome Target

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. Outcome Type : Change in Condition Outcome Measure

2008 : 0 **2009 :** 0 **2010 :** 5 **2011 :** 0 **2012 :** 5

3. Associated Knowledge Area(s)

- 102 - Soil, Plant, Water, Nutrient Relationships
- 111 - Conservation and Efficient Use of Water
- 205 - Plant Management Systems

V(J). Planned Program (External Factors)

1. External Factors which may affect Outcomes

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

Description

Government programs have an overarching influence on the adoption of many improved dryland cropping system management practices. Subsidies and disincentives play a major role in the determining whether and how rapidly research is adopted by growers. Input costs for items based on fossil fuels such as diesel fuel, fertilizers, and pesticides will strongly influence decisions about crop management practices.

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

1. Evaluation Studies Planned

- {NO DATA ENTERED}

Description

{NO DATA ENTERED}

2. Data Collection Methods

- {NO DATA ENTERED}

Description

{NO DATA ENTERED}

V(A). Planned Program (Summary)

1. Name of the Planned Program

Economics of Land and Water Use on Private and Public Lands

2. Brief summary about Planned Program

Economic issues underlie many of the political debates over land and water use in Oregon and the West. The research programs in this proposal are focused on some of the most pressing policy issues regarding how land and water are and will be managed in the coming decades. Although much of the focus is on land and water management in rural areas (particularly those impacted by agricultural activity), the research will also consider important questions involving land use in the rural-urban interface. The objectives of this research are (a) to improve the efficiency of irrigation water use through use of markets and other policy tools, (b) evaluate various market mechanisms that can better allocate land and water resources, (c) improve the understanding of environmental and economic impacts of land use policies, and (d) better understand how various policy options can impact on the environmental consequences of land use and farming practices. Government has become involved in helping to achieve social goals because open markets fail either partially or completely. The role of the economist is to understand the issues, identify reasons why normal market incentives do not achieve socially desirable outcomes, and then suggest ways in which policymakers can change these incentives to achieve more positive outcomes. The economist can also evaluate various policies to determine how individuals are likely to react.

3. Program existence : New (One year or less)

4. Program duration : Long-Term (More than five years)

5. Expending formula funds or state-matching funds : Yes

6. Expending other than formula funds or state-matching funds : Yes

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

- 605 100% Natural Resource and Environmental Economics

V(C). Planned Program (Situation and Scope)

1. Situation and priorities

Oregon, endowed with an abundance of natural resources, is a state where citizens place a high value on quality of life attributes, such as pristine rivers and streams, rural open spaces, clean air, extensive wilderness areas, public access to beaches, and limits to urban sprawl. Oregon citizens have been supportive of innovative ideas to encourage wise stewardship of its natural resource base, so the state also functions as a laboratory for policies sometimes adopted by policymakers in other states.

In recent years federal and state governments are increasingly involved in designing programs to influence land and water use as a means of achieving some desired social goals, including reducing nonpoint solution, increasing instream flows, preserving open space, reducing sprawl and accompanying traffic problems, and providing compensation for loss of rights to land and water use. Government becomes involved in helping achieve these social goals because open markets fail either partially or completely. In other words, economic motivations are not present or are perversely formulated to obtain these goals. The role of the economist is to understand the issue, identify reasons why normal market incentives do not achieve socially desirable outcomes, suggest ways in which policymakers can change these incentives to achieve more positive outcomes, and evaluate various policies to determine how individuals are likely to react.

The role of economics in irrigation management is increasingly important because of the competition for water with higher value users; yet, even the most sophisticated irrigation management procedures used today give inadequate consideration to economics. And, because non-point source pollution from irrigated agriculture is directly related to the intensity of water use, optimization can also reduce the environmental impacts of irrigated agriculture under some circumstances. The efficiency advantages of market-based water allocations have been noted for decades but in the case of water controlled by the Bureau of Reclamation, institutional constraints on allocative efficiency have been noted. For example, supply reduction may not be the most important factor affecting the social cost of aquatic habitat protection, but rather the impact depends on how water supply reductions are distributed, bringing to mind the theory of the second best.

A recent development in the economics of land use has been the application of econometric techniques to land-use data, for example, to explain the decisions by private landowners to allocate land to alternative uses or to identify determinants of land prices. Studies have provided strong support for decisions governed by profit maximization, and for land prices affected by human population pressures, climate,

soil quality, and other factors. Other models are used to focus on the consequences of urban sprawl and the consequences of zoning and regulatory restrictions. This program will also address how land use changes induced by policies affect watershed health and biodiversity, an aspect little reported in the literature.

2. Scope of the Program

- Multistate Research
- Multistate Extension
- Integrated Research and Extension
- Multistate Integrated Research and Extension
- In-State Extension
- In-State Research

V(D). Planned Program (Assumptions and Goals)

1. Assumptions made for the Program

A key assumption in this research project is that policymakers recognize the impact that economic behavior has in social decisions regarding management of water and land resources. These policymakers also value economic analysis when addressing issues related to management of land and water.

2. Ultimate goal(s) of this Program

To examine pressing policy issues regarding how land and water are and will be managed in the coming decades, both in rural areas and in the rural-urban interface.

1. To evaluate current irrigation practices and identify ways in which water can be used more efficiently. (Perry, Jaeger)

2. To assess the impact of changes in policies that influence the supply and cost of water in both agricultural and non-agricultural uses. (Jaeger)

3. Assess market mechanisms governing water and private land-use decisions (Plantinga, Wu, Jaeger)

4. Investigate the environmental and economic impacts of various land-use policies. (Plantinga, Wu, Jaeger)

5. To examine the adequacy and efficiency of policy options to reduce the environmental impacts of land use and farming practices. (Wu)

V(E). Planned Program (Inputs)

1. Estimated Number of professional FTE/SYs to be budgeted for this Program

Year	Extension		Research	
	1862	1890	1862	1890
2008	1.0	0.0	3.0	0.0
2009	1.0	0.0	3.0	0.0
2010	1.0	0.0	3.0	0.0
2011	1.0	0.0	3.0	0.0
2012	1.0	0.0	3.0	0.0

V(F). Planned Program (Activity)

1. Activity for the Program

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. Type(s) of methods to be used to reach direct and indirect contacts

Extension	
Direct Methods	**Indirect Methods**
• Education Class • Workshop • One-on-One Intervention • Demonstrations • Group Discussion	• Other 1 (newspaper) • Other 2 (professional journals) • Web sites

3. Description of targeted 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(G). Planned Program (Outputs)

1. Standard output measures

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

	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	Target	Target	Target	Target
2008	930	2700	55	0
2009	1040	4500	55	0
2010	1160	8100	55	0
2011	1420	18100	55	0
2012	1420	18100	55	0

2. (Standard Research Target) Number of Patents

Expected Patents

2008 : 0 **2009 :** 0 **2010 :** 0 **2011 :** 0 **2012 :** 0

3. Expected Peer Review Publications

Year	Research Target	Extension Target
2008	5	0
2009	9	0
2010	2	0
2011	1	0
2012	1	0

V(H). State Defined Outputs

1. Output Target

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

  2008 : 5 **2009 :** 3 **2010 :** 2 **2011 :** 1 **2012 :** 1

- 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

  2008 : 11 **2009 :** 9 **2010 :** 11 **2011 :** 4 **2012 :** 4

V(I). State Defined Outcome

1. Outcome Target

(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. Outcome Type : Change in Action Outcome Measure

2008 : 1	**2009 :** 1	**2010 :** 0	**2011 :** 0	**2012 :** 0

3. Associated Knowledge Area(s)

- 605 - Natural Resource and Environmental Economics

1. Outcome Target

(2) Produce realistic models that demonstrate the potential gains, and help point to ways that the conflicts between competing goals can be minimized.

2. Outcome Type : Change in Action Outcome Measure

2008 : 0	**2009 :** 1	**2010 :** 0	**2011 :** 1	**2012 :** 0

3. Associated Knowledge Area(s)

- 605 - Natural Resource and Environmental Economics

1. Outcome Target

(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.

2. Outcome Type : Change in Condition Outcome Measure

2008 : 0	**2009 :** 0	**2010 :** 0	**2011 :** 0	**2012 :** 2

3. Associated Knowledge Area(s)

- 605 - Natural Resource and Environmental Economics

1. Outcome Target

(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. Outcome Type : Change in Action Outcome Measure

2008 : 0	**2009 :** 0	**2010 :** 0	**2011 :** 0	**2012 :** 1

3. Associated Knowledge Area(s)

- 605 - Natural Resource and Environmental Economics

V(J). Planned Program (External Factors)

1. External Factors which may affect Outcomes

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

Description

An assessment of the impacts of policy on land and water use is critically dependent on the policies in place at present and other policies that are to be implemented or are under consideration. Likewise, unexpected legal rulings can suddenly create policy issues that demand analysis and educational programs for the public and policymakers. Consequently, it is critically important that those implementing this program have the flexibility to react to important new policy initiatives that may become important over the next five years.

A critical component for this research program is funding, both to support the faculty working on the project and also for graduate student support.

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

1. Evaluation Studies Planned

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

Description

{NO DATA ENTERED}

2. Data Collection Methods

- Mail
- Structured
- Case Study
- Observation
- On-Site
- Sampling
- Unstructured

Description

No specific evaluation studies are planned for this project. The success of the research and extension programs will be determined using several criteria:
(a) The number of presentations made to policymakers addressing the subjects included in this proposal;
(b) The number of popular press publications authored by the project participants or articles in which work on this project is cited;
(c) The number of refereed journal articles published by project participants;
(d) The number of citations of work published by project participants.
(e) Other indicators that demonstrate ways in which the research efforts have caused policymakers, producers or opinionmakers to change behavior or viewpoint in response to this research.

The project participants will track these numbers on an annual basis and provide a summary that will be included in the annual report.

V(A). Planned Program (Summary)

1. Name of the Planned Program

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

2. Brief summary about Planned Program

The overarching goal of the Transcription Factor Cluster (TFC) is to 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). Ligand-activated TFs include the steroid hormone receptors for estrogen, testosterone, thyroid hormone and glucocorticoids as well as the aryl hydrocarbon receptor (AhR), an orphan receptor with no known endogenous ligand. Activated TFs regulate mRNA and protein expression by promoting or inhibiting transcription of specific genes. Inappropriate activation of TFs has been shown to mediate the toxicity induced by exposure to several different environmental chemicals. At the same time, exposure to other chemicals may alleviate the toxicity by antagonizing TF activation or downstream signaling alterations. The research carried out by the TFC will utilize several model systems and several disease endpoints to understand the changes cell signaling induced in different target tissues by chemicals. Results of this research 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.

3. Program existence : Intermediate (One to five years)

4. Program duration : Long-Term (More than five years)

5. Expending formula funds or state-matching funds : Yes

6. Expending other than formula funds or state-matching funds : Yes

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

- 723 100% Hazards to Human Health and Safety

V(C). Planned Program (Situation and Scope)

1. Situation and priorities

It is becoming increasingly apparent that the overall approach to toxicity testing of chemicals found in the human environment is not meeting the needs of society. With current testing paradigms, we spend most of our efforts and a great deal of money testing a limited number of chemicals in extensive testing protocols using laboratory animals. On the other hand, 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.

Transcription factors (TFs) are specialized DNA-binding proteins that bind to promoter regions of specific genes and regulate gene transcription. Some TFs are ligand-activated receptors that bind to DNA after becoming activated by an extracellular ligand. Most endocrine hormones, such as estrogen, testosterone, and thyroid hormones, cause their effects by binding to ligand-activated TFs in target cells. The change in gene expression that ensues is responsible for the hormone dependent response. Cells that do not express the specific receptors do not respond to the hormone, conveying specificity to the response.

Interestingly, several different classes of toxic chemicals have been shown to mediate their toxicity by binding to TFs. This is an important mechanism because such chemicals are potentially capable of causing significant toxic effects at very low exposure levels. For example, several environmental chemicals are capable of binding to estrogen receptors, resulting in either estrogen-like effects (agonistic) or blocking the effects of natural estrogens (antagonistic). In either case, normal body functions may be negatively affected. Other chemicals have been found to bind to TFs that have unknown natural ligands. Such is the case with the ligand-activated AhR that acts as a transcription factor after binding ligands such as 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD) and polycyclic aromatic hydrocarbons (PAHs). Activation of the AhR is recognized as the necessary first step in mediating the extremely potent toxicity of these environmental toxicants.

The TFC will focus their research on studying chemicals that bind and activate TFs. The ultimate goal is to understand the changes in gene

expression that result from TF activation that lead to toxicity. In addition, exposure to other chemicals that are found in the food supply or consumed as nutritional supplements have to potential to counteract this toxicity, through several possible mechanisms. This TFC group has expertise in several model systems with different health endpoints under investigation. Understanding how environmental chemicals hijack the normal transcriptional machinery will play a major role in determining the risk to human health from exposure as well as treatment regimes that could alleviate toxicity if exposure occurs. Expertise using the zebrafish model will contribute to the validation of the zebrafish as a screening tool for toxicity testing and for elucidating mechanisms of toxicant action.

2. Scope of the Program

- In-State Research
- Multistate Research

V(D). Planned Program (Assumptions and Goals)

1. Assumptions made for the Program

Assumptions are that:
the overall approach to toxicity testing of chemicals found in the human environment is not meeting the needs of society.
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.

2. Ultimate goal(s) of this Program

To understand the health effects of environmental chemicals as a function of their ability to act as ligands for certain ligand-activated transcription factors (TFs).
To identify biomarkers that are expressed in response to a set of relevant model toxicants, to generate stable reporter animals using gene regulatory elements. (Tanguay)
To assess the risk of dioxins to humans and understand the downstream pathways and novel antagonists for mediating toxicity (Kolluri)
To investigate the underlying mechanisms of immune suppression. (Kerkvliet)
Through the modulation of the maternal diet, reduce the risk of the fetus to toxic chemicals capable of crossing the placenta (Williams)

V(E). Planned Program (Inputs)

1. Estimated Number of professional FTE/SYs to be budgeted for this Program

Year	Extension		Research	
	1862	1890	1862	1890
2008	0.0	0.0	2.5	0.0
2009	0.0	0.0	2.5	0.0
2010	0.0	0.0	2.5	0.0
2011	0.0	0.0	2.5	0.0
2012	0.0	0.0	2.5	0.0

V(F). Planned Program (Activity)

1. Activity for the Program

- Conduct Research Experiments.- Develop Products, Curriculum, Resources.- Assessments.

2. Type(s) of methods to be used to reach direct and indirect contacts

Extension	
Direct Methods	**Indirect Methods**
• Education Class • Other 1 (professional journals)	• Web sites

3. Description of targeted audience

Scientists, Medical organizations

V(G). Planned Program (Outputs)

1. Standard output measures

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

	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	Target	Target	Target	Target
2008	100	0	0	0
2009	100	0	0	0
2010	100	0	0	0
2011	100	0	0	0
2012	100	0	0	0

2. (Standard Research Target) Number of Patents

Expected Patents

2008 :0 **2009 :**0 **2010 :**0 **2011 :**0 **2012 :**0

3. Expected Peer Review Publications

Year	Research Target	Extension Target
2008	6	0
2009	6	0
2010	6	0
2011	6	0
2012	6	0

V(H). State Defined Outputs

1. Output Target

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

2008 :8 **2009 :**8 **2010 :**8 **2011 :**8 **2012 :**8

- 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.

2008 : 7 **2009 :** 7 **2010 :** 7 **2011 :** 7 **2012 :** 7

V(I). State Defined Outcome

1. Outcome Target

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. Outcome Type : Change in Knowledge Outcome Measure

2008 : 5 **2009 :** 5 **2010 :** 5 **2011 :** 5 **2012 :** 5

3. Associated Knowledge Area(s)

- 723 - Hazards to Human Health and Safety

1. Outcome Target

Develop transgenic lines of zebrafish for response to toxicants

2. Outcome Type : Change in Knowledge Outcome Measure

2008 : 1 **2009 :** 0 **2010 :** 1 **2011 :** 1 **2012 :** 0

3. Associated Knowledge Area(s)

- 723 - Hazards to Human Health and Safety

1. Outcome Target

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. Outcome Type : Change in Action Outcome Measure

2008 : 0 **2009 :** 0 **2010 :** 2 **2011 :** 0 **2012 :** 3

3. Associated Knowledge Area(s)

- 723 - Hazards to Human Health and Safety

V(J). Planned Program (External Factors)

1. External Factors which may affect Outcomes

- Appropriations changes
- Public Policy changes
- Competing Public priorities

Description

Funding priorities affect direction and duration of research

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

1. Evaluation Studies Planned

- Other ()

Description

{NO DATA ENTERED}

2. Data Collection Methods

- {NO DATA ENTERED}

Description

{NO DATA ENTERED}

V(A). Planned Program (Summary)

1. Name of the Planned Program

Families, Youth, and Communities

2. Brief summary about Planned Program

Three specific programs have been targeted as essential research areas whereby the outcomes of the studies have a tremendous impact on populations of great need. These collaborative research efforts will enable faculty in the College of Health and Human Sciences, in collaboration with other academic programs to gain important insights in the needs of rural populations who face on-going challenges of health and well-being. The work of one of the projects, Rural Families Speak, is an on-going multi-state project specifically addresses understanding the underlying challenges and interactions of public assistance and public policy that affect quality of life of families and individuals who live in poverty. This research is vital and continuation of such related research is an important priority. The second, new project area is also focused on families in need, specifically Latino families in Oregon, and the factors that positively or negatively affect physical activity behavior. As is well understood, how much daily physical activity is critical in maintaining adequate energy balance/energy expenditure issues that affect obesity. USDA, CDC, NIH and other federal agencies are seeking ways to influence and prevent obesity. The team of faculty assembled for this important research is poised to seek various sources of funding to assist in the research initiative that aligns nicely with university mission of meeting the biological, social and environmental needs of the residents of Oregon. The third activity of important, yet differently focused work, is related to textile development to improve the quality of lives of people in Oregon and beyond. Specifically the work of Dr. Chen will examine the thermal qualities of readily available agricultural products to be used in clothing design and development. Ideally the outcomes of this research will improve the quality and availability of a sustainable product, to be used in clothing for older adults and disabled adults who often have impaired thermoregulatory capacity. Better garments may lower the need for other sources of heat which are costly.

3. Program existence : Intermediate (One to five years)

4. Program duration : Long-Term (More than five years)

5. Expending formula funds or state-matching funds : Yes

6. Expending other than formula funds or state-matching funds : Yes

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

- 802 70% Human Development and Family Well-Being
- 804 30% Human Environmental Issues Concerning Apparel, Textiles, and Residential and Commercial Structures

V(C). Planned Program (Situation and Scope)

1. Situation and priorities

The outcomes of the studies have a tremendous impact on populations of great need.

- rural populations who face on-going challenges of health and well-being.
- families and individuals who live in poverty.
- Latino families in Oregon, and the factors that positively or negatively affect physical activity behavior, as well as, how much daily physical activity is critical in maintaining adequate energy balance/energy expenditure issues that affect obesity.
- older adults and disabled adults who often have impaired thermoregulatory capacity.

2. Scope of the Program

- In-State Extension
- Integrated Research and Extension
- Multistate Research

V(D). Planned Program (Assumptions and Goals)

1. Assumptions made for the Program

Assumptions are that:

- underlying challenges and interactions of public assistance and public policy that affect quality of life of families and individuals who live in poverty
- daily physical activity is critical in maintaining adequate energy balance/energy expenditure issues that affect obesity
- there are thermal qualities of readily available agricultural products that can be used in clothing design and development
- Although the properties of poplar seed hair fibers have never been studied, comforters made of poplar seed hair fibers have been produced by a small company in Germany. 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. 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.

2. Ultimate goal(s) of this Program

To gain important insights in the needs of rural populations who face on-going challenges of health and well-being.

Objective #1: To understand the links between quality of life for individual families and wider community and public policy influences.
To analyze the interactions among public assistance and informal social supports, community context, and individual and family characteristics and their relation to the functioning and well-being of rural low income families with children over three years time.
To assess across time the relative effects of economic opportunity, and personal attributes and actions, on employment and self-sufficiency among the rural low income families participating in the study.
To assess over time, how families have adapted to policy and economic changes to achieve self-sufficiency (household adaptive strategies and well being that are associated with economic, food security, family functioning and policy).
To analyze policy areas connected to each quality of life domain, such as food security, access to mental and physical health resources, economic issues including transportation and childcare, and place-based policies for three specific sub-populations: Latino, non-Hispanic White, and Appalachian.

Objective #2: To examine perceptions of and barriers to physical activity in rural communities.
Identify individual attributes and family processes associated with specific patterns of physical activity among by youth within the context of a rural community.
Identify specific resources, opportunities, and barriers within the social and physical environment that either positively or negatively affect patterns of physical activity among small town youth.
Examine how individual attributes, family processes, and characteristics of place shape the capacity of rural youth to develop and maintain healthy patterns of physical activity.

Objective #3: To explore and study environmentally friendly and sustainable agricultural product (e.g., poplar seed hair fibers) in functional textile applications.
Determine the features of the chemical constitution and physical structures of poplar tree seed hair fibers that are relevant to their use in textile thermal insulation applications.
Quantitatively evaluate thermal insulation and related properties of poplar seed hair fiber textile products.

V(E). Planned Program (Inputs)

1. Estimated Number of professional FTE/SYs to be budgeted for this Program

Year	Extension		Research	
	1862	1890	1862	1890
2008	0.2	0.0	1.1	0.0
2009	0.2	0.0	1.1	0.0
2010	0.2	0.0	1.1	0.0
2011	0.2	0.0	1.1	0.0
2012	0.2	0.0	1.1	0.0

V(F). Planned Program (Activity)

1. Activity for the Program

- Conduct Research Experiments.- Develop Products, Curriculum, Resources.- Provide Training.- Assessments.- Partnering.

2. Type(s) of methods to be used to reach direct and indirect contacts

Extension	
Direct Methods	Indirect Methods
• Group Discussion	• Other 2 (professional publications) • Other 1 (policy briefs)

3. Description of targeted audience

- extension educators.- commercial producers.- youth aged 13-18.- elderly residents
- rural residents
- Latino populations- economists.- policy makers.

V(G). Planned Program (Outputs)

1. Standard output measures

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

	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	Target	Target	Target	Target
2008	150	500	0	0
2009	50	500	0	0
2010	50	400	0	0
2011	100	500	0	0
2012	50	500	0	0

2. (Standard Research Target) Number of Patents

Expected Patents

2008 :0 **2009 :**0 **2010 :** 0 **2011 :**0 **2012 :**0

3. Expected Peer Review Publications

Year	Research Target	Extension Target
2008	4	0
2009	2	0
2010	1	0
2011	1	0
2012	2	0

V(H). State Defined Outputs

1. Output Target

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

2008 :5 **2009 :**2 **2010 :** 1 **2011 :**1 **2012 :**2

- 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.

2008 :3 **2009 :**4 **2010 :** 3 **2011 :**4 **2012 :**3

V(I). State Defined Outcome

1. Outcome Target

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. Outcome Type : Change in Knowledge Outcome Measure

2008 :5 **2009 :** 5 **2010 :** 5 **2011 :**5 **2012 :** 5

3. Associated Knowledge Area(s)

- 802 - Human Development and Family Well-Being

1. Outcome Target

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

2. Outcome Type : Change in Knowledge Outcome Measure

2008 : 0	**2009 :** 1	**2010 :** 0	**2011 :** 1	**2012 :** 0

3. Associated Knowledge Area(s)

- 802 - Human Development and Family Well-Being

1. Outcome Target

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

2. Outcome Type : Change in Knowledge Outcome Measure

2008 : 0	**2009 :** 1	**2010 :** 1	**2011 :** 1	**2012 :** 1

3. Associated Knowledge Area(s)

- 804 - Human Environmental Issues Concerning Apparel, Textiles, and Residential and Commercial Structures

1. Outcome Target

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

2. Outcome Type : Change in Action Outcome Measure

2008 : 0	**2009 :** 0	**2010 :** 1	**2011 :** 0	**2012 :** 1

3. Associated Knowledge Area(s)

- 802 - Human Development and Family Well-Being

1. Outcome Target

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

2. Outcome Type : Change in Condition Outcome Measure

2008 : 0	**2009 :** 0	**2010 :** 2	**2011 :** 0	**2012 :** 2

3. Associated Knowledge Area(s)

- 802 - Human Development and Family Well-Being
- 804 - Human Environmental Issues Concerning Apparel, Textiles, and Residential and Commercial Structures

V(J). Planned Program (External Factors)

1. External Factors which may affect Outcomes

- Economy
- Populations changes (immigration,new cultural groupings,etc.)

Description

{NO DATA ENTERED}

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

1. Evaluation Studies Planned

- {NO DATA ENTERED}

Description

{NO DATA ENTERED}

2. Data Collection Methods

- {NO DATA ENTERED}

Description

{NO DATA ENTERED}

V(A). Planned Program (Summary)

1. Name of the Planned Program

Field Crop Pest Management and Biology

2. Brief summary about Planned Program

We will develop and apply the best tools of contemporary weed, insect and disease management to address the challenges and opportunities facing Oregon's agricultural industry and natural resource communities. Innovations in strategic use of pesticides, use of herbicide resistant crops, integrated pest management strategies to minimize pest presence and impact, and developing a greater understanding of pest biology will be keys to success. Research and extension efforts will focus on weed control in grass and other seed, grain, and vegetable crops; insect and slug control in seed and grain crops; and disease work in nurseries, forests, and grass seed production. Our ultimate goal is to make significant contributions toward providing a stable, sustainable, and healthy supply of food, fuel, fiber and planting seed for the nation while strengthening Oregon's rural communities and to contribute to scientific knowledge.

3. Program existence : Mature (More then five years)

4. Program duration : Long-Term (More than five years)

5. Expending formula funds or state-matching funds : Yes

6. Expending other than formula funds or state-matching funds : Yes

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

- 211 15% Insects, Mites, and Other Arthropods Affecting Plants
- 212 15% Pathogens and Nematodes Affecting Plants
- 213 40% Weeds Affecting Plants
- 214 10% Vertebrates, Mollusks, and Other Pests Affecting Plants
- 215 5% Biological Control of Pests Affecting Plants
- 216 15% Integrated Pest Management Systems

V(C). Planned Program (Situation and Scope)

1. Situation and priorities

Approximately 25% of Oregon's economy is based on agriculture. The field crops for which we provide pest management research and extension support in the Oregon State University Department of Crop and Soil Science – forages and hays, seed crops, cereal grains, onions, potatoes, vegetable row crops, mint, containerized nursery crops, Christmas trees, and others – account for over 50% of agricultural farm gate value in a typical year. Hence, over 12% of Oregon's economy can be directly influenced and affected by the success of our research and extension programs in pest management. Via integration of fundamental and applied research, CSS pest management scientists work hand-in-hand with their clientele to improve the sustainability – in all of its meanings - of growing field crops in Oregon and of pest control in other venues – roadside and aquatic weeds, structural pests, etc. We refine current pest management practices to provide greatest economic benefit with the least environmental impact for our broad range of clientele. We develop new pest management systems. We work with our plant breeding and genetics, plant production, and soils colleagues in these activities. We work directly with clientele to understand pest management needs. We make significant contributions to the fundamental understanding of pests and pest management systems.

2. Scope of the Program

- In-State Extension
- In-State Research
- Integrated Research and Extension
- Multistate Extension
- Multistate Integrated Research and Extension
- Multistate Research

V(D). Planned Program (Assumptions and Goals)

1. Assumptions made for the Program

Crop and Soil Science faculty are in on-going contact with professional peers across the OSU campus, around the state of Oregon, the country and world. They work in cooperation with peers in county, state, regional and federal agencies. They work with county extension and branch research station faculty and their advisory committees. They work with commodity commission and grower association leaders. They converse directly with end users of their programs and products. They are members of successful regional and national competitive grant consortia. Through this array of contacts they have a keen awareness of local, state, regional, national and international extension and research needs in pest management.

2. Ultimate goal(s) of this Program

The goal of this program is develop and apply the best tools in contemporary pest management sciences to address the challenges and opportunities facing Oregon's agricultural industry and natural resource communities. Oregon's natural resource communities face significant challenges in dealing with rising production costs, environmental concerns, labor issues, transportation issues, competition from other domestic and foreign producers and other eternal factors. In the pest management area there are specific concerns about continued use of organophosphate insecticides and some type of fumigants; the development of resistance in pests due to the on-going use of pesticides with similar modes of action; the lack of development of pesticides with new modes of action; developing effective pest management strategies with ever increasing pressure from urban-rural interface issues; and dealing with invasive pests. The goal of this program is to work with clientele to find best solutions for addressing these problems. Innovations in strategic use of pesticides, use of herbicide resistant crops, integrated pest management strategies to minimize pest presence and impact, and developing a greater understanding of pest biology will be keys to success.

Program Objectives and Associated Investigators

Program scientists will evaluate current and newly developed pesticides for effectiveness in pest control and interactions in cropping systems and make recommendations on pesticide use and registration – Affeldt, Butler, Fisher, Flowers, Mallory-Smith, Young, new weeds specialist

Program scientists will investigate the biology of pests and use the knowledge gained to make recommendations on pest control strategies of all types – modeling for prediction of pest thresholds, cultural, chemical, biological, IPM – Butler, Fisher, Flowers, Mallory-Smith, Parke, Rao, Young, new weeds specialist

Program scientist will increase the pool of fundamental knowledge about crop pests through more basic research efforts – Fisher, Mallory-Smith, Parke, Rao, new weed specialist

V(E). Planned Program (Inputs)

1. Estimated Number of professional FTE/SYs to be budgeted for this Program

Year	Extension		Research	
	1862	1890	1862	1890
2008	2.6	0.0	4.5	0.0
2009	2.6	0.0	4.5	0.0
2010	2.6	0.0	4.5	0.0
2011	2.6	0.0	4.5	0.0
2012	2.6	0.0	4.5	0.0

V(F). Planned Program (Activity)

1. Activity for the Program

- Conduct Research Experiments.
- Conduct trials
- Conduct Workshops, meetings.- Deliver Services.- Develop Products, Curriculum, Resources.- Provide Training.- Assessments.- Partnering.

2. Type(s) of methods to be used to reach direct and indirect contacts

Extension	
Direct Methods	**Indirect Methods**
• One-on-One Intervention • Demonstrations • Group Discussion • Education Class • Workshop	• Newsletters • Web sites • Other 2 (peer journals)

3. Description of targeted 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(G). Planned Program (Outputs)

1. Standard output measures

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

	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	Target	Target	Target	Target
2008	500	5000	50	0
2009	500	5000	50	0
2010	500	5000	50	0
2011	500	5000	50	0
2012	500	5000	50	0

2. (Standard Research Target) Number of Patents

Expected Patents

2008 : 0 **2009 :** 0 **2010 :** 0 **2011 :** 0 **2012 :** 0

3. Expected Peer Review Publications

Year	Research Target	Extension Target
2008	30	0
2009	30	0
2010	30	0
2011	30	0
2012	30	0

V(H). State Defined Outputs

1. Output Target

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

2008 :40 **2009 :**40 **2010 :** 40 **2011 :**40 **2012 :**40

- 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.

2008 :5 **2009 :**5 **2010 :** 5 **2011 :**5 **2012 :**5

V(I). State Defined Outcome

1. Outcome Target

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. Outcome Type : Change in Knowledge Outcome Measure

2008 :4 **2009 :** 4 **2010 :** 4 **2011 :**4 **2012 :** 4

3. Associated Knowledge Area(s)

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

1. Outcome Target

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

2. Outcome Type : Change in Action Outcome Measure

2008 :	2009 :	2010 :	2011 :	2012 :
0	5	0	5	0

3. Associated Knowledge Area(s)

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

1. Outcome Target

In the long run,

· Agricultural producers will realize greater economic return in their enterprises;

· Strategies for avoiding invasive pests will be in place

2. Outcome Type : Change in Condition Outcome Measure

2008 :	2009 :	2010 :	2011 :	2012 :
0	0	0	0	5

3. Associated Knowledge Area(s)

- 216 - Integrated Pest Management Systems

V(J). Planned Program (External Factors)

1. External Factors which may affect Outcomes

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

Description

Government subsidies and programs can dramatically affect crop production. If subsidies exist for the production of a particular crop, despite integrate pest management recommendations, acreage can be driven toward that crop.

As production input prices climb, grower may be forced to make production decisions based on available dollars versus best pest management practices.

Public concerns may result in the untimely removal of certain classes of pesticides from use before effective alternatives are identified.

The unintended introduction or identification of internationally quarantined pests could result in wholesale loss of the value of some agricultural enterprises – recent examples in other areas include Karnal bunt in wheat and mad cow disease

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

1. Evaluation Studies Planned

- {NO DATA ENTERED}

Description

{NO DATA ENTERED}

2. Data Collection Methods

- {NO DATA ENTERED}

Description

{NO DATA ENTERED}

V(A). Planned Program (Summary)

1. Name of the Planned Program

Horticultural Management Systems

2. Brief summary about Planned Program

Horticultural management systems, describes a program that balances two themes in the Department of Horticulture, i.e., ecological landscapes and food/farm systems that benefit Oregonians and Americans. Goals and objectives are defined by faculty and advisory groups with activities to integrate and deliver research, teaching, and Extension programs across Oregon and collaboratively within the Pacific Northwest. Activities are prioritized within commodity work groups with similar sub-objectives to aggregate results, learning, change, and impact over time. Both organic practices and plant protection (KA 216) are described as sub-objectives and featured in each work group for reference or data access.

3. Program existence : New (One year or less)

4. Program duration : Long-Term (More than five years)

5. Expending formula funds or state-matching funds : Yes

6. Expending other than formula funds or state-matching funds : Yes

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

- 205 65% Plant Management Systems
- 216 35% Integrated Pest Management Systems

V(C). Planned Program (Situation and Scope)

1. Situation and priorities

Horticultural enterprises are changing as managers adapt to new marketing strategies, environmental issues, urbanization, and opportunities. By 2010, we envision greater emphasis on landscapes, turf, and golf course management; and food and farming systems that better integrate enterprises (commodities) into local communities, society, and the environment. Faculty see opportunities to expand the science and teaching of horticulture principles to conservation, restoration, and green industries and to integrate plants and practices into riparian and regional landscapes that benefit the environment, contribute ecosystem services, and enhance beauty or livability in Oregon. Envisioned also are fruit and vegetable products that contribute to a health conscious public combined with lifestyles where plants and landscapes improve lives, health, and habits.

2. Scope of the Program

- In-State Extension
- In-State Research
- Integrated Research and Extension
- Multistate Integrated Research and Extension
- Multistate Research

V(D). Planned Program (Assumptions and Goals)

1. Assumptions made for the Program

Faculty members in the College of Agricultural Sciences are expected to address critical needs as well as deliver assigned duties that are defined in position descriptions regardless of FTE assignment. They balance stakeholder input/concerns with knowledge of the literature to prioritize program activities. Faculty also must supplement modest funds provided by the College of Agricultural Sciences with external grants, often submitted to federal agencies and commodity commissions. They assume that their ideas and proposed activities will compete successfully to enable program delivery.

2. Ultimate goal(s) of this Program

Horticultural management systems will be improved by integrating practices, cultivars, and technologies to achieve greater efficiencies,

integrated pest management, organic production, and products that meet market and consumer demand while considering impacts on the environment, worker protection, and human health or livelihoods.

Ecological landscapes is a thematic emphasis that combines horticultural principles and practices with the sciences of ecology, restoration, conservation, riparian ecology, and 'green' technologies. This program will be complemented by social and health sciences and basic plant biology (KA 206), ecology of plants and plant communities in horticultural and ecological landscapes.

Farm/Food systems is a second programmatic theme that focuses on production efficiencies within commodities while expanding enterprises, increasing crop rotations, and plant protection (KA 216). This program is underpinned by market analysis, consumer demand for sustainable and organic practices, and basic plant biology (KA 206) that integrate plant breeding, genetics, disease resistance, and plant nutrition (see page 7).

General Objectives are:

Objective 1: Develop, test, and disseminate practices and technologies designed to improve production/management efficiencies of horticultural crops, enterprises, and systems.

Objective 2: Develop, test, and disseminate plant protection practices and technologies that manage or minimize pests and pest damage in horticultural cropping systems.

Objective 3: Develop, test, and disseminate organic practices/technologies that achieve certification standards for horticultural crops and cropping systems.

V(E). Planned Program (Inputs)

1. Estimated Number of professional FTE/SYs to be budgeted for this Program

Year	Extension		Research	
	1862	1890	1862	1890
2008	24.1	0.0	6.8	0.0
2009	26.8	0.0	7.8	0.0
2010	26.8	0.0	7.8	0.0
2011	26.8	0.0	7.8	0.0
2012	26.8	0.0	7.8	0.0

V(F). Planned Program (Activity)

1. Activity for the Program

- Conduct Research Experiments.- Conduct Workshops, meetings.- Deliver Services.- Develop Products, Curriculum, Resources.- Provide Training.- Provide Counseling.- Assessments.- Work with Media.- Partnering.- Facilitating.

2. Type(s) of methods to be used to reach direct and indirect contacts

Extension	
Direct Methods	**Indirect Methods**
• Group Discussion • Demonstrations • Education Class • One-on-One Intervention • Other 1 (distance ed/eXtension) • Workshop • Other 2 (meetings/journals/magazine/tours)	• TV Media Programs • Newsletters • Public Service Announcement • Billboards • Other 1 (distance education) • Web sites

3. Description of targeted 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(G). Planned Program (Outputs)

1. Standard output measures

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

	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	Target	Target	Target	Target
2008	23170	7230250	210	0
2009	23170	7230250	210	0
2010	23170	7230250	210	0
2011	23170	7230250	210	0
2012	23170	7230250	210	0

2. (Standard Research Target) Number of Patents

Expected Patents

2008 : 2 **2009 :** 2 **2010 :** 2 **2011 :** 2 **2012 :** 2

3. Expected Peer Review Publications

Year	Research Target	Extension Target
2008	5	0
2009	5	0
2010	5	0
2011	5	0
2012	8	0

V(H). State Defined Outputs

1. Output Target

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

2008 : 10 **2009 :** 10 **2010 :** 10 **2011 :** 10 **2012 :** 10

- 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.

2008 : 5000 **2009 :** 5000 **2010 :** 5000 **2011 :** 5000 **2012 :** 5000

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

2008 : 0 **2009 :** 0 **2010 :** 0 **2011 :** 3000 **2012 :** 0

- 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.

2008 :20 **2009 :**20 **2010 :** 20 **2011 :**23 **2012 :**25

- 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

2008 :0 **2009 :**0 **2010 :** 1 **2011 :**1 **2012 :**1

-

2008 :0 **2009 :**0 **2010 :** 0 **2011 :**2 **2012 :**0

- 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

2008 :0 **2009 :**1 **2010 :** 0 **2011 :**0 **2012 :**1

V(I). State Defined Outcome

1. Outcome Target

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. Outcome Type : Change in Knowledge Outcome Measure

2008 :1000 **2009 :** 1000 **2010 :** 1000 **2011 :**1000 **2012 :** 1000

3. Associated Knowledge Area(s)

- 216 - Integrated Pest Management Systems

1. Outcome Target

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. Outcome Type : Change in Knowledge Outcome Measure

2008 :100 **2009 :** 100 **2010 :** 100 **2011 :**100 **2012 :** 100

3. Associated Knowledge Area(s)

- 205 - Plant Management Systems
- 216 - Integrated Pest Management Systems

1. Outcome Target

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. Outcome Type : Change in Action Outcome Measure

2008 :	**2009 :**	**2010 :**	**2011 :**	**2012 :**
1000	1000	1000	1000	1000

3. Associated Knowledge Area(s)

- 205 - Plant Management Systems
- 216 - Integrated Pest Management Systems

1. Outcome Target

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. Outcome Type : Change in Knowledge Outcome Measure

2008 :	**2009 :**	**2010 :**	**2011 :**	**2012 :**
75	75	75	75	75

3. Associated Knowledge Area(s)

- 205 - Plant Management Systems
- 216 - Integrated Pest Management Systems

1. Outcome Target

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.

2. Outcome Type : Change in Condition Outcome Measure

2008 :	**2009 :**	**2010 :**	**2011 :**	**2012 :**
2500	2500	2500	2500	2500

3. Associated Knowledge Area(s)

- 205 - Plant Management Systems

1. Outcome Target

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. Outcome Type : Change in Condition Outcome Measure

2008 :	**2009 :**	**2010 :**	**2011 :**	**2012 :**
1500	1500	1500	1500	1500

3. Associated Knowledge Area(s)

- 205 - Plant Management Systems
- 216 - Integrated Pest Management Systems

V(J). Planned Program (External Factors)

1. External Factors which may affect Outcomes

- Natural Disasters (drought,weather extremes,etc.)
- Economy
- Appropriations changes
- Public Policy changes
- Government Regulations
- Competing Public priorities
- Competing Programatic Challenges
- Populations changes (immigration,new cultural groupings,etc.)
- Other (university/college policies)

Description

External factors critical to the success of this plan include monetary support from grants and contracts. Newly hired faculty must compete for support dollars in areas of dwindling resources. An alternative might be to consider ways that horticultural research programs can collaborate with faculty projects that qualify for DOE or NIH funds.

Senior researchers express concern for new faculty hired at 0.75FTE with expectations that they supplement their salary with grant funds. A significant consequence of this policy is that fewer workers will be hired to do the research. Also, new and senior faculty will compete unequally for commodity funds or regional grants, resulting in advantages for projects that deliver greater output or benefits.

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

1. Evaluation Studies Planned

- Retrospective (post program)
- During (during program)

Description

Since faculty routinely measure program success, outcomes indicators will measure performance using criteria defined by principle investigators based on the "logic model" as a common framework of evaluation. This seamless evaluation model asks questions designed to improve programs while gathering evidence of outcomes-based performance. Scientists and educators will describe novel ideas and successes to identify what worked and what might be improved. Queries add evidence that research objectives were addressed and followed by the "logic" that learning precedes changes in behavior and practice that, in turn, precedes economic, environment, or social impacts. Seamless evaluation asks questions important to researchers and educators in ways that attribute to progress and performance and that can be accessed in individual reports as well as aggregated for the departmental, college, and national programs. An outline of the process follows:

2. Data Collection Methods

- Sampling
- On-Site
- Structured
- Unstructured
- Observation
- Tests

Description

· Program objectives addressed and include evidence of novel ideas, successes, discoveries, and program improvement.

· Activities planned/reported, ie., number of projects, publications, students, seminars, conferences, papers published, grants received, etc.

· Results expected and reported (outcomes)

o Learning or knowledge (intentional learning activities such as one-minute drawings, post-then pre scales, post assessment of learning objectives, etc)

§ Learning/skills developed/implemented within research project.

§ Students assess learning in classes, skills learned by grad students, progress toward graduation requirements, etc.

§ Colleagues/peers attend seminars, response/questions following presentation or number people who discuss poster at professional meetings, number of people attend poster literature citations/web hits, news stories, etc.

§ Discoveries published, literature citations, invited papers, etc.

o Change in behavior or practice (cards ask peers about novel ideas learned and possible use of idea/insight, evidence that peers used information or discovery, commodity commissions report acres planted to new cultivar, new businesses started, ecosystem services measured, individuals report health or healthy lifestyles improved, etc)

§ Methods changed and/or improved within research project.

§ Colleagues andpeers report changes and improvements in their research programs either local or other institutions and business enterprises.

§ New practices and cultivars are released and used by public.

o Impacts or long-term change (impact indicators attribute progress toward achieving project/program goals such as reduced costs, reduced disease incidence and improved environmental impact from incorporation of resistance genes in horticultural plants, plants provide ecosystem services to reduce heat load in urban environments, etc.)

§ Economic impact, estimates and evidence that your successes were used to reduce costs, improve markets, change livelihoods.

§ Environmental impact, estimates, and evidence that your successes contributed to changes in the environment, ecosystems services, policy or ways people manage natural resources.

§ Social impact, estimates, and evidence that your successes changed lives, health, healthy lifestyles, beauty, social awareness, and well-being of Oregonians and others.

V(A). Planned Program (Summary)

1. Name of the Planned Program

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

2. Brief summary about Planned Program

College of Health and Human Sciences (CHHS) is a partner college with College of Agricultural Sciences (CAS) to accomplish the goal of 'A healthy, well-nourished population'. Human nutrition and the interaction of healthy behavioral choices including healthy diet and physical activity are primary areas of interest and focus of research and extension in CHHS. There are three topical areas to be considered as AES priorities for the CHHS. The first area is related to the USDA knowledge area (KA) 702, i.e. Requirements and Function of Nutrients and Other Food Components, second area is KA 703, i.e. Nutrition Education and Behavior, and the third area is KA 724, i.e. Healthy Lifestyle. Together, the AES projects in College of Health and Human Sciences is making contribution to the National Goal #3 - 'A healthy, well-nourished population'.

Faculty members with AES appointment participated in three specific multistate projects that are related to the USDA knowledge areas in CHHS. Emily Ho is member of W1002 – Phytochemicals and beyond. This project proposes to study the dietary zinc function in prevention of prostate cancer and to characterize the effect of sulforaphane (SFN), a bioactive compound in broccoli on HDAC activity & cell proliferation in prostate cancer. Mary Cluskey is member of multistate project W-1003. This project focuses on the assessment of food intake and dietary patterns, explore interrelationships among food intake factors in the prevention of osteoporosis and control of obesity among white, Hispanic and Asian adolescents. Melinda Manore is a member of multi-state project (W-TEMP 1821) which is an integrated approach to prevention of obesity in high risk families. Healthy lifestyle is a specific area that will attract more faculty members with interest and expertise in physical activity and obesity.

3. Program existence : Intermediate (One to five years)

4. Program duration : Long-Term (More than five years)

5. Expending formula funds or state-matching funds : Yes

6. Expending other than formula funds or state-matching funds : Yes

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

- 702 40% Requirements and Function of Nutrients and Other Food Components
- 703 25% Nutrition Education and Behavior
- 724 35% Healthy Lifestyle

V(C). Planned Program (Situation and Scope)

1. Situation and priorities

Important health issues in the U.S. include cancer and obesity and result in loss of lives, as well as high health care costs and loss of productivity in the work force.

Prostate cancer is the most frequently diagnosed non-cutaneous cancer, and is the second leading cause of cancer death in American men. The role of zinc and cancer has received increasing attention since the role of zinc in a wide range of cellular processes, including cell proliferation, reproduction, immune function, and defense against free radicals, has been well established (1, 2). In addition, the precise etiologic factors that initiate and enhance the progression of prostate cancer remains unknown, but epigenetic alterations and diet/lifestyle factors have come forth as significant contributing factors. Epidemiological studies suggest that cruciferous vegetable intake decreases the risk for prostate cancer.

Overweight and obesity have reached epidemic proportions in the United States. The proportion of adults who are overweight increased substantially between 1980 and 2002 (CDC, 2005). By 2002, 65% of U.S. adults (20-74 yrs of age) were overweight and 31% were obese. Likewise, obesity has become the most prevalent nutritional disease of children and adolescents (Dietz, 1998, CDC, 2005). Children from low SES and racial/ethnic minority groups tend to have higher rates of obesity in comparison to other groups (Nesbitt et al., 2004; Thompson et al., 2003). Among adults, obesity rates are about 28% for men regardless of racial/ethnic group membership. Adult women have higher rates of obesity than males. Obesity rates are higher among Hispanic women (39%) than White women (31%) and even higher (50%) among African-American women (CDC, 2005). It is well known that chronic disease risks increase with increasing body weight (Mokdad et al., 2001).

It is also clear that overweight and obese children are likely to remain overweight and obese adults and to develop chronic diseases at younger ages (Ebbing et al., 2002). Obesity was first declared a major public concern in 1952 (Nestle and Jacobson, 2000). Since then billions of dollars have been spent to prevent and intervene with no discernable effect. It is obvious that we need new approaches. The complexity and multifaceted nature of obesity development and its intractability strongly argue for multi-disciplinary approaches.

2. Scope of the Program

- In-State Extension
- In-State Research
- Integrated Research and Extension
- Multistate Extension
- Multistate Integrated Research and Extension
- Multistate Research

V(D). Planned Program (Assumptions and Goals)

1. Assumptions made for the Program

The role of zinc in a wide range of cellular processes, including cell proliferation, reproduction, immune function, and defense against free radicals, has been well established (1, 2). Thus, zinc plays an important role in protecting cellular components from oxidation and damage to DNA and may play an important role in prostate cancer development. Another phytochemicals that may play a role is solforaphane.

Epidemiologic studies suggest that cruciferous vegetable intake may lower overall risk of prostate cancer, particularly during the early stages (1-4), and there is growing interest in identifying the specific chemoprotective constituents and their mechanisms of action.

2. Ultimate goal(s) of this Program

To demonstrate the benefits of human nutrition and interaction of healthy behavioral choices, including healthy diet and physical activity,

Objective #1a. To determine the contribution of zinc in protecting prostate epithelial cells from oxidant-mediated cellular DNA damage both in vitro and in vivo. (Ho/Wong)

a: Define the role of zinc in the protection of prostate epithelial cells against DNA damage.

b: Define the mechanistic consequences of alterations in dietary zinc in prostate carcinogenesis.

Objective #1b: Characterize effect and mechanisms of sulforaphane on prostate cancer cells (Ho/Wong, multistate projects)

Objective #2 To assess food intake and dietary patterns as determinants of health, obesity among white, Hispanic and Asian ethnicities.

Subobjective a: explore interrelationships among food intake factors in the prevention of osteoporosis and control of obesity among white, Hispanic and Asian adolescents

1. Determine obstacles/motivators to calcium intakes among white, Hispanic, and Asian adolescents
2. Identify motivating strategies to increase calcium consumption; develop nutrition education materials geared to those strategies
3. Explore relationship between dairy consumption and weight control

Subobjective b: include economic, taste, social and time use as determining factors influencing healthful food choices among young adults of white, Hispanic and Asian ethnicities in an attempt to improve obesity incidence in young populations. (McCluskey)

1. Examine and identify factors that motivate the choice of healthy foods
2. Determine how peers influence food intake in social settings

3. Identify effective nutrition education messages that modify the perception of healthy foods among young adults.
4. Determine ways to increase healthful food choices when dining out
5. Identify tasty, inexpensive, and quick to prepare healthful foods which are acceptable to young adults
6. Gather a large data pool of nutrient intake data based on food choices made outside of the home

Objective #3. To take an integrated approach to prevention of obesity in high risk families to reduce the incidence of obesity in the U.S. and improve weight maintenance. (Manore/Hardin/van der Mars) – multistate project

Conduct an expert field review of key behavioral measures purported to contribute to excessive weight gain in children aged 4-10 years old.

Identify anthropometric and physiological measures that could be used to differentiate families within the target population in the community setting

To assess parent-child interactions in the target population as they relate to key behaviors identified as being associated with resilience to

overweight

V(E). Planned Program (Inputs)

1. Estimated Number of professional FTE/SYs to be budgeted for this Program

Year	Extension		Research	
	1862	1890	1862	1890
2008	0.2	0.0	2.6	0.0
2009	0.2	0.0	2.6	0.0
2010	0.2	0.0	2.6	0.0
2011	0.2	0.0	2.6	0.0
2012	0.2	0.0	2.6	0.0

V(F). Planned Program (Activity)

1. Activity for the Program

- Conduct Research Experiments.- Conduct Workshops, meetings.- Deliver Services.- Develop Products, Curriculum, Resources.- Provide Training.- Provide Counseling.- Assessments.- Partnering.

2. Type(s) of methods to be used to reach direct and indirect contacts

Extension	
Direct Methods	Indirect Methods
• Education Class • Workshop	• Newsletters • Web sites • Other 1 (professional publications)

3. Description of targeted audience

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

V(G). Planned Program (Outputs)

1. Standard output measures

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

	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	Target	Target	Target	Target
2008	50	0	0	0
2009	50	0	0	0
2010	50	0	0	0
2011	50	0	0	0
2012	50	0	0	0

2. (Standard Research Target) Number of Patents

Expected Patents

2008 :0 **2009 :**0 **2010 :** 0 **2011 :**0 **2012 :**0

3. Expected Peer Review Publications

Year	Research Target	Extension Target
2008	4	0
2009	4	0
2010	4	0
2011	4	0
2012	4	0

V(H). State Defined Outputs

1. Output Target

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

2008 :5 **2009 :**5 **2010 :** 5 **2011 :**5 **2012 :**5

- 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.

2008 :3 **2009 :**3 **2010 :** 3 **2011 :**3 **2012 :**3

V(I). State Defined Outcome

1. Outcome Target

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. Outcome Type : Change in Knowledge Outcome Measure

2008 : 10	**2009 :** 10	**2010 :** 10	**2011 :** 10	**2012 :** 10

3. Associated Knowledge Area(s)

- 702 - Requirements and Function of Nutrients and Other Food Components
- 703 - Nutrition Education and Behavior
- 724 - Healthy Lifestyle

1. Outcome Target

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. Outcome Type : Change in Action Outcome Measure

2008 : 0	**2009 :** 2	**2010 :** 2	**2011 :** 2	**2012 :** 0

3. Associated Knowledge Area(s)

- 702 - Requirements and Function of Nutrients and Other Food Components
- 703 - Nutrition Education and Behavior
- 724 - Healthy Lifestyle

1. Outcome Target

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. Outcome Type : Change in Action Outcome Measure

2008 : 0	**2009 :** 2	**2010 :** 0	**2011 :** 2	**2012 :** 1

3. Associated Knowledge Area(s)

- 702 - Requirements and Function of Nutrients and Other Food Components
- 703 - Nutrition Education and Behavior
- 724 - Healthy Lifestyle

1. Outcome Target

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. Outcome Type : Change in Condition Outcome Measure

2008 : 0 **2009 :** 0 **2010 :** 5 **2011 :** 0 **2012 :** 5

3. Associated Knowledge Area(s)

- 702 - Requirements and Function of Nutrients and Other Food Components
- 703 - Nutrition Education and Behavior
- 724 - Healthy Lifestyle

V(J). Planned Program (External Factors)

1. External Factors which may affect Outcomes

- Economy
- Public Policy changes
- Competing Public priorities

Description

{NO DATA ENTERED}

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

1. Evaluation Studies Planned

- {NO DATA ENTERED}

Description

{NO DATA ENTERED}

2. Data Collection Methods

- {NO DATA ENTERED}

Description

{NO DATA ENTERED}

V(A). Planned Program (Summary)

1. Name of the Planned Program

Improving Agribusiness & Food Marketing Decisions in the Pacific NorthWest

2. Brief summary about Planned Program

This research program is aimed at generating new insights and knowledge to help agribusiness & food marketing managers in Oregon (and beyond) better understand buyer response to existing and new offers. Ultimately, by generating information on how to more successfully market products, brands, and services, food and agri-businesses will be enabled to survive and prevail in national and international markets.

3. Program existence : Mature (More then five years)

4. Program duration : Long-Term (More than five years)

5. Expending formula funds or state-matching funds : Yes

6. Expending other than formula funds or state-matching funds : Yes

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

- 602 10% Business Management, Finance, and Taxation
- 604 80% Marketing and Distribution Practices
- 607 10% Consumer Economics

V(C). Planned Program (Situation and Scope)

1. Situation and priorities

Traditionally, food and agri-businesses focus on quality, production, and cost issues. While market-orientation has been identified as a key factor in creating and sustaining business success across product categories and markets, underlying principles have gained little recognition by agribusiness and food marketers. It is becoming increasingly obvious that – in order to survive – food and agribusinesses in Oregon and elsewhere need to obtain more knowledge on buyer behavior and obtain the skills necessary for recognizing and responding to respective challenges and opportunities. First among those skills are branding, packaging, and marketing communications based on sound research rather than individual gut feelings.

By creating and maintaining an agribusiness & food marketing research program rooted in business marketing, Oregon is among the very few institutions which have recognized and risen to this challenge. While the vast majority of institutions still relies on economics research, the rapid in-state, national, and international attention and interest generated through this research program is evidence for its significance to single businesses, groups of businesses and ultimately to society as a whole.

2. Scope of the Program

- In-State Research
- Integrated Research and Extension
- Multistate Research

V(D). Planned Program (Assumptions and Goals)

1. Assumptions made for the Program

- research beneficiaries understand basic marketing principles
- funding stakeholders understand that the nature of this program prevents it from being self-sustaining (because it provides information to small businesses who cannot afford to hire business consultants)
- research beneficiaries are willing and able to dedicate funds for business research (in contrast to production-related research)
- funding stakeholders understand that such a research-only program is little effective without an extension complement
- research beneficiaries understand that research findings may not be to their liking

2. Ultimate goal(s) of this Program

Improve the quality of agribusiness and food marketing decisions.

V(E). Planned Program (Inputs)

1. Estimated Number of professional FTE/SYs to be budgeted for this Program

Year	Extension		Research	
	1862	1890	1862	1890
2008	0.0	0.0	1.0	0.0
2009	0.0	0.0	1.0	0.0
2010	0.0	0.0	1.0	0.0
2011	0.0	0.0	1.0	0.0
2012	0.0	0.0	1.0	0.0

V(F). Planned Program (Activity)

1. Activity for the Program

Conduct Research Experiments.- Conduct Workshops, meetings.- Deliver Services.- Develop Products, Curriculum, Resources.- Provide Training.- Provide Counseling.- Assessments.- Partnering.

2. Type(s) of methods to be used to reach direct and indirect contacts

Extension	
Direct Methods	Indirect Methods
• Demonstrations • Workshop • One-on-One Intervention	• Other 2 (managerial publications) • Other 1 (trade magazines) • Web sites

3. Description of targeted 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(G). Planned Program (Outputs)

1. Standard output measures

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

	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	Target	Target	Target	Target
2008	300	1000	0	0
2009	400	1200	0	0
2010	400	1200	0	0
2011	400	1000	0	0
2012	400	1000	0	0

2. (Standard Research Target) Number of Patents

Expected Patents

2008 :0 **2009 :**0 **2010 :** 0 **2011 :**0 **2012 :**0

3. Expected Peer Review Publications

Year	Research Target	Extension Target
2008	10	0
2009	10	0
2010	10	0
2011	10	0
2012	10	0

V(H). State Defined Outputs

1. Output Target

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

2008 :16 **2009 :**16 **2010 :** 16 **2011 :**16 **2012 :**16

- 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.

2008 :4 **2009 :**2 **2010 :** 3 **2011 :**0 **2012 :**0

V(I). State Defined Outcome

1. Outcome Target

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. Outcome Type : Change in Knowledge Outcome Measure

2008 :	2009 :	2010 :	2011 :	2012 :
0	0	3	2	3

3. Associated Knowledge Area(s)

- 602 - Business Management, Finance, and Taxation
- 604 - Marketing and Distribution Practices
- 607 - Consumer Economics

1. Outcome Target

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.

2. Outcome Type : Change in Action Outcome Measure

2008 :	2009 :	2010 :	2011 :	2012 :
0	0	0	0	10

3. Associated Knowledge Area(s)

- 604 - Marketing and Distribution Practices
- 607 - Consumer Economics

1. Outcome Target

improved marketing understanding increases economic viability of food and agri-businesses and overall quality of life

2. Outcome Type : Change in Condition Outcome Measure

2008 :	2009 :	2010 :	2011 :	2012 :
0	0	0	0	10

3. Associated Knowledge Area(s)

- 604 - Marketing and Distribution Practices
- 607 - Consumer Economics

V(J). Planned Program (External Factors)

1. External Factors which may affect Outcomes

- Economy
- Public Policy changes
- Government Regulations
- Competing Public priorities
- Populations changes (immigration,new cultural groupings,etc.)

Description

- the cultural context of marketing research studies will be specifically accounted for; market segments and target markets will be identified according to their cultural background
- as a rule of thumb, businesses tend to ease up on their market orientation during times of general economic upswing; marketers need to be prepared for times of economic downturn because of the significant time lag between program establishment and generation of actionable insights
- wine as an alcoholic research object is prone to political influence; for example, traditional (federal) funding sources often do not look favorably upon research proposing to examine marketing related to wine, beer or spirits

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

1. Evaluation Studies Planned

- {NO DATA ENTERED}

Description

{NO DATA ENTERED}

2. Data Collection Methods

- {NO DATA ENTERED}

Description

{NO DATA ENTERED}

V(A). Planned Program (Summary)

1. Name of the Planned Program

Innovation, Technical Change, and Productivity Growth

2. Brief summary about Planned Program

Productivity growth is the principal source of long-run growth and prosperity in the U.S. economy. Examining the types and sources of productivity change strongly complements other research areas such as biotechnology, trade, natural resources, and rural development. The theory of the sources and measurement of productivity growth is still a young science. For this reason, much of our effort will be devoted to examining alternative ways of understanding the growth of productivity, namely of output/input ratios, takes place and the strengths and weaknesses of alternative ways of measuring it. Besides developing new and better measures of technical change and productivity growth, we need to understand why the observed growth patterns take place.
Because the technical and resource situations in which firms find themselves are quite heterogeneous, the search for the determinants and characteristics of productivity growth will take us into a wide variety of settings and will require an empirical outlook. One area of special regard will be the innovations presently occurring at a rapid rate in agricultural biotechnology, which is widely regarded as a principal engine of innovation in U.S. farming. In its early phases in the 1980s and 1990s, biotech focused on farm-cost-saving plant varieties. Today, the focus is expanding to include changes in food characteristics such as improved vitamin content and shelf life. Among the major economic issues to be resolved in agricultural biotechnology is the manner in which private- and public-sector research and funding efforts ought to be coordinated.

3. Program existence : New (One year or less)

4. Program duration : Long-Term (More than five years)

5. Expending formula funds or state-matching funds : Yes

6. Expending other than formula funds or state-matching funds : Yes

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

- 609 100% Economic Theory and Methods

V(C). Planned Program (Situation and Scope)

1. Situation and priorities

Productivity growth is the principal source of long-run growth and prosperity in the U.S. economy. Examining the types and sources of productivity change is a worthwhile research goal although the theory of the sources and measurement of productivity growth is still a young science. For this reason, much of our effort should be devoted to examining alternative ways of understanding the growth of productivity, namely of output/input ratios, takes place and the strengths and weaknesses of alternative ways of measuring it. For example, an output/input ratio shift can be decomposed in a number of ways, such as into a shift in the industry best-practices standard plus a shift in the sample-mean firm's performance relative to that standard. As another example, firms are well known to produce polluting as well as desirable products, and ways must be determined for characterizing the tradeoffs between these good and bad outputs.
Besides developing new and better measures of technical change and productivity growth, we need to understand why the observed growth patterns take place. What are the underlying sources of changes in best-practices technologies and in firm's abilities to achieve them? In general, the answer is three-fold: the firms acquire more inputs, the inputs are of higher quality or have more capital embodied in them, or they are coordinated or organized in more effective fashion. The second and third of these sources are generally termed "innovation." For the most part, then, to understand productivity growth is to understand how innovation occurs.
Because the technical and resource situations in which firms find themselves are quite heterogeneous, the search for the determinants and characteristics of productivity growth will take us into a wide variety of settings and will require an empirical outlook. One area of special regard will be the innovations presently occurring at a rapid rate in agricultural biotechnology. Industry and university biotechnology research not only is a rapidly growing industry in its own right, but is widely regarded to be the principal engine of innovation in U.S. farming. In its early phases in the 1980s and 1990s, biotech focused on farm-cost-saving plant varieties. Today, the focus is expanding to include changes in food characteristics such as improved vitamin content and shelf life. Among the major economic issues to be resolved in agricultural biotechnology is the manner in which private- and public-sector research and funding efforts ought to be coordinated. How, for example, should profit incentives – often associated with the need for secrecy –be balanced with the need for open scrutiny of the research procedures and results of others? How much emphasis should be devoted to food and plant characteristics that can be marketed for profit, in

contrast to those with social benefits that cannot be captured in the market place?

2. Scope of the Program

- Multistate Research
- In-State Research

V(D). Planned Program (Assumptions and Goals)

1. Assumptions made for the Program

- Productivity growth is the principal source of long-run growth and prosperity in the U.S. economy.
- To understand productivity growth is to understand how innovation occurs.
- Industry and university biotechnology research not only is a rapidly growing industry in its own right, but is widely regarded to be the principal engine of innovation in U.S. farming.

2. Ultimate goal(s) of this Program

To search for the determinants and characteristics of productivity growth and examine these determinants in settings of technological change.

V(E). Planned Program (Inputs)

1. Estimated Number of professional FTE/SYs to be budgeted for this Program

Year	Extension		Research	
	1862	1890	1862	1890
2008	0.0	0.0	1.3	0.0
2009	0.0	0.0	1.3	0.0
2010	0.0	0.0	1.3	0.0
2011	0.0	0.0	1.3	0.0
2012	0.0	0.0	1.3	0.0

V(F). Planned Program (Activity)

1. Activity for the Program

- Conduct Research Experiments.
- Develop models, computer algorithms- Develop Products, Resources.- Assessments.- Partnering.

2. Type(s) of methods to be used to reach direct and indirect contacts

Extension	
Direct Methods	Indirect Methods
• Demonstrations • Education Class • Group Discussion • Other 1 (conferences, seminars)	• Web sites

3. Description of targeted audience

public sector
private sector
economists.policy makers.
agricultural biotechnology firms
farmers

V(G). Planned Program (Outputs)

1. Standard output measures

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

	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	Target	Target	Target	Target
2008	100	0	0	0
2009	100	0	0	0
2010	100	0	0	0
2011	100	0	0	0
2012	100	0	0	0

2. (Standard Research Target) Number of Patents

Expected Patents

2008 :0 **2009 :**0 **2010 :** 0 **2011 :**0 **2012 :** 0

3. Expected Peer Review Publications

Year	Research Target	Extension Target
2008	3	0
2009	3	0
2010	3	0
2011	3	0
2012	3	0

V(H). State Defined Outputs

1. Output Target

- 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

  2008 :0 **2009 :**0 **2010 :** 6 **2011 :**0 **2012 :**6

V(I). State Defined Outcome

1. Outcome Target

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. Outcome Type : Change in Knowledge Outcome Measure

2008 : 1	**2009 :** 1	**2010 :** 2	**2011 :** 2	**2012 :** 2

3. Associated Knowledge Area(s)

- 609 - Economic Theory and Methods

1. Outcome Target

Action such as behavior, practices, decision-making, policies

Best Practices
- Funding agencies make better investments in basic-to-applied research continuum

2. Outcome Type : Change in Action Outcome Measure

2008 : 0	**2009 :** 0	**2010 :** 0	**2011 :** 0	**2012 :** 1

3. Associated Knowledge Area(s)

- 609 - Economic Theory and Methods

V(J). Planned Program (External Factors)

1. External Factors which may affect Outcomes

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

Description

We need to understand why observed growth patterns take place. To understand productivity growth is to understand how innovation

occurs and what drives it, e.g., example, changing public policy and regulations, public attitudes towards innovation and change, and public investment in technological change.

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

1. Evaluation Studies Planned

- {NO DATA ENTERED}

Description

{NO DATA ENTERED}

2. Data Collection Methods

- {NO DATA ENTERED}

Description

{NO DATA ENTERED}

V(A). Planned Program (Summary)

1. Name of the Planned Program

Integrated Production Systems

2. Brief summary about Planned Program

Sustainable agricultural production on intensely farmed land in Malheur County, Oregon depends on the integration of multiple production factors (e.g., selection of crop cultivars of high productivity and quality, efficient use of water and fertilizer inputs, sound weed and pest control, minimization of unnecessary inputs, tillage reduction, profitable crop rotations, and reduction in soil erosion). This integration strategy addresses economic and environmental problems. Each annual crop production cycle needs to be an integral part of a sound cropping system. Sustainable livestock production on rangeland depends on proper grazing pressure and timing, control of invading noxious weeds, management of woody vegetation, implementing grazing innovations, and managing riparian corridors.
The Malheur Experiment Station plans to continue to improve the productivity, economic viability, and conservation of agricultural, range, and water resources. The station plan is designed around responsiveness to the practical needs of producers, the needs of citizens in the community to have reasonable levels of family income, and the long term need to protect the natural resource base. Control of weeds in fields and rangeland are of highest priority to the region. These local needs are consistent with national USDA goals.

3. Program existence : Mature (More then five years)

4. Program duration : Long-Term (More than five years)

5. Expending formula funds or state-matching funds : Yes

6. Expending other than formula funds or state-matching funds : Yes

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

- 102 10% Soil, Plant, Water, Nutrient Relationships
- 111 10% Conservation and Efficient Use of Water
- 121 4% Management of Range Resources
- 203 1% Plant Biological Efficiency and Abiotic Stresses Affecting Plants
- 204 10% Plant Product Quality and Utility (Preharvest)
- 205 40% Plant Management Systems
- 216 25% Integrated Pest Management Systems

V(C). Planned Program (Situation and Scope)

1. Situation and priorities

Sustainable management studies continue for important crops and potential alternate crops of the Treasure Valley of eastern Oregon and southwestern Idaho including onions, sugar beets, alfalfa, small grains and the alternative crops: soybeans, poplars, yew, and native wildflower seeds. Variety trials are the foundation of local growers' competitive position, and the station evaluates varieties of small grains, alfalfa, onion, sugar beet, and other crops. Quality evaluations include grain density, protein, and cooking characteristics; sugar beet sucrose, nitrate, and conductivity; onion grade, single-centeredness, sugar and pungency; and alfalfa forage quality.

Control of weeds in fields (nutsedge in particular) and rangeland are of highest priority to the region. Heavy, persistent weed populations emerge with irrigation and spring rains. Weeds are controlled currently by cultivation and hand weeding. Appropriate herbicides and application schedules (to deal with late emergent weeds or escapement from early applications) for weed control are urgently needed to reduce production costs.

Efficient use of soil nitrate and other available N sources depend on irrigation being roughly in balance with crop water needs so that nitrate leaching is minimal or only moderate. Determining soil moisture criteria will help growers apply the right amount of water added at the right time. Dozens of growers have adopted the soil moisture criteria and soil moisture sensors for potatoes. Irrigation management has improved and is continuing to improve.

Water issues drive several efforts at the station. Years ago the station cooperated with the Bureau of Reclamation to build an AgriMet weather station to estimate daily crop consumptive water use. Since 1997, linkages on the Malheur Experiment Station web page make daily crop consumptive water use available to growers. Drip and micro sprinkler irrigation represented only 1 % of Oregon's nearly 2 million irrigated acres. Drip irrigation produces more marketable yield per applied water than sprinkler irrigation and furrow irrigation.

Over the last 20 years the station has placed emphasis on the economic production of quality potatoes and potato products through refinement of irrigation, fertilization, and other management factors. It is generally recognized that some potato varieties are more drought tolerant than others, that is, they give higher yields in dry years than other varieties. Innovations are needed to expand subsurface drip irrigation use to potatoes. Potatoes develop irregular shape in response to variations in soil water and heat. With drip irrigation it is possible to maintain better control of irrigation and nearly constant soil water. Potato grade may be improved through reduced stress on the potato plant; also less water would be applied at each irrigation and irrigations would occur at greater frequency.

The Station also participates in the evaluation of Total Maximum Daily Load assessments for the Owyhee and Malheur Rivers that drain roughly 12,000,000 acres of the region to identify water quality problems for mitigation.

2. Scope of the Program

- In-State Extension
- In-State Research
- Integrated Research and Extension
- Multistate Integrated Research and Extension
- Multistate Research

V(D). Planned Program (Assumptions and Goals)

1. Assumptions made for the Program

Sustainable agricultural production on intensely farmed land in Malheur County, Oregon depends on the integration of multiple production factors. Each annual crop production cycle needs to be an integral part of a sound cropping system. Furthermore, sustainable livestock production on rangeland depends on proper grazing pressure and timing, control of invading noxious weeds, management of woody vegetation, implementing grazing innovations, and managing riparian corridors.

2. Ultimate goal(s) of this Program

Through research and education, empower the agricultural system with knowledge that will improve competitiveness in domestic production, processing, and marketing; weed and pest management will be an important component. Additionally, users of project results will enhance the quality of the environment through better understanding of and building on agriculture's and forestry's complex links with soil, water, air, and biotic resources. Competitiveness will be addressed through:

1. Market Opportunities
2. Increased Profitability
3. Potentially Profitable Alternative Crops
4. Integrated pest and weed management

Sustainability will be addressed through:

1. Irrigation Efficiency
2. Watershed Protection
3. Vegetation Management

V(E). Planned Program (Inputs)

1. Estimated Number of professional FTE/SYs to be budgeted for this Program

Year	Extension		Research	
	1862	1890	1862	1890
2008	0.0	0.0	4.0	0.0
2009	0.0	0.0	4.0	0.0
2010	0.0	0.0	4.0	0.0
2011	0.0	0.0	4.0	0.0
2012	0.0	0.0	4.0	0.0

V(F). Planned Program (Activity)

1. Activity for the Program

- - 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. Type(s) of methods to be used to reach direct and indirect contacts

Extension	
Direct Methods	Indirect Methods
• Demonstrations • One-on-One Intervention • Workshop • Group Discussion	• Web sites

3. Description of targeted audience

- growers
- community leaders
- extension educators.- commercial producers.- policy makers.

V(G). Planned Program (Outputs)

1. Standard output measures

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

	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	Target	Target	Target	Target
2008	100	100	0	0
2009	100	100	0	0
2010	100	100	0	0
2011	100	100	0	0
2012	100	100	0	0

2. (Standard Research Target) Number of Patents

Expected Patents

2008 : 0 **2009 :** 0 **2010 :** 0 **2011 :** 0 **2012 :** 0

3. Expected Peer Review Publications

Year	Research Target	Extension Target
2008	4	0
2009	4	0
2010	4	0
2011	4	0
2012	4	0

V(H). State Defined Outputs

1. Output Target

- 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.

2008 : 10 **2009 :** 10 **2010 :** 10 **2011 :** 10 **2012 :** 10

- 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.

2008 : 2 **2009 :** 1 **2010 :** 3 **2011 :** 1 **2012 :** 1

- SCHOLARLY excellence through papers and reports, book chapters, presentations, service, on boards/panels and to local clientele, awards and honors

2008 : 4 **2009 :** 4 **2010 :** 4 **2011 :** 4 **2012 :** 4

- 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

2008 : 10 **2009 :** 10 **2010 :** 10 **2011 :** 10 **2012 :** 10

V(I). State Defined Outcome

1. Outcome Target

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. Outcome Type : Change in Knowledge Outcome Measure

2008 : 0 **2009 :** 10 **2010 :** 0 **2011 :** 15 **2012 :** 16

3. Associated Knowledge Area(s)

- 205 - Plant Management Systems
- 216 - Integrated Pest Management Systems

1. Outcome Target

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. Outcome Type : Change in Knowledge Outcome Measure

2008 : 2 **2009 :** 2 **2010 :** 2 **2011 :** 2 **2012 :** 2

3. Associated Knowledge Area(s)

- 102 - Soil, Plant, Water, Nutrient Relationships
- 111 - Conservation and Efficient Use of Water
- 203 - Plant Biological Efficiency and Abiotic Stresses Affecting Plants
- 204 - Plant Product Quality and Utility (Preharvest)
- 205 - Plant Management Systems

1. Outcome Target

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.

2. Outcome Type : Change in Knowledge Outcome Measure

2008 : 2 **2009 :** 2 **2010 :** 2 **2011 :** 2 **2012 :** 2

3. Associated Knowledge Area(s)

- 102 - Soil, Plant, Water, Nutrient Relationships
- 111 - Conservation and Efficient Use of Water
- 205 - Plant Management Systems

1. Outcome Target

Growers apply metham sodium when environmental conditions are more favorable for effective activity against yellow nutsedge.

2. Outcome Type : Change in Action Outcome Measure

2008 : 1 **2009 :** 2 **2010 :** 2 **2011 :** 3 **2012 :** 3

3. Associated Knowledge Area(s)

- 205 - Plant Management Systems
- 216 - Integrated Pest Management Systems

1. Outcome Target

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. Outcome Type : Change in Action Outcome Measure

2008 : 2	**2009 :** 2	**2010 :** 3	**2011 :** 4	**2012 :** 4

3. Associated Knowledge Area(s)

- 102 - Soil, Plant, Water, Nutrient Relationships
- 111 - Conservation and Efficient Use of Water
- 204 - Plant Product Quality and Utility (Preharvest)
- 205 - Plant Management Systems

1. Outcome Target

Through appropriate application of herbicides, producers reduce 50% of the yellow nutsedge tubers they must manage in following crops.

2. Outcome Type : Change in Condition Outcome Measure

2008 : 0	**2009 :** 0	**2010 :** 1	**2011 :** 2	**2012 :** 3

3. Associated Knowledge Area(s)

- 205 - Plant Management Systems
- 216 - Integrated Pest Management Systems

1. Outcome Target

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. Outcome Type : Change in Condition Outcome Measure

2008 : 0	**2009 :** 0	**2010 :** 0	**2011 :** 10	**2012 :** 10

3. Associated Knowledge Area(s)

- 102 - Soil, Plant, Water, Nutrient Relationships
- 111 - Conservation and Efficient Use of Water

V(J). Planned Program (External Factors)

1. External Factors which may affect 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.)

Description

Economics and public policy are the most critical. Changing or stricter rules on domestic productivity versus marketing (for imported commodities) create hardship for domestic growers in a global market.

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

1. Evaluation Studies Planned

- {NO DATA ENTERED}

Description

{NO DATA ENTERED}

2. Data Collection Methods

- {NO DATA ENTERED}

Description

{NO DATA ENTERED}

V(A). Planned Program (Summary)

1. Name of the Planned Program

Integrating Science Into High School Agricultural Education Programs

2. Brief summary about Planned Program

In recent years, agricultural education programs have faced a lack of stability in enrollment, a shifting of the job structure in the agriculture industry, and changing clientele in agricultural educaiton. Will updating curriculum by integrating science into agriculture programs revitalize secondary agricultural education programs? The purpose of this study is to determine the impact of integrating science on secondary agricultural education programs.

3. Program existence : Intermediate (One to five years)

4. Program duration : Long-Term (More than five years)

5. Expending formula funds or state-matching funds : Yes

6. Expending other than formula funds or state-matching funds : No

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

- 803 30% Sociological and Technological Change Affecting Individuals, Families and Communities
- 903 70% Communication, Education, and Information Delivery

V(C). Planned Program (Situation and Scope)

1. Situation and priorities

Educational reform has called for increased science achievement by U.S. students. The potential for Agricultural Science and Technology Programs to enhance student achievement in science is considerable. In Oregon, diploma requirements has increased the science credit for high school graduates to three credits. The third credit is proposed to be a laboratory intensive credit. Oregon high school Agricultural Science and Technology Programs have an opportunity to provide a contextual science credit that is laboratory based. Additional research is needed to determine the opportunity for Agricultural Science and Technology Programs to impact science achievement of students. Will updating curriculum by integrating science into agriculture programs revitalize secondary agricultural education programs? The purpose of this study is to determine the impact of integrating science on secondary agricultural education programs.

2. Scope of the Program

- In-State Research
- Multistate Research

V(D). Planned Program (Assumptions and Goals)

1. Assumptions made for the Program

* The potential for Agricultural Science and Technology Programs to enhance student achievement in science is paramount.
* Oregon high school Agricultural Science and Technology Programs have an opportunity to provide a contextual science credit that is laboratory based and will meet the Oregon diploma requirements for laboratory science credit.

2. Ultimate goal(s) of this Program

To determine the impact of integrating science on secondary agricultural education programs (Thompson).

V(E). Planned Program (Inputs)

1. Estimated Number of professional FTE/SYs to be budgeted for this Program

Year	Extension		Research	
	1862	1890	1862	1890
2008	0.0	0.0	0.2	0.0
2009	0.0	0.0	0.5	0.0
2010	0.0	0.0	0.5	0.0
2011	0.0	0.0	0.5	0.0
2012	0.0	0.0	0.5	0.0

V(F). Planned Program (Activity)

1. Activity for the Program

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. Type(s) of methods to be used to reach direct and indirect contacts

Extension	
Direct Methods	Indirect Methods
• Other 2 (conferences) • Group Discussion • Education Class • Other 1 (peer publications)	• Web sites • Newsletters

3. Description of targeted audience

teachers; decision-makers

V(G). Planned Program (Outputs)

1. Standard output measures

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

	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	Target	Target	Target	Target
2008	50	50	30	0
2009	50	50	30	0
2010	50	50	30	0
2011	50	50	30	0
2012	50	50	30	0

2. (Standard Research Target) Number of Patents

Expected Patents

2008 :0 **2009 :**0 **2010 :** 0 **2011 :**0 **2012 :** 0

3. Expected Peer Review Publications

Year	Research Target	Extension Target
2008	0	0
2009	1	0
2010	0	0
2011	1	0
2012	1	0

V(H). State Defined Outputs

1. Output Target

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

  2008 :0 **2009 :**1 **2010 :** 1 **2011 :**1 **2012 :** 1

- 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

  2008 :1 **2009 :**1 **2010 :** 0 **2011 :**0 **2012 :** 0

V(I). State Defined Outcome

1. Outcome Target

Informed decision-makers and citizenry and Information exchanged with peers regarding the opportunities to integrate agricultural education into high school curriculums

2. Outcome Type : Change in Knowledge Outcome Measure

2008 :0 **2009 :** 1 **2010 :** 1 **2011 :**1 **2012 :** 0

3. Associated Knowledge Area(s)

- 803 - Sociological and Technological Change Affecting Individuals, Families and Communities
- 903 - Communication, Education, and Information Delivery

V(J). Planned Program (External Factors)

1. External Factors which may affect Outcomes

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

Description

{NO DATA ENTERED}

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

1. Evaluation Studies Planned

- {NO DATA ENTERED}

Description

{NO DATA ENTERED}

2. Data Collection Methods

- {NO DATA ENTERED}

Description

{NO DATA ENTERED}

V(A). Planned Program (Summary)

1. Name of the Planned Program

Managing Marine Resources for Sustainable Systems

2. Brief summary about Planned Program

The program proposal "Managing Marine Resources for Sustainable Systems" focuses on improving utilization and sustainability of marine resources in Oregon and the Pacific Northwest. The program is conducted by interdisciplinary faculty of the Coastal Oregon Marine Experiment Station (COMES) located at the Hatfield Marine Science Center in Newport, Oregon. The program includes aquaculture (Aquatic Production), fish disease, (Animal Protection) fisheries population dynamics, marine mammals, fisheries ecology and genetics, (Aquatic Wildlife Management), fishery management and policy, and marine economics and marketing, (Resource Economics). The strategic approach is to maximize the creativity and impacts of our researchers by anticipating the future, balancing risks with opportunities, and seamlessly integrating research, outreach, and teaching responsibilities. Much of this research involves a diverse array of cooperators including OSU faculty, Oregon Sea Grant, national and international research institutes, interstate research groups and coordinating committees, industry and seafood commodity commissions, and state and federal government agencies including National Marine Fisheries Service, USDA Agricultural Research Service, Oregon Department of Fish and Wildlife, and Oregon Department of Agriculture.

3. Program existence : Mature (More then five years)

4. Program duration : Long-Term (More than five years)

5. Expending formula funds or state-matching funds : Yes

6. Expending other than formula funds or state-matching funds : Yes

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

- 135 50% Aquatic and Terrestrial Wildlife
- 302 5% Nutrient Utilization in Animals
- 303 10% Genetic Improvement of Animals
- 311 15% Animal Diseases
- 604 10% Marketing and Distribution Practices
- 605 10% Natural Resource and Environmental Economics

V(C). Planned Program (Situation and Scope)

1. Situation and priorities

Oregon and Pacific Northwest marine industries and coastal communities face significant challenges in balancing utilization and sustainability of marine resources. Many fishery resource stocks have reached natural biological limits or have been declared over-fished. Formal declarations of fishery disasters by West coast state governors have become common. A number of fisheries are overcapitalized and undergoing "rationalization" in order to improve management and balance resource use with natural productivity. Rationalization requires the adoption of new management approaches based on property rights, incentives, and treating ocean resources as valuable assets. These limits to growth also require greater focus on market-driven and value-added production rather than traditional dependence on supply strategies. Aquaculture provides opportunities to increase production, particularly for shellfish resources, but faces technological and regulatory hurdles.

The need for applied science is critical for fully utilizing marine resources—it is also critical given sustainability mandates that require conservation of stocks and species, protection of marine habitats, and use of precautionary and ecosystem-based management. Without adequate science, commercial and recreational marine resource industries will be unable to access marine resources. Deftly balancing intelligent use and conservation of species and habitats will become an increasingly greater challenge and require scientists with interdisciplinary perspectives and an ability to work cooperatively with industry, science-management agencies, and multiple stakeholder groups.

These problems affect all citizens in the state of Oregon and the Pacific Northwest including citizens who live and work on the coast, those who visit for consumptive and non-consumptive recreation, those who consume marine resource as food or medicines, and those who desire that marine ecosystems meet the needs of future generations. The greatest impacts are on the resource extraction industries and the coastal communities that depend on these industries for direct and indirect jobs and income. These coastal communities are transitioning from primary dependence on harvesting natural resources as "commodities" to depending on business activities and services based on a

combination of consumptive and non consumptive uses including recreation and tourism. These growing economic sectors provide new opportunities for traditional marine and seafood industries for adding value through adaptive integration and participating in local food systems.

The numerous projects summarized in this report illustrate the wide range of interdisciplinary and cooperative science needed to fully address the challenges inherent with successfully utilizing and sustaining Pacific Northwest marine resources. The greatest opportunities for creative and innovative solutions will require scientific leadership that partners with stakeholders that have ideas, resources, and technologies for addressing the challenges. Helping coastal communities and industries succeed will require that they participate in science and management.

2. Scope of the Program

- In-State Extension
- In-State Research
- Integrated Research and Extension
- Multistate Extension
- Multistate Integrated Research and Extension
- Multistate Research

V(D). Planned Program (Assumptions and Goals)

1. Assumptions made for the Program

This program will operate according to the strategic mission and plans of Oregon State University and the College of Agricultural Sciences. Consistent with the OSU plan, this program will strives to "develop partnerships to add economic and social value" and be accountable as an "engine for economic growth." In particular this program will focus its strategic goals and initiatives consistent with two of OSU's five strategic themes:
Managing natural resources that contribute to Oregon's quality of life, and growing and sustaining natural resources-based industries.
Optimizing enterprise, innovation, and economic development.

This program will operate in alignment with the College of Agricultural Sciences in its three broad areas of emphasis:

§ New value-added products and markets that leverage the economic contributions of Oregon agriculture.
§ Natural resources management and policy through discovery and learning to improve understanding of nature as a system.
§ Integrated management systems that help assure economically sustainable, environmentally sound agriculture.

To achieve these three areas of emphasis the program is committed to supporting existing areas of research, education, and extension/outreach, while emphasizing the College's Four Strategic Emphases including
Build strength in biobased products
Build excellence in ecosystem services
Build excellence in food, nutrition, and health
Build excellence in water and watersheds
The program will also embody the values of the Coastal Oregon Marine Experiment Station:

Respond to the needs of Oregon coastal communities, the seafood industry, and disciplinary professions.
Embrace diverse relationships and openness to new ideas and working styles
Commit to fostering undergraduate and graduate student research and education
Support teamwork and coordination among colleagues within COMES, the Hatfield Marine Science

2. Ultimate goal(s) of this Program

As a core activity of the Coastal Oregon Marine Experiment Station, this program will conduct research to understand, utilize, and sustain marine resources and coastal ecosystems in order to benefit the citizens of Oregon, the Pacific Northwest, the Nation, and the World. In furtherance of this mission, the long term goals are to:

Increase economic and social benefits from wise use, management, and sustainability of the State's valuable marine resources and coastal ecosystems;
Develop new or improved seafood products and efficient production processes that provide safer and higher valued seafood;
Develop new and improved aquaculture products, processes and systems;
Improve marketing efficiency and expand the export and domestic markets for Oregon's seafood products;
Develop systems for protecting living marine resources from diseases, genetic depletion, and other hazards;

Support beneficial economic development of coastal Oregon communities;
Communicate knowledge to students, scientists, managers, industry, and the public that supports wise utilization and sustainability of marine resources;
Teach, advise, and mentor undergraduate and graduate students who become future leaders in marine science and resource management.
Program Objectives and associated investigators

Aquatic and Wildlife Management: Michael Banks, Bruce Mate, Jessica Miller, and David Sampson
Marketing and Distribution Practices: Susan Hanna and Gil Sylvia
Natural Resource and Environmental Economics: Susan Hanna and Gil Sylvia
Nutrient Utilization in Animals: Chris Langdon
Genetic Improvement in Animals: Chris Langdon
Animal Diseases: Paul Reno

V(E). Planned Program (Inputs)

1. Estimated Number of professional FTE/SYs to be budgeted for this Program

Year	Extension		Research	
	1862	1890	1862	1890
2008	0.0	0.0	9.5	0.0
2009	0.0	0.0	10.5	0.0
2010	0.0	0.0	10.5	0.0
2011	0.0	0.0	10.5	0.0
2012	0.0	0.0	10.5	0.0

V(F). Planned Program (Activity)

1. Activity for the Program

- 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. Type(s) of methods to be used to reach direct and indirect contacts

Extension	
Direct Methods	Indirect Methods
• Group Discussion • Other 1 (professional journals) • Workshop • Demonstrations • One-on-One Intervention • Education Class	• Public Service Announcement • Web sites • Other 1 (newspaper articles) • Newsletters • TV Media Programs

3. Description of targeted audience

770fishing industry and managers, coastal communities and leaders, peers, extension educators, economists, aquaculture producers, food safety agencies and seafood producers.

V(G). Planned Program (Outputs)

1. Standard output measures

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

	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	Target	Target	Target	Target
2008	720	27700	170	3000
2009	1150	34400	170	4000
2010	1220	38800	170	5000
2011	1550	1504400	170	401000
2012	1550	1504400	170	4000

2. (Standard Research Target) Number of Patents

Expected Patents

2008 :0 **2009 :**0 **2010 :** 0 **2011 :**0 **2012 :**0

3. Expected Peer Review Publications

Year	Research Target	Extension Target
2008	6	0
2009	12	0
2010	12	0
2011	4	0
2012	10	0

V(H). State Defined Outputs

1. Output Target

- 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)

  2008 :2 **2009 :**2 **2010 :** 2 **2011 :**1 **2012 :**2

- 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)

  2008 :3 **2009 :**2 **2010 :** 0 **2011 :**3 **2012 :**0

- 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

2008 : 5 **2009 :** 8 **2010 :** 12 **2011 :** 5 **2012 :** 5

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

2008 : 1 **2009 :** 2 **2010 :** 2 **2011 :** 1 **2012 :** 1

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

2008 : 9 **2009 :** 16 **2010 :** 18 **2011 :** 7 **2012 :** 9

- 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)

2008 : 12 **2009 :** 12 **2010 :** 12 **2011 :** 12 **2012 :** 12

V(I). State Defined Outcome

1. Outcome Target

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. Outcome Type : Change in Knowledge Outcome Measure

2008 : 0 **2009 :** 20 **2010 :** 20 **2011 :** 20 **2012 :** 10

3. Associated Knowledge Area(s)

- 135 - Aquatic and Terrestrial Wildlife
- 604 - Marketing and Distribution Practices

- 605 - Natural Resource and Environmental Economics

1. Outcome Target

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

2. Outcome Type : Change in Knowledge Outcome Measure

2008 :	2009 :	2010 :	2011 :	2012 :
1	1	0	1	0

3. Associated Knowledge Area(s)

- 135 - Aquatic and Terrestrial Wildlife
- 302 - Nutrient Utilization in Animals

1. Outcome Target

· Understanding of the process of pathogen dispersal.

2. Outcome Type : Change in Knowledge Outcome Measure

2008 :	2009 :	2010 :	2011 :	2012 :
0	0	0	10	0

3. Associated Knowledge Area(s)

- 135 - Aquatic and Terrestrial Wildlife
- 303 - Genetic Improvement of Animals
- 311 - Animal Diseases

1. Outcome Target

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

2. Outcome Type : Change in Knowledge Outcome Measure

2008 :	2009 :	2010 :	2011 :	2012 :
1	3	1	4	1

3. Associated Knowledge Area(s)

- 135 - Aquatic and Terrestrial Wildlife

1. Outcome Target

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. Outcome Type : Change in Action Outcome Measure

2008 :	2009 :	2010 :	2011 :	2012 :
0	5	5	0	5

3. Associated Knowledge Area(s)

- 135 - Aquatic and Terrestrial Wildlife

- 303 - Genetic Improvement of Animals
- 311 - Animal Diseases
- 604 - Marketing and Distribution Practices
- 605 - Natural Resource and Environmental Economics

1. Outcome Target

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

2. Outcome Type : Change in Action Outcome Measure

2008 :	2009 :	2010 :	2011 :	2012 :
0	0	0	1	1

3. Associated Knowledge Area(s)

- 302 - Nutrient Utilization in Animals

1. Outcome Target

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. Outcome Type : Change in Condition Outcome Measure

2008 :	2009 :	2010 :	2011 :	2012 :
0	0	3	0	2

3. Associated Knowledge Area(s)

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

V(J). Planned Program (External Factors)

1. External Factors which may affect Outcomes

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

Description

This research program has been designed through strategic planning and major discussions with science peers, university administrators, and key stakeholder groups. To the extent possible, the research programs have attempted to anticipate major environmental, political, economic, and institutional change. This planning should maximize expected benefits of economic, social, and/or environmental related outcomes.
In addition the scientist conducting these programs have, on average, over twenty years experience working on marine resource issues.

Not every change, however, can be anticipated. Possibly issues that could impact outcomes include:

Reduction in university budgets supporting the program
Major change in climate and/or marine environmental conditions
Unanticipated changes in marine and fishery laws that could influence adaptation
Major changes in market and or resource stock conditions
Changes in the state and coastal economies

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

1. Evaluation Studies Planned

- Other (peer review process)

Description

The Coastal Oregon Marine Experiment Station tracks major outputs and impacts of our research programs. These outputs include graduate students, workshops, presentations, and publications. In addition the College of Agriculture requires that for each program we estimate the social, environmental and economic impacts. This date is summarized in the Oregon Invest database run by the College of Agriculture.

2. Data Collection Methods

- {NO DATA ENTERED}

Description

{NO DATA ENTERED}

V(A). Planned Program (Summary)

1. Name of the Planned Program

Microbiology and a Healthy World

2. Brief summary about Planned Program

This program, Microbiology and a healthy world, aims to broadly study the involvement of microorganisms in the health of the world and its plant, animal and human inhabitants. Bacteria, viruses and microscopic parasites are abundant and in many cases interact with humans or with our activities to result in negative impacts. Many of these impacts are felt in the agricultural sector, through diseases of crops, farm animals or harvested wild animals (including fish), and of farmers and their families. Not all microbes are pathogens, however, and bacteria, especially, contribute enormously to the health and balance of the soils and oceans that support farm and fisheries productivity, as well as the overall health of the Earth.
This program assembles 8 subprograms, each of which focuses on studying a particular aspect of microbiology influencing the health of the world and its inhabitants. The proposed research ranges from (1) molecular studies of viruses and bacteria that are aimed at understanding these infectious entities so that they can be managed and (2) studies of microbial pathogens of fish to (3) studies of bacteria that contribute to the health and productivity of the oceans and (4) studies developing biosensors to detect exposure to pathogenic bacteria. Our subprograms address issues with immediate agricultural relevancy (e.g., fish health, development of biosensors capable of detecting bacterial contaminants of food) and explore more basic questions that are likely to provide benefits to the agricultural community in the future (in the form of control strategies for viral and bacterial pathogens and an understanding of ocean bacteria to healthy climate and ocean productivity. The outputs of this program will be mostly in the form of (1) new knowledge and (2) highly trained individuals who can continue studies at the intersection of microbiology and agriculture into the future.

3. Program existence : Intermediate (One to five years)

4. Program duration : Long-Term (More than five years)

5. Expending formula funds or state-matching funds : Yes

6. Expending other than formula funds or state-matching funds : Yes

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

- 112 7% Watershed Protection and Management
- 135 7% Aquatic and Terrestrial Wildlife
- 136 7% Conservation of Biological Diversity
- 201 7% Plant Genome, Genetics, and Genetic Mechanisms
- 212 19% Pathogens and Nematodes Affecting Plants
- 311 7% Animal Diseases
- 313 7% Internal Parasites in Animals
- 712 7% Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occuring Toxins
- 723 32% Hazards to Human Health and Safety

V(C). Planned Program (Situation and Scope)

1. Situation and priorities

Microorganisms are ubiquitous and can be viewed in certain cases as limiting agricultural productivity and in other cases as supporting agricultural productivity. In some cases, microbes exert their effects obviously and directly, while in other cases the effect is indirect, possibly obscure, but none-the-less significant in its impact. Much about the involvement of microorganisms in the health of the Earth (necessary for sustaining agricultural productivity) is still to be discovered, but clear current challenges do exist. This program aims to contribute on both of these levels, responding to the challenges represented by pathogenic bacterial, viral or parasitic infections of plants, fish and animals, as well as to the need for accumulating a better fundamental understanding of microbes in general.
This program emphasizes mainly the production of novel information and understanding, disseminated in the scientific literature to be read by other scientists to further advance scientific understanding or to inform policy decisions. Another major output from this program is the training of highly proficient scientists capable of carrying out future research addressing problems of interest to agriculture. The wide scope of this program provides opportunities for blending varied skill sets that could be applied to unexpected problems and for training scientists with a wide base of knowledge.

2. Scope of the Program

- In-State Research
- Multistate Research

V(D). Planned Program (Assumptions and Goals)

1. Assumptions made for the Program

Microorganisms are ubiquitous and can be viewed in certain cases as limiting agricultural productivity and in other cases as supporting agricultural productivity.

2. Ultimate goal(s) of this Program

To address issues associated with the role of microbes in maintaining the health of the Earth and its inhabitants, and in sustaining agricultural productivity. This program is represented by the following subprograms and thematic areas:

Human health and the biology and biotechnology of viruses and bacteria (KA 723):

Orthopoxvirus metalloproteinase inhibitors

P.I., Dr. Dennis E. Hruby, Subprogram 1

Baculovirus Molecular Biology

P.I., Dr. George F. Rohrmann, Subprogram 2

Quorum sensing gene regulation in Pseudomonas aeruginosa

P.I., Dr. Martin Schuster, Subprogram 3 (p. 19)

Plant pathogens and plant genetic mechanisms (KA 201, 212):

Replication and gene expression of positive strand RNA viruses

P.I., Dr. Theo W. Dreher, Subprogram 4

Transformation of plants by Agrobacterium tumefaciens

P.I., Dr. L. Walt Ream, Subprogram 5

Food and water safety (K 112, 712):

Monitoring food and water associated pathogenic bacteria with cell based biosensor technology. Dr. Janine E. Trempy, Subprogram 6

Microbes and environmental health (KA 135, 136):

Pelagibacter ubique: A Post-Genomic Investigation of Carbon Metabolism and Photochemisty in an Extraordinarily Abundant Oceanic Bacterium

Dr. Stephen J. Giovannoni, Subprogram 7

Fish health (KA 311, 313):

Diseases of Importance to Wild, Cultured and Laboratory Fishes

Dr. Michael L. Kent, Subprogram 8

V(E). Planned Program (Inputs)

1. Estimated Number of professional FTE/SYs to be budgeted for this Program

Year	Extension		Research	
	1862	1890	1862	1890
2008	0.0	0.0	3.7	0.0
2009	0.0	0.0	3.7	0.0
2010	0.0	0.0	3.7	0.0
2011	0.0	0.0	3.7	0.0
2012	0.0	0.0	3.7	0.0

V(F). Planned Program (Activity)

1. Activity for the Program

- Conduct Research Experiments.- Develop Products.- Provide Training.- Assessments.- Partnering.

2. Type(s) of methods to be used to reach direct and indirect contacts

Extension	
Direct Methods	**Indirect Methods**
• Group Discussion • Workshop • Other 1 (professional journals) • Education Class	• Web sites • Other 1 (media releases)

3. Description of targeted audience

Salmonid industry
biomedical researchers
oceanographers
climatographers
agricultural producers
virologists

V(G). Planned Program (Outputs)

1. Standard output measures

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

	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	Target	Target	Target	Target
2008	600	2800	0	0
2009	600	2800	0	0
2010	600	2800	0	0
2011	600	2800	0	0
2012	600	2800	0	0

2. (Standard Research Target) Number of Patents

Expected Patents

2008 :0 **2009 :**0 **2010 :** 0 **2011 :**0 **2012 :** 0

3. Expected Peer Review Publications

Year	Research Target	Extension Target
2008	12	0
2009	12	0
2010	12	0
2011	12	0
2012	12	0

V(H). State Defined Outputs

1. Output Target

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

2008 : 16 **2009 :** 20 **2010 :** 16 **2011 :** 20 **2012 :** 15

- 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

2008 : 3 **2009 :** 3 **2010 :** 3 **2011 :** 3 **2012 :** 3

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

2008 : 1 **2009 :** 1 **2010 :** 1 **2011 :** 1 **2012 :** 1

- 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

2008 : 5 **2009 :** 4 **2010 :** 4 **2011 :** 4 **2012 :** 4

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

2008 : 1 **2009 :** 1 **2010 :** 1 **2011 :** 1 **2012 :** 1

V(I). State Defined Outcome

1. Outcome Target

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. Outcome Type : Change in Knowledge Outcome Measure

2008 :	**2009 :**	**2010 :**	**2011 :**	**2012 :**
0	10	20	20	10

3. Associated Knowledge Area(s)

- 135 - Aquatic and Terrestrial Wildlife
- 136 - Conservation of Biological Diversity
- 201 - Plant Genome, Genetics, and Genetic Mechanisms
- 212 - Pathogens and Nematodes Affecting Plants
- 311 - Animal Diseases

1. Outcome Target

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. Outcome Type : Change in Knowledge Outcome Measure

2008 :	**2009 :**	**2010 :**	**2011 :**	**2012 :**
10	10	15	20	15

3. Associated Knowledge Area(s)

- 135 - Aquatic and Terrestrial Wildlife

1. Outcome Target

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. Outcome Type : Change in Knowledge Outcome Measure

2008 :	**2009 :**	**2010 :**	**2011 :**	**2012 :**
10	20	20	20	20

3. Associated Knowledge Area(s)

- 135 - Aquatic and Terrestrial Wildlife
- 311 - Animal Diseases

1. Outcome Target

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.

2. Outcome Type : Change in Action Outcome Measure

2008 :	**2009 :**	**2010 :**	**2011 :**	**2012 :**
0	0	0	4	0

3. Associated Knowledge Area(s)

- 311 - Animal Diseases

- 723 - Hazards to Human Health and Safety

1. Outcome Target

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

2. Outcome Type : Change in Action Outcome Measure

2008 : 0	**2009 :** 0	**2010 :** 1	**2011 :** 0	**2012 :** 1

3. Associated Knowledge Area(s)

- 135 - Aquatic and Terrestrial Wildlife
- 136 - Conservation of Biological Diversity

V(J). Planned Program (External Factors)

1. External Factors which may affect Outcomes

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

Description

In view of the strong reliance for the delivery of this program on competitively obtained grant funds, continuing success and productivity will depend on the success of each subprogram in remaining competitive. This is done by conducting relevant research and by communicating and disseminating the results of that research, so that the new knowledge may be used by other scientists for further research or for the good of society.

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

1. Evaluation Studies Planned

- Before-After (before and after program)

Description

Evaluations of the subprograms of this program occur on a regular basis through the grant-awarding process. Grants are awarded on the basis of past productivity and the relevance and quality of planned experiments. The second major type of evaluation will be in the form of reports that list productivity of each subprogram (and of the program as a whole) in terms of articles published in journals or other venues, conference communications, patents awarded, etc. and other forms of productivity and recognition generated by activities.

2. Data Collection Methods

- Other (peer review process)

Description

{NO DATA ENTERED}

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

2. Brief summary about Planned Program

This Program represents subprograms designed and managed by 13 faculty members of the Department of Food Science & Technology at Oregon State University. The proposed Program encompasses diverse scientific expertise of faculty whose training and specialization includes food chemistry, food microbiology, food process engineering, fermentation processes, and sensory science. The proposed Program includes the following nine objectives:

1. Investigate high pressure processing technologies to provide improved quality foods with fresh-like attributes, while inactivating pathogenic and spoilage microorganisms
2. Develop edible surface coatings for fruits and vegetables to extend shelf-life and deliver functional benefits (anti-browning, anti-microbial, bioactives, added nutrients)
3. Investigate relationships between molecular understandings of flavor, sensory attributes and chemical compounds responsible for those sensory characteristics to improve food and ingredient quality during production and processing.
4. Develop new value-added seafood products that utilize enzyme inhibitors and enhanced protein recovery technologies to meet changing market demands and pricing
5. Develop and scale-up a seafood industry (albacore, salmon, crab) traceability system to ensure supply-side management, quality assurance, and market tracking.
6. Determine the incidence, frequency, and virulence factors of bacterial pathogens associated with seafood
7. Determine modes of contamination of Northwest fresh berries and study the survival of microbial pathogens in berry juices and purees
8. Investigate new sanitation procedures to reduce bacterial contamination and microbial pathogens in seafood, fresh and processed berry fruits, and berry juices
9. Evaluate mechanistic models and processes for bio-based saccharification of plant cell wall materials to simple sugars.
10. Increase Oregon's grape & wine quality while considering grower profitability and environmentally sustainable production practices.

A variety of subprograms are represented in this Program and include subprograms that focus on development of advances in food processing technologies (edible coatings, vacuum infusion and high pressure processing), microbial detection methods for research/food production, and implementation and application research support for processing trials by local and national food and seafood processors. The experimental approaches that will be used to meet the specific objectives of these subprograms include pilot studies for Oregon, the Pacific Northwest, and the U.S. In addition, the experimental approaches will also include controlled laboratory experiments and database/model development. The methods that will be employed to reach consumer, food processor and regulatory agency 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 knowledge generation and databases of food safety and food processing technologies, and flavor / ingredient databases that relate to food quality parameters. As a result of this Program, application of knowledge and new leading-edge food technologies will result in improved quality and safety with positive impacts on value-added food production, processing, handling, and distribution systems.

3. Program existence : Mature (More then five years)

4. Program duration : Long-Term (More than five years)

5. Expending formula funds or state-matching funds : Yes

6. Expending other than formula funds or state-matching funds : Yes

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

- 501 20% New and Improved Food Processing Technologies
- 502 50% New and Improved Food Products
- 511 5% New and Improved Non-Food Products and Processes
- 711 5% Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources.
- 712 20% Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occuring Toxins

V(C). Planned Program (Situation and Scope)

1. Situation and priorities

Over the past 20 years, advances made by food process engineers and scientists in the Department of Food Science & Technology (FST) have created new technologies (e.g., high pressure processing), improved existing ones (e.g., edible coatings) and ultimately benefited consumers in Oregon and the world with safer and higher quality foods. To remain competitive, Oregon food processors must respond with safer foods of higher sensory quality fulfilling nutritional needs while meeting complex consumer expectations. Therefore, food researchers must continue to develop and adapt technologies assuring food wholesomeness and responding to these complex consumer expectations. Simultaneously, food scientists must increase the value added to agricultural commodities to benefit Oregon farmers and the Oregon economy in general.

Fruits and vegetables are increasingly being consumed because of their appreciated nutritional and fresh properties. However, the content of some important minerals and vitamins, such as calcium, zinc, and vitamin E, is low in most fruits and vegetables. Calcium, zinc and vitamin E play significant roles in the human body to prevent certain diseases. For adults, dairy products supply 72% of the calcium in the U.S. diet, grain products about 11%, and vegetables and fruits about 6% (USDA, 1989). With the change of dietary habit, it is difficult for those individuals whose staple food is vegetables and fruits to ingest enough calcium. Many of them have turned to dietary supplements to meet their needs. An important source of zinc and vitamin E in the American diet is also provided through supplement tablets. The enrichment of fresh fruits with calcium, zinc, vitamin E or other PACs provides opportunities for increasing the intake of these nutrients, thereby decreasing the need for nutritional supplements.

Public concern about the health-extending attributes of foods relates to curiosity in knowing which foods and food constituents contribute natural anti-oxidant, cancer-inhibiting, and anti-inflammatory properties. Presumably, these “functional foods” can also act to strengthen the immune response against pathogens and other toxins. On the molecular level, knowledge of the chemical constituents, pharmacokinetics, and metabolic pathways will augment and enhance our ability to prevent chronic disease and extend health-span. Relating this information to food processing is important, since an understanding of which components are degraded or enhanced during processing will enable delivery of more potent forms of natural foods and food ingredients.

Foodborne disease outbreaks traced to seafood consumption and that of fresh fruits and vegetables is of continuing concern in the U.S. In the past few decades there has been a significant increase in the consumption of seafood and fresh produce in part as a response to health authorities advocating them as part of a healthy diet. This coupled with a growing consumer preference for minimally handled and processed food has driven the need to develop new and more product-specific technologies designed to curtail microbial contamination with these foods.

Although seafoods are usually as safe to eat as any food when properly handled and processed, they are more susceptible to bacterial contamination and decomposition. Seafood can be easily contaminated with spoilage and pathogenic bacteria naturally present in seawater and processing environments. Contamination in products generally results in loss of quality, reduced shelf-life, product recalls, and potential foodborne outbreaks. Between 1993 and 1998, the U.S. Food and Drug Administration reported a total of 1,328 food products recalls due to microbial contamination (Wong and others 2000). Among them, seafood was second to dairy product accounting for 12% of the total recalls. Contamination of seafood is a serious problem for the industries and public health.

There is tremendous potential to develop an industrial sector based on the use of plant biomass-derived carbohydrates, such as are available as food and agricultural processing byproducts. A major limitation to expansion in this field is the current inability to economically convert the polysaccharide fraction of these byproducts, typically a heterogeneous mixture of plant cell wall polysaccharides (PCW), into its constituent sugars. This process, the conversion of polysaccharides into simple sugars, is known as “saccharification”. Saccharification is a necessary operation for the production of many value-added products because the simple sugars obtained thru saccharification are the key common intermediates from which a host of products, including biofuels, biomaterials, and biochemicals, can be generated. A conservative, but reliable, approach to making significant advances in saccharification technology is to better understand its underlying science.

2. Scope of the Program

- In-State Extension
- In-State Research
- Integrated Research and Extension
- Multistate Extension
- Multistate Integrated Research and Extension
- Multistate Research

V(D). Planned Program (Assumptions and Goals)

1. Assumptions made for the Program

A goal of the Oregon State University College of Agricultural Sciences is to advance fundamental knowledge about food, nutrition, and health. A considerable amount of federal research funding and clinical studies have been devoted to better understanding the role and efficacy of primarily fruit- and vegetable-derived components as concentrated health-promoting ingredients in food systems. Concentrates of these food components are hoped to be able to act as natural anti-oxidants, prevent the onset of cancer, and inhibit atherosclerosis, heart disease, and arthritis. Understanding function and processes are keys to sustainable food production and use of natural resources. The outcomes of the program are deliverables that can be used by individuals, food processors, regulatory and commodity groups, and agricultural and natural resource stakeholders to improve food production and processing. We assume this knowledge will enable citizens and policy makers to make informed decisions and management choices that allow sustainable use of natural resources.

The development and adaptation of new food technologies requires today broader and deeper knowledge of food properties and accurate estimations of the response of quality attributes in foods to conventional and new non-thermal processes. Control of these food and beverage processes must be improved via new sensing methods. The Oregon industry alone cannot respond to these demands, as new and improved technologies generate new engineering challenges requiring further research. Advances in these areas may optimally be achieved by OSU researchers working independently and also in collaboration with other research institutions in the U.S. (e.g., Multistate Project NC-1023), and with the food processing industry.

The development of a strong value-added program for the agriculture and seafood sector is critical to the need of developing healthy rural economies throughout Oregon. The Oregon agricultural landscape is changing, and the need for differentiating Oregon products through nutrient-enhanced parameters is key to assuring success in the marketplace. A robust food science & technology program provides unique opportunities for affecting change and promoting the entrepreneurial spirit across the agricultural and business sectors in Oregon.

2. Ultimate goal(s) of this Program

The goal of this program is to develop wholesome, secure, high value/ high quality and safe food supply. Understanding the influences of thermal and non-thermal processes on foods, food ingredients, and packaging materials is required to ensure the delivery of high-value products. Because food materials are variable, complex, and subject to a multitude of physical, chemical and biological transformations during processing, additional fundamental knowledge about the properties, stability and safety of foods is essential. This information can be used to inform the public and policy makers about issues with food safety and handling, to identify ways to track, minimize, and mediate food hazards, and to develop knowledge and technologies that enable delivery of high-value packaged foods. The proposed Program encompasses diverse scientific expertise of faculty whose training and specialization includes food chemistry, food microbiology, food process engineering, fermentation processes, and sensory science.

The proposed Program includes the following nine objectives:

1. Investigate high pressure processing technologies to provide improved quality foods with fresh-like attributes, while inactivating pathogenic and spoilage microorganisms
2. Develop edible surface coatings for fruits and vegetables to extend shelf-life and deliver functional benefits (anti-browning, anti-microbial, bioactives, added nutrients)
3. Investigate relationships between molecular understandings of flavor, sensory attributes and chemical compounds responsible for those sensory characteristics to improve food and ingredient quality during production and processing.
4. Develop new value-added seafood products that utilize enzyme inhibitors and enhanced protein recovery technologies to meet changing market demands and pricing
5. Develop and scale-up a seafood industry (albacore, salmon, crab) traceability system to ensure supply-side management, quality assurance, and market tracking.
6. Determine the incidence, frequency, and virulence factors of bacterial pathogens associated with seafood
7. Determine modes of contamination of Northwest fresh berries and study the survival of microbial pathogens in berry juices and purees
8. Investigate new sanitation procedures to reduce bacterial contamination and microbial pathogens in seafood, fresh and processed berry fruits, and berry juices
9. Evaluate mechanistic models and processes for bio-based saccharification of plant cell wall materials to simple sugars.
10. Increase Oregon's grape & wine quality while considering grower profitability and environmentally sustainable production practices.

V(E). Planned Program (Inputs)

1. Estimated Number of professional FTE/SYs to be budgeted for this Program

Year	Extension		Research	
	1862	1890	1862	1890
2008	2.5	0.0	9.1	0.0
2009	2.5	0.0	9.1	0.0
2010	2.5	0.0	9.1	0.0
2011	2.5	0.0	9.1	0.0
2012	2.5	0.0	9.1	0.0

V(F). Planned Program (Activity)

1. Activity for the Program

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. Type(s) of methods to be used to reach direct and indirect contacts

Extension	
Direct Methods	Indirect Methods
• Group Discussion • Workshop • Other 1 (conference) • Education Class • Demonstrations	• Web sites • Newsletters • Other 1 (professional journals)

3. Description of targeted 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(G). Planned Program (Outputs)

1. Standard output measures

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

	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	Target	Target	Target	Target
2008	3000	5000	500	2000
2009	3000	5000	500	2000
2010	3000	5000	500	2000
2011	3000	5000	500	2000
2012	3000	5000	500	2000

2. (Standard Research Target) Number of Patents

Expected Patents

2008 :0 **2009 :**0 **2010 :** 0 **2011 :** 0 **2012 :** 0

3. Expected Peer Review Publications

Year	Research Target	Extension Target
2008	48	0
2009	48	0
2010	35	0
2011	25	0
2012	20	0

V(H). State Defined Outputs

1. Output Target

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

  2008 :58 **2009 :**60 **2010 :** 58 **2011 :**60 **2012 :**50

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

  2008 :5 **2009 :**5 **2010 :** 5 **2011 :**5 **2012 :**5

- EFFECTS ON AND PROTECTION OF HUMAN HEALTH

  2008 :2 **2009 :**2 **2010 :** 2 **2011 :**2 **2012 :**2

- DEVELOP IMPROVED BIOPRODUCT PRODUCTION SYSTEMS

  2008 :1 **2009 :**1 **2010 :** 1 **2011 :**1 **2012 :**1

- DEVELOP DISTANCE EDUCATION OUTLETS TO FURTHER REACH CLIENTELE.

  2008 :2 **2009 :**3 **2010 :** 3 **2011 :**2 **2012 :**2

V(I). State Defined Outcome

1. Outcome Target

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. Outcome Type : Change in Knowledge Outcome Measure

2008 :	**2009 :**	**2010 :**	**2011 :**	**2012 :**
10	10	10	10	10

3. Associated Knowledge Area(s)

- 501 - New and Improved Food Processing Technologies
- 502 - New and Improved Food Products
- 511 - New and Improved Non-Food Products and Processes
- 711 - Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources.
- 712 - Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occuring Toxins

1. Outcome Target

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. Outcome Type : Change in Action Outcome Measure

2008 :	**2009 :**	**2010 :**	**2011 :**	**2012 :**
0	1	1	1	1

3. Associated Knowledge Area(s)

- 501 - New and Improved Food Processing Technologies
- 502 - New and Improved Food Products
- 711 - Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources.
- 712 - Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occuring Toxins

1. Outcome Target

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. Outcome Type : Change in Condition Outcome Measure

2008 :	**2009 :**	**2010 :**	**2011 :**	**2012 :**
0	0	5	0	8

3. Associated Knowledge Area(s)

- 501 - New and Improved Food Processing Technologies
- 502 - New and Improved Food Products
- 711 - Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources.
- 712 - Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occuring Toxins

V(J). Planned Program (External Factors)

1. External Factors which may affect Outcomes

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

Description

This program focuses on increasing understanding and knowledge of food processing technologies (edible coatings, vacuum infusion and high pressure processing), microbial detection methods for research/food production, food chemistry, and sensory quality. Multiple external factors inform decisions regarding priorities for research and extension activities. Recent food recall incidents, media exposure, or current “hot topics” can drive the food research agenda. Agricultural commodity groups, state natural resource agencies, the major food processing industry, and consumer interest groups influence allocation of state and federal funds through the legislative process. They also sponsor research directly. Scientific peer review panels are especially important in directing federal support for research and extension.

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

1. Evaluation Studies Planned

- Other (peer process)

Description

Each sub-program and will be evaluated based on the goals, and the entire Program will undergo periodic evaluation. The evaluation process will assess project planning, project implementation and project outcomes. Reactions of peer review panels to grant applications is the primary means for evaluation of research initiatives. The department records each submission and our accounting system tracks awards. Reviews of total intramural and extramural funding occurs on a semi-annual basis. Data collection will occur as appropriate in accordance with the expected outcomes. Numbers of manuscripts and theses will be tabulated for the Program.

2. Data Collection Methods

- {NO DATA ENTERED}

Description

{NO DATA ENTERED}

V(A). Planned Program (Summary)

1. Name of the Planned Program

Pathogens and Nematodes Affecting Plants (Molecular and Field Programs)

2. Brief summary about Planned Program

Pathogens and nematodes account for significant losses to growers in Oregon and beyond. Improved management of: 1) the Columbia root knot nematode (Meloidogyne chitwoodi) on potato with less more economical chemical control combined with cultural strategies, and 2) postharvest fungal decay on pear with pre- and post-harvest fungicides, nutrient management, biological control agents and modified storage environments will reduce the reliance and expense invested in chemical control programs. The impact of an integrated approach will be to maximize control of the diseases using a combination of strategies that fit within the various production and marketing objectives of the producers.

Plant disease development at the molecular level is investigated in plant viruses as both a model and in relation to diseases of grape, and plant pathogenic fungi Pyrenophora tritici-repentis and Cochliobolus victoriae which cause tan spot of wheat and Victoria blight of oats respectively. Molecular tools are being used to develop risk prediction models in the control of decay in pear.
This portion of the program will impact our knowledge of the development of plant diseases through the identification and characterization of genes involved in pathogenicity and host-specificity, uncovering the relationships between disease susceptibility and resistance, and by understanding virus-host interactions and their coevolution. Enabling accurate prediction of plant diseases will impact their control by allowing more specific, economical and integrated measures to be utilized.

3. Program existence : Mature (More then five years)

4. Program duration : Long-Term (More than five years)

5. Expending formula funds or state-matching funds : Yes

6. Expending other than formula funds or state-matching funds : Yes

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

- 212 100% Pathogens and Nematodes Affecting Plants

V(C). Planned Program (Situation and Scope)

1. Situation and priorities

Pathogens and nematodes account for significant losses to growers in Oregon and beyond. The impact of an integrated approach will be to maximize control of the diseases using a combination of strategies that fit within the various production and marketing objectives of potato and pear producers. Additionally, plant disease development at the molecular level is investigated in plant viruses as both a model and in relation to diseases of grape, and plant pathogenic fungi Pyrenophora tritici-repentis and Cochliobolus victoriae which cause tan spot of wheat and Victoria blight of oats respectively. Molecular tools are being used to develop risk prediction models in the control of decay in pear. The molecular portion of the program will impact our knowledge of the development of plant diseases through the identification and characterization of genes involved in pathogenicity and host-specificity, uncovering the relationships between disease susceptibility and resistance, and by understanding virus-host interactions and their coevolution.

1. Tan spot of wheat is a destructive disease throughout major wheat growing areas of the world. The goal of our research program is a description at the molecular level of the events that determine disease development in tan spot of wheat caused by the fungus. Our goals include identification and characterization of genes involved in disease development and host specificity, and mechanisms of susceptibility and resistance.

2. Due to their relatively small genomes, viruses represent an excellent model with which to reveal how the genetic program of a pathogen operates. The next challenge is to devise a detailed picture of infection development and to apply the generated knowledge to the needs of agriculture.

3. Pear growers need to be able to incorporate practices to lower decay risk, including reduced fungicide usage. Packinghouses need to

identify high risk fruit lots and to market these before decay has time to develop in storage, while maintaining acceptable levels of sanitation for crop and food safety and minimize unnecessary disposal and reduce waste water issues.

4. Victoria Blight of oats is caused by the fungus Cochliobolus victoriae which produces the host selective toxin, victorin. The mode of action of this fungal metabolite is being investigated.

5. A large proportion (25-50%) of potato production acreage in the Pacific Northwest is at risk from quality defects caused by nematode diseases such as Columbia root-knot nematode, CRKN (Meloidogyne chitwoodi) or corky ringspot (CRS) a virus disease vectored by stubby-root nematodes that cause potato crops to be rejected. Additional losses occur to post harvest aspects of the potato industry due to lost supply. This economic value can be considerable due to the value-added nature of this commodity.

6. Recent work has focused on development of alternatives to pear postharvest chemical treatments. Biological control using yeast species has been effective in reducing several types of fruit decay in pre-harvest or postharvest applications. Postharvest treatments effectiveness can be improved by combination with a variety of materials that may suppress the pathogen, stimulate fruit resistance, or stimulate the biocontrol agent. The atmosphere in which pears are stored also affects the incidence and severity of postharvest decay, both in controlled atmosphere storage room and in modified atmosphere packaging. All of these techniques can be viewed in the context of integration.

2. Scope of the Program

- In-State Extension
- In-State Research
- Integrated Research and Extension
- Multistate Research

V(D). Planned Program (Assumptions and Goals)

1. Assumptions made for the Program

The research literature provides a solid background for this program. Growers, crop consultants, extension faculty and researchers in the wheat, grape, pear and cereal industries, as well as the potato and pear industries, are resources for the needs in each of these areas of research. Significant change and benefits will result from the stated outcomes in each of the following;
control of fungal diseases of wheat
control of plant viral diseases
control of viral diseases of grape
control of storage decay in pear
control of fungal diseases of oats

control of nematode diseases in potato
control of postharvest decay in pears

2. Ultimate goal(s) of this Program

To conduct molecular and field programs concerning the control of pathogens and nematodes affecting crops of commercial importance.

MOLECULAR…….

1. Pathogenicity factors and their involvement in disease development in wheat (Lynda Ciuffetti)
The long-term goal of our research program is a complete molecular description of the host-pathogen interactions in tan spot of wheat caused by the fungus Pyrenophora tritici-repentis. This plan covers genome sequence of the fungus and site-and mode-of-action of a host-selective toxin.

2. Functional genomics of the closteroviruses and generation of the virus-derived gene expression vectors (Valerian Dolja)
To understand fundamental processes of virus-host interactions and coevolution, using Beet yellows virus (BYV) and Grapevine leafroll-associated virus-2 (GLRaV-2).

3. New approaches to decay control of pear (Robert Spotts)
To use molecular tools to develop decay risk prediction models for use in orchards and packinghouses and to identify species and subspecies complexes of fungal pathogens in Pacific Northwest orchards and their sensitivity to fungicides.

4. Integrated analysis of plant disease resistance and susceptibility (Thomas Wolpert)
To understand relationships between disease susceptibility and disease resistance.through (1) Positional cloning of the LOV locus in Arabidopsis thaliana.(2) Characterization of the role of LIV in victorin-induced cell death.
(3) Analysis of the relationship of resistance-associated cell death with disease susceptibility. (4) Comparative genetic analyses of Arabidopsis and oats.

FIELD……..

1. Designing Nematode Management Strategies for the Future of Oregon Potato Production, and Genetic Variability in the Cyst and Root-Knot Nematodes (Russell Ingham)
Better understand nematode biology and how nematodes cause disease in potato. Design chemical and cultural management strategies to maintain or improve control while reducing use of pesticides and improving grower profitability.

2. Integrated Management of Postharvest Decay of Pear Fruit (David Sugar)
Provide programs to pear producers which maximize the control of postharvest decay within the various production and marketing objectives of producers.

V(E). Planned Program (Inputs)

1. Estimated Number of professional FTE/SYs to be budgeted for this Program

Year	Extension		Research	
	1862	1890	1862	1890
2008	0.2	0.0	6.4	0.0
2009	0.2	0.0	6.4	0.0
2010	0.2	0.0	6.4	0.0
2011	0.2	0.0	6.4	0.0
2012	0.2	0.0	6.4	0.0

V(F). Planned Program (Activity)

1. Activity for the Program

- Conduct Research Experiments.- Develop Products, Curriculum, Resources.- Conduct Workshops, meetings.- Provide Training.

2. Type(s) of methods to be used to reach direct and indirect contacts

Extension	
Direct Methods	Indirect Methods
• Group Discussion • Other 2 (presentations) • One-on-One Intervention • Other 1 (professional publications) • Workshop • Education Class	• Other 1 (trade magazines) • Web sites • Newsletters

3. Description of targeted audience

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

V(G). Planned Program (Outputs)

1. Standard output measures

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

	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	Target	Target	Target	Target
2008	500	450	50	0
2009	500	450	50	0
2010	600	700	50	0
2011	600	700	50	0
2012	600	700	50	0

2. (Standard Research Target) Number of Patents

Expected Patents

2008 :0 **2009 :**1 **2010 :** 0 **2011 :**0 **2012 :**0

3. Expected Peer Review Publications

Year	Research Target	Extension Target
2008	3	0
2009	0	0
2010	4	0
2011	2	0
2012	2	0

V(H). State Defined Outputs

1. Output Target

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

2008 :4 **2009 :**0 **2010 :** 4 **2011 :**2 **2012 :**2

- 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.

2008 :4 **2009 :**4 **2010 :** 4 **2011 :**4 **2012 :**4

V(I). State Defined Outcome

1. Outcome Target

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. Outcome Type : Change in Knowledge Outcome Measure

2008 :7 **2009 :** 7 **2010 :** 7 **2011 :**7 **2012 :** 7

3. Associated Knowledge Area(s)

- 212 - Pathogens and Nematodes Affecting Plants

1. Outcome Target

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. Outcome Type : Change in Knowledge Outcome Measure

2008 :5 **2009 :** 5 **2010 :** 5 **2011 :**5 **2012 :** 5

3. Associated Knowledge Area(s)

- 212 - Pathogens and Nematodes Affecting Plants

1. Outcome Target

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. Outcome Type : Change in Action Outcome Measure

2008 : 0	**2009 :** 1	**2010 :** 0	**2011 :** 1	**2012 :** 0

3. Associated Knowledge Area(s)

- 212 - Pathogens and Nematodes Affecting Plants

1. Outcome Target

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

2. Outcome Type : Change in Action Outcome Measure

2008 : 0	**2009 :** 0	**2010 :** 2	**2011 :** 0	**2012 :** 3

3. Associated Knowledge Area(s)

- 212 - Pathogens and Nematodes Affecting Plants

1. Outcome Target

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.

2. Outcome Type : Change in Condition Outcome Measure

2008 : 0	**2009 :** 0	**2010 :** 1	**2011 :** 0	**2012 :** 1

3. Associated Knowledge Area(s)

- 212 - Pathogens and Nematodes Affecting Plants

V(J). Planned Program (External Factors)

1. External Factors which may affect Outcomes

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

Description

Where plans of work include field studies (resistance tests, pesticide trials, seed bulking, etc.), weather can always affect outcomes. Most field plots include irrigation, thereby mitigating rainfall concerns. But unpredictable field conditions can influence results. Where plans of work include laboratory studies, results can be influenced by building infrastructure and repair of equipment. Participants in the projects are typically graduate students and faculty research assistants/associates in addition to principal investigators. Turnover of personnel can disrupt progress, but can also bring opportunities for new investigators with different skill sets.

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

1. Evaluation Studies Planned

- {NO DATA ENTERED}

Description

{NO DATA ENTERED}

2. Data Collection Methods

- {NO DATA ENTERED}

Description

{NO DATA ENTERED}

V(A). Planned Program (Summary)

1. Name of the Planned Program

Plant and Soil Management in Agricultural Systems

2. Brief summary about Planned Program

We will develop and apply the best tools of contemporary plant and soil sciences to address the challenges and opportunities facing Oregon's agricultural industry and natural resource communities. Innovations in planting techniques, seed technology, pest management, nutrient management, crop harvest, crop processing and crop marketing will be keys to success. Our ultimate goal is to make significant contributions toward providing a stable, sustainable, and healthy supply of food, fuel, fiber and planting seed for the nation while strengthening Oregon's rural communities.

3. Program existence : Mature (More then five years)

4. Program duration : Long-Term (More than five years)

5. Expending formula funds or state-matching funds : Yes

6. Expending other than formula funds or state-matching funds : Yes

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

- 102 20% Soil, Plant, Water, Nutrient Relationships
- 205 75% Plant Management Systems
- 511 5% New and Improved Non-Food Products and Processes

V(C). Planned Program (Situation and Scope)

1. Situation and priorities

Approximately 25% of Oregon's economy is based on agriculture. The field crops for which we provide research and extension support in the Oregon State University Department of Crop and Soil Science – forages and hays, seed crops, cereal grains, onions, potatoes, mint, Christmas trees, and others – account for over 35% of agricultural farm gate value in a typical year. Hence, nearly 9% of Oregon's economy can be directly influenced and affected by the success of our research and extension programs in plant and soil management. Via integration of fundamental and applied research, CSS scientists work hand-in-hand with their clientele to improve the sustainability – in all of its meanings - of growing agronomic crops in Oregon and of utilization of plant and soil resources in other venues. We strive to refine current cropping systems (pre-plant through post-harvest processing) to provide greatest economic return to growers with the least environmental impact. We work to develop new cropping systems that afford additional resource management and marketing opportunities for growers. We work with our plant breeding and genetics, pest management, and soils colleagues in these activities. We work with clientele to understand nutrient, water and waste management issues in other natural resources systems and to develop effective management strategies. We make significant contributions to a fundamental understanding of plant and soil management. Seed services scientists (testing and certification), generate information on field production and seed sample condition and contamination which are used in making seed production, conditioning and business decisions at state, regional, national and global market levels.

2. Scope of the Program

- In-State Extension
- In-State Research
- Integrated Research and Extension
- Multistate Extension
- Multistate Integrated Research and Extension
- Multistate Research

V(D). Planned Program (Assumptions and Goals)

1. Assumptions made for the Program

Crop and Soil Science faculty are in on-going contact with professional peers across the OSU campus, around the state of Oregon, the country and world. They work in cooperation with peers in state, regional and federal agencies. They work with county extension and branch research station faculty and their advisory committees. They work with commodity commission and grower association leaders. They converse directly with end users of their programs and products. They are members of successful regional and national competitive grant consortia. Through this array of contacts they have a keen awareness of local, state, regional, national and international extension and research needs in agronomy, soil fertility, seed science, and other areas of plant science.

2. Ultimate goal(s) of this Program

The goal of this program is develop and apply the best tools of contemporary plant and soil sciences to address the challenges and opportunities facing Oregon's agricultural industry and natural resource communities. Oregon's natural resource communities face significant challenges in dealing with rising production costs, environmental concerns, labor issues, transportation issues, competition from other domestic and foreign producers and other eternal factors. The goal of this program is to work with producers to find best solutions for addressing these problems. Innovations in new crops, planting techniques, seed technology, pest management, fertilizer management, crop harvest and crop marketing will be keys to success.

Program Objectives and Associated Investigators

Program scientists will investigate plant development-nutrient uptake relationships and develop refined nutrient management strategies – Chastain, Flowers, Hart, Sullivan, Young

Program scientists will determine the morphological, physiological, crop yield and crop quality responses of studied crops to management practices such as tillage, planting method, fertilization (materials, timing and rate), irrigation, plant growth regulators, and residue management, and use the knowledge gained to refine current or develop new production practices – Bohle, Chastain, Duggan, Flowers, Hart, Sullivan, Young

Program scientists will use geographic information system and other technologies to develop climate, soil, and crop species/cultivar databases that can be used to identify crop adaptation and management zone information on an individual field and larger scale basis and to deliver this through web-based delivery systems – Flowers, Hannaway

Program scientists will develop or refine techniques for post-harvest management of crops to optimize efficiency, quality and economic return to producers – Duggan, Elias, Garay

Program scientists will develop research-based information, recommendations, and educational materials to support effective and efficient utilization of nutrients and soil amendments. Nutrient sources include traditional fertilizer materials, new fertilizer materials, animal manure, biosolids, crop residues, municipal compost, and other materials. Soil amendments include materials such as, sawdust, lime, gypsum, elemental sulfur, and by products (settling pond and clarifier solids). – Hart, Sullivan

V(E). Planned Program (Inputs)

1. Estimated Number of professional FTE/SYs to be budgeted for this Program

Year	Extension		Research	
	1862	1890	1862	1890
2008	6.0	0.0	2.9	0.0
2009	6.0	0.0	2.9	0.0
2010	6.0	0.0	2.9	0.0
2011	6.0	0.0	2.9	0.0
2012	6.0	0.0	2.9	0.0

V(F). Planned Program (Activity)

1. Activity for the Program

- Conduct Research Experiments.- Conduct Workshops, meetings.- Deliver Services.- Develop Products, Curriculum, Resources.- Provide

Training.- Assessments.- Work with Media.- Partnering.- Facilitating.

2. Type(s) of methods to be used to reach direct and indirect contacts

Extension	
Direct Methods	**Indirect Methods**
• Education Class • Demonstrations • One-on-One Intervention • Group Discussion • Workshop	• Other 2 (professional journals) • Newsletters • Web sites

3. Description of targeted 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(G). Planned Program (Outputs)

1. Standard output measures

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

	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	Target	Target	Target	Target
2008	750	5000	50	0
2009	750	5000	50	0
2010	750	5000	50	0
2011	750	5000	50	0
2012	750	5000	50	0

2. (Standard Research Target) Number of Patents

Expected Patents

2008 : 0 **2009 :** 0 **2010 :** 0 **2011 :** 0 **2012 :** 0

3. Expected Peer Review Publications

Year	Research Target	Extension Target
2008	26	0
2009	26	0
2010	26	0
2011	26	0
2012	26	0

V(H). State Defined Outputs

1. Output Target

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

2008 : 33 **2009 :** 33 **2010 :** 33 **2011 :** 33 **2012 :** 33

- 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

2008 : 0 **2009 :** 4 **2010 :** 2 **2011 :** 3 **2012 :** 2

- 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

2008 : 0 **2009 :** 0 **2010 :** 2 **2011 :** 0 **2012 :** 2

V(I). State Defined Outcome

1. Outcome Target

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. Outcome Type : Change in Knowledge Outcome Measure

2008 : 0 **2009 :** 1 **2010 :** 0 **2011 :** 1 **2012 :** 1

3. Associated Knowledge Area(s)

- 102 - Soil, Plant, Water, Nutrient Relationships
- 205 - Plant Management Systems

1. Outcome Target

new management systems will be adopted by end users

2. Outcome Type : Change in Action Outcome Measure

2008 : 0 **2009 :** 10 **2010 :** 0 **2011 :** 10 **2012 :** 10

3. Associated Knowledge Area(s)

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

1. Outcome Target

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

2. Outcome Type : Change in Condition Outcome Measure

2008 :	2009 :	2010 :	2011 :	2012 :
0	10	0	10	10

3. Associated Knowledge Area(s)

- 102 - Soil, Plant, Water, Nutrient Relationships
- 205 - Plant Management Systems

V(J). Planned Program (External Factors)

1. External Factors which may affect Outcomes

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

Description

Government subsidies and programs can dramatically affect crop production. If subsidies exist for the production of a particular crop, despite long-term economic projections, acreage can be driven toward that crop.

As fuel and fertilizer prices climb, growers may be forced to make production decisions based on available dollars versus any other factors.

US immigration policy will affect the labor force available for field and processing work.

Domestic and foreign competition for grass seed may drive the seed industry toward crops with a specific production capability in Oregon

Interest in biofuels and geopolitics may result in cropping system changes or need for adaptation

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

1. Evaluation Studies Planned

- {NO DATA ENTERED}

Description

{NO DATA ENTERED}

2. Data Collection Methods

- {NO DATA ENTERED}

Description

{NO DATA ENTERED}

V(A). Planned Program (Summary)

1. Name of the Planned Program

Plant Breeding, Genetics, Biotechnology and Crop Quality

2. Brief summary about Planned Program

Contemporary tools in plant breeding, genetics, biology and chemistry will be developed, refined and utilized to create basic knowledge and to develop new plant varieties – barley, meadowfoam, potatoes and wheat - with the best disease and pest tolerance possible and with quality attributes that allow Oregon growers to expand and enter new markets. Our ultimate goal is to make significant contributions toward providing a stable, sustainable, and healthy supply of food, fuel, and fiber for the nation while strengthening Oregon's rural communities.

3. Program existence : Mature (More then five years)

4. Program duration : Long-Term (More than five years)

5. Expending formula funds or state-matching funds : Yes

6. Expending other than formula funds or state-matching funds : Yes

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

- 201 20% Plant Genome, Genetics, and Genetic Mechanisms
- 202 10% Plant Genetic Resources
- 203 15% Plant Biological Efficiency and Abiotic Stresses Affecting Plants
- 204 30% Plant Product Quality and Utility (Preharvest)
- 212 15% Pathogens and Nematodes Affecting Plants
- 213 10% Weeds Affecting Plants

V(C). Planned Program (Situation and Scope)

1. Situation and priorities

New crop varieties are needed in order to provide a stable, sustainable, and healthy supply of food, fuel, and fiber. Approximately 25% of Oregon's economy is based on agriculture. The four crops for which we have breeding programs in the Oregon State University Department of Crop and Soil Science – wheat, potatoes, barley and meadowfoam – account for over 10% of agricultural farm gate value in a typical year. Hence, roughly 2% of Oregon's economy can be directly influenced and affected by the success of our breeding programs. Each of these four crops also represents a unique plant genetic model system: they represent diploids and polyploids; sexual and asexual propagation; dicots and monocots; and inbreeding and outbreeding. They also include one of the world's most ancient crops (barley) and one of the newest (meadowfoam). Via integration of fundamental and applied research, CSS researchers work hand-in-hand with their producer clientele to improve the sustainability – in all of its meanings - of growing these crops in Oregon. We strive to develop crops with the best disease and pest tolerance possible and with quality attributes that allow growers to expand and enter new markets. At the same time, we make significant contributions to a fundamental understanding of plant genetics, biology and chemistry.

2. Scope of the Program

- In-State Extension
- In-State Research
- Integrated Research and Extension
- Multistate Extension
- Multistate Integrated Research and Extension
- Multistate Research

V(D). Planned Program (Assumptions and Goals)

1. Assumptions made for the Program

Crop and Soil Science faculty are in on-going contact with professional peers across the OSU campus, around the state of Oregon, the country and the world. They work in cooperation with peers in state, regional and federal agencies. They work with county extension and branch research station faculty and their advisory committees. They work with commodity commission and grower association leaders. They converse directly with end users of their products. They are members of successful regional and national competitive grant consortia. Through this array of contacts they have a keen awareness of local, state, regional, national and international research needs in plant breeding, genetics, biotechnology and crop quality.

2. Ultimate goal(s) of this Program

The goal of this program is develop and apply the best tools of contemporary genetics, plant breeding and plant biology to address the challenges and opportunities facing the United States plant science community and Oregon's agricultural industry. New crop varieties are needed in order to provide a stable, sustainable, and healthy supply of food, fuel, and fiber. New varieties are developed through plant breeding, and progress in plant breeding requires an understanding of basic plant biology, chemistry and genetic diversity. More efficient strategies are needed for characterizing, manipulating, and deploying genetic diversity. Diversity will be characterized from the genomic to the phenomic level. The targeted deployment of genetic diversity will be addressed in four biological contexts: (1) physiological processes and pathways, (2) biotic and abiotic stress resistance, (3) crop quality, and (4) genome and agroecosystem interactions.

Program Objectives and Associated Investigators

Crop variety development

(1) Barley: Hayes
(2) Meadowfoam: Kling
(3) Potatoes: Vales
(4) Wheat: Peterson

Genetic diversity

(1) Physiological processes and pathways:
Chastain, Duggan, Hayes, Riera-Lizarazu

(2) Biotic and abiotic stress resistance
Hayes, Kling, Mallory-Smith, Peterson, Riera-Lizarazu, Vales

(3) Crop quality
Hayes, Kling, Peterson, Petrie, Riera-Lizarazu, Ross, Vales

(4) Genome and agroecosystem interactions
Hayes, Kling, Mallory-Smith, Petrie, Riera-Lizarazu, Vales

Contemporary tools in plant breeding, genetics, biology and chemistry will be developed, refined and utilized to create basic knowledge and to develop new plant varieties – barley, meadowfoam, potatoes and wheat - with the best disease and pest tolerance possible and with quality attributes that allow Oregon growers to expand and enter new markets. Our ultimate goal is to make significant contributions toward providing a stable, sustainable, and healthy supply of food, fuel, and fiber for the nation while strengthening Oregon's rural communities.

V(E). Planned Program (Inputs)

1. Estimated Number of professional FTE/SYs to be budgeted for this Program

Year	Extension		Research	
	1862	1890	1862	1890
2008	0.8	0.0	12.5	0.0
2009	0.8	0.0	12.5	0.0
2010	0.8	0.0	12.5	0.0
2011	0.8	0.0	12.5	0.0
2012	0.8	0.0	12.5	0.0

V(F). Planned Program (Activity)

1. Activity for the Program

- Conduct Research Experiments.- Conduct Workshops, meetings.- Deliver Services.- Develop Products, Curriculum, Resources.- Provide Training.- Assessments.- Partnering.- Facilitating.

2. Type(s) of methods to be used to reach direct and indirect contacts

Extension	
Direct Methods	Indirect Methods
• One-on-One Intervention • Education Class • Workshop	• Web sites

3. Description of targeted 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(G). Planned Program (Outputs)

1. Standard output measures

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

	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	Target	Target	Target	Target
2008	0	0	0	0
2009	0	0	0	0
2010	0	0	0	0
2011	0	0	0	0
2012	0	0	0	0

2. (Standard Research Target) Number of Patents

Expected Patents

2008 :0 **2009 :**0 **2010 :** 0 **2011 :**0 **2012 :**0

3. Expected Peer Review Publications

Year	Research Target	Extension Target
2008	15	0
2009	15	0
2010	15	0
2011	15	0
2012	15	0

V(H). State Defined Outputs

1. Output Target

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

2008 :21 **2009 :**21 **2010 :** 21 **2011 :**21 **2012 :**21

- 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.

2008 :1 **2009 :**2 **2010 :** 2 **2011 :**2 **2012 :**3

- 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

2008 :2 **2009 :**2 **2010 :** 2 **2011 :**2 **2012 :**2

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

2008 :0 **2009 :**1 **2010 :** 0 **2011 :**1 **2012 :**0

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

2008 :1 **2009 :**1 **2010 :** 1 **2011 :**1 **2012 :**1

V(I). State Defined Outcome

1. Outcome Target

- 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. Outcome Type : Change in Knowledge Outcome Measure

2008 : 0	**2009 :** 2	**2010 :** 0	**2011 :** 2	**2012 :** 0

3. Associated Knowledge Area(s)

- 201 - Plant Genome, Genetics, and Genetic Mechanisms
- 202 - Plant Genetic Resources
- 203 - Plant Biological Efficiency and Abiotic Stresses Affecting Plants
- 213 - Weeds Affecting Plants

1. Outcome Target

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

2. Outcome Type : Change in Action Outcome Measure

2008 : 0	**2009 :** 1	**2010 :** 1	**2011 :** 1	**2012 :** 1

3. Associated Knowledge Area(s)

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

1. Outcome Target

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. Outcome Type : Change in Condition Outcome Measure

2008 : 0	**2009 :** 0	**2010 :** 0	**2011 :** 0	**2012 :** 0

3. Associated Knowledge Area(s)

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

V(J). Planned Program (External Factors)

1. External Factors which may affect Outcomes

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

Description

Government subsidies and programs can dramatically affect crop production. If subsidies exist for the production of a particular crop, despite long-term economic projections, acreage can be driven toward that crop.

Niche marketing to foreign countries is dependent on the ability of competitors to respond quickly with a similar product.

Niche marketing to foreign countries is dependent on the balance of trade between the US and that country. If many goods are being shipped by container to the US and empty containers are available for the return shipment, shipment of small quantities of bulk materials can be affordable.

Niche marketing to foreign, and to an increasing extent to distant locations in the United States, is dependent on fuel prices. As fuel prices climb, buyers may look to use of less desirable but cheaper nearby products.

US immigration policy affects the ability of students to come to the US for advanced study.

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

1. Evaluation Studies Planned

- {NO DATA ENTERED}

Description

{NO DATA ENTERED}

2. Data Collection Methods

- {NO DATA ENTERED}

Description

{NO DATA ENTERED}

V(A). Planned Program (Summary)

1. Name of the Planned Program

Plant Genome, Genetics, and Genetic Mechanisms

2. Brief summary about Planned Program

Fundamental molecular mechanisms critical to plant production and associated agricultural practices are investigated using model organisms, including the bacteria Nitrosomonas europaea and Nitrobacter winogradskyi, and the economically important crop Zea mays. The processes in focus include: microbial processes in nitrate production, and hormonal regulation in seed development.

Impacts of these investigations include: mitigation of the effects of nitrifiers in agricultural soils and enhancement of their role in wastewater treatment facilitated by a thorough understanding of their metabolism; and, prevention of significant loss of yield and quality in cereals through an understanding of the developmental pathways involved in seed maturation.

3. Program existence : Mature (More then five years)

4. Program duration : Long-Term (More than five years)

5. Expending formula funds or state-matching funds : Yes

6. Expending other than formula funds or state-matching funds : Yes

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

- 201 100% Plant Genome, Genetics, and Genetic Mechanisms

V(C). Planned Program (Situation and Scope)

1. Situation and priorities

Fundamental molecular mechanisms critical to plant production and associated agricultural practices are investigated using model organisms, including the bacteria Nitrosomonas europaea and Nitrobacter winogradskyi, and the economically important crop Zea mays. The processes in focus include: microbial processes in nitrate production, and hormonal regulation in seed development. Impacts of these investigations include: mitigation of the effects of nitrifiers in agricultural soils and enhancement of their role in wastewater treatment facilitated by a thorough understanding of their metabolism; and, prevention of significant loss of yield and quality in cereals through an understanding of the developmental pathways involved in seed maturation.

The reactions carried out by nitrifying microorganisms are critical to the fate of NH3 and urea applied to croplands and the subsequent impact of these fertilizers on the environment. The first set of studies will focus on the well-characterized nitrifying bacteria Nitrosomonas europaea and Nitrobacter winogradskyi but will also include other nitrifying bacteria for which complete genomes are available.

Complex developmental processes are often controlled by the interplay of positive and antagonistic, or modulating, signaling pathways. This research concerns the interaction of antagonistic signaling pathways that regulate the switch between embryogenesis and the maturation phase of maize embryo development. The overall goal of this second research segment is to test models of how these signaling systems interact during maize embryo development, and to dissect their roles in controlling the changing gene expression and developmental capabilities of the maize embryo during maturation.

2. Scope of the Program

- In-State Research

V(D). Planned Program (Assumptions and Goals)

1. Assumptions made for the Program

The research literature provides a solid background for this program. Growers, crop consultants, extension faculty and researchers concerned with agroecosystems as a whole, and the cereal industry in particular are resources for the needs in each of these areas of research. Significant change and benefits will result from the stated outcomes in each of the following;
watershed quality.
cereal yields and seed quality.

2. Ultimate goal(s) of this Program

To examine the fundamental molecular mechanisms critical to plant production and associated agricultural practices.

1. Molecular investigations of nitrifying bacteria (Arp and Sayavedra Soto)
Mitigation of the negative effects and exploitation of the beneficial effects of ammonia oxidizers will be facilitated by a thorough understanding of their metabolism. We propose to investigate the expression of genes and the nature of the enzymes required for the oxidation of ammonia (NH3) by nitrifying bacteria.

2. Regulatory Circuits in Maize Embryo Development: ABA, GA and the ROP GTPases (Rivin and Fowler)
The interest in hormone interaction in maize is enhanced by the agricultural importance of cereal seeds; the events of maturation are what make grains both nutritious and storable, and understanding seed maturation results in prevention of significant loss of yield and quality. This research concerns the interaction of antagonistic signaling pathways that regulate the switch between embryogenesis and the maturation phase of maize embryo development.

V(E). Planned Program (Inputs)

1. Estimated Number of professional FTE/SYs to be budgeted for this Program

Year	Extension		Research	
	1862	1890	1862	1890
2008	0.0	0.0	2.3	0.0
2009	0.0	0.0	2.3	0.0
2010	0.0	0.0	2.3	0.0
2011	0.0	0.0	2.3	0.0
2012	0.0	0.0	2.3	0.0

V(F). Planned Program (Activity)

1. Activity for the Program

- Conduct Research Experiments.- Develop Products, Curriculum, Resources.- Provide Training.

2. Type(s) of methods to be used to reach direct and indirect contacts

Extension	
Direct Methods	Indirect Methods
• Other 1 (professional publications) • Other 2 (presentations) • Education Class	• Web sites

3. Description of targeted audience

Growers in all agroecosystems.
Cereal industry.

V(G). Planned Program (Outputs)

1. Standard output measures

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

	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	Target	Target	Target	Target
2008	100	0	0	0
2009	100	0	0	0
2010	100	0	0	0
2011	100	0	0	0
2012	100	0	0	0

2. (Standard Research Target) Number of Patents

Expected Patents

2008 :0 **2009 :**0 **2010 :** 0 **2011 :**0 **2012 :** 0

3. Expected Peer Review Publications

Year	Research Target	Extension Target
2008	4	0
2009	4	0
2010	4	0
2011	4	0
2012	4	0

V(H). State Defined Outputs

1. Output Target

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

2008 :4 **2009 :**4 **2010 :** 4 **2011 :**4 **2012 :**4

- 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.

2008 :4 **2009 :**4 **2010 :** 4 **2011 :**4 **2012 :**4

V(I). State Defined Outcome

1. Outcome Target

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. Outcome Type : Change in Knowledge Outcome Measure

2008 :6 **2009 :** 6 **2010 :** 6 **2011 :**6 **2012 :** 6

3. Associated Knowledge Area(s)

- 201 - Plant Genome, Genetics, and Genetic Mechanisms

1. Outcome Target

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. Outcome Type : Change in Action Outcome Measure

2008 :0 **2009 :** 0 **2010 :** 0 **2011 :**1 **2012 :** 1

3. Associated Knowledge Area(s)

- 201 - Plant Genome, Genetics, and Genetic Mechanisms

1. Outcome Target

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.

2. Outcome Type : Change in Condition Outcome Measure

2008 :0 **2009 :** 0 **2010 :** 0 **2011 :**0 **2012 :** 5

3. Associated Knowledge Area(s)

- 201 - Plant Genome, Genetics, and Genetic Mechanisms

V(J). Planned Program (External Factors)

1. External Factors which may affect Outcomes

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

Description

Where plans of work include field studies (resistance tests, pesticide trials, seed bulking, etc.), weather can always affect outcomes. Most field plots include irrigation, thereby mitigating rainfall concerns. But unpredictable field conditions can influence results. Where plans of work include laboratory studies, results can be influenced by building infrastructure and repair of equipment. Participants in the projects are typically graduate students and faculty research assistants/associates in addition to principal investigators. Turnover of personnel can disrupt progress, but can also bring opportunities for new investigators with different skill sets.

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

1. Evaluation Studies Planned

- {NO DATA ENTERED}

Description

{NO DATA ENTERED}

2. Data Collection Methods

- {NO DATA ENTERED}

Description

{NO DATA ENTERED}

V(A). Planned Program (Summary)

1. Name of the Planned Program

Rangeland Ecology and Management

2. Brief summary about Planned Program

The Department of Rangeland Ecology and Management at Oregon State University has a significant commitment to rangeland research. The focus of this research centers on three principal goals: (1) increasing the efficiency and sustainability of rangeland based enterprises, (2) designing multiple use management strategies that ensure and sustain productivity, biodiversity, and stability of rangeland watersheds and ecosystems, and (3) expand humankind's understanding of rangelands and their ecology. Current research programs emphasize the following areas: Ecological Theory, Water and Land Relations/Riparian, Watershed Management, Weed Ecology, Livestock Grazing Ecology, Land Restoration, Agroforestry, Rangeland Insects, and Landscape Ecology.

3. Program existence : Mature (More then five years)

4. Program duration : Long-Term (More than five years)

5. Expending formula funds or state-matching funds : Yes

6. Expending other than formula funds or state-matching funds : Yes

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

- 121 90% Management of Range Resources
- 125 10% Agroforestry

V(C). Planned Program (Situation and Scope)

1. Situation and priorities

Rangelands are the dominant landscape in Oregon making up about half of the total land area of the state. To address rancher and other land managers need and be responsive to demand, the Department of Rangeland Ecology and Management will carry out research that is attentive to Oregon's diverse agriculture and its food industries: especially animals and the environment and the economic and environmental sustainability of Oregon agriculture. In addition stewardship of Oregon land and water resources is an important focus. Within this area of research we will focus on: interaction of humans with the managed environment, interaction of livestock with the ecosystems of eastern Oregon, system-based understanding of water resources of streams and rivers, soils in relation to crop production and landscape studies, water quality and ecosystem studies, and. understanding of ecological systems.
Production of cattle and calves is the largest food sector of Oregon Agriculture. The majority of Oregon ranches are forage based and future profitability depends on improvements in production and management of their forage base. These livestock graze about half of the land area of Oregon and their interplay with conservation needs and practices creates new issues periodically. There is a large body of research towards understanding the rangeland resources and their management. Currently new ecological ideas in the area of multi-equilibrial ecology, water quality and management strategies are changing some of the long held premises of resource management. Environmental interactions are major drivers of ecosystems and their effects are being understood on a landscape scale using new statistical techniques. This work has influenced the way private and public landowners implement management strategies.

2. Scope of the Program

- In-State Extension
- In-State Research
- Integrated Research and Extension
- Multistate Extension
- Multistate Integrated Research and Extension
- Multistate Research

V(D). Planned Program (Assumptions and Goals)

1. Assumptions made for the Program

This research group works cooperatively with the ARS at the Burns Oregon station. The collaboration helps focus both groups on problems and areas of the state to maximize complementarities and eliminate duplication of programs. All research projects are evaluated annually.

2. Ultimate goal(s) of this Program

This research group has two goals for the research program:

1. Generate new knowledge that increases the understanding of ecology of rangeland ecosystems.

2. Formulate strategies for sustainable range management through advances in research.

Program Objectives and associated investigators
List the Program Objectives for the next 5-Year Program Period and identify the investigators for each objective
Subprogram 1: to examine the accuracy and precision of state-and-transition models to predict response to disturbance on the basis of ecological function.
1. Understand multi-equilibrial ecology and expand theoretical foundations of the theory. (Stringham, Krueger)
2. Understand the relationships of plant communities to hydrology in riparian systems (Stringham, Krueger, Buckhouse)
Subprogram2: to understand the riparian relationships associated with livestock grazing for improved management.
3.Watershed Management on Oregon's Rangelands: Objective One: Response to juniper removal from an encroached watershed. (Buckhouse)
Subprogram 3: to better understand sage grouse habitat in relation to spatial and temporal patterns in the landscape
4.Watershed Management on Oregon's Rangelands: Objective Two: Animal behavior in relation to wildland watershed features.(Buckhouse, McInnis)
5. Develop new and innovative methodologies for sampling and analyzing vegetation growing on rangelands and forest lands(Johnson, Petersen)
6. Develop spatial models that predict the spread of weeds and the movement of animals across landscapes (Johnson, McInnis)
7. Assess sage-grouse nesting and brood rearing habitat at multiple spatial and temporal scales.
Subprogram 4: To quantify the tree-pasture-animal interactions within conifer-based agroforests in western Oregon
8 Provide insights about competition and interference among components of silvopastures in order to facilitate development of more efficient land use practices in western Oregon. (Sharrow)
Subprogram 5: To compare insect biological data between and among habitats to assess population and community responses to insect pest management practices, land-use management, and conservation programs.
9. Compare insect biological diversity between and among various habitats, using select taxa, primarily Lepidoptera and Coleoptera, for the assessment of population and community responses to insect pest management practices, land-use management, and conservation programs. (Miller)

V(E). Planned Program (Inputs)

1. Estimated Number of professional FTE/SYs to be budgeted for this Program

Year	Extension		Research	
	1862	1890	1862	1890
2008	0.0	0.0	4.4	0.0
2009	0.0	0.0	4.4	0.0
2010	0.0	0.0	4.4	0.0
2011	0.0	0.0	4.4	0.0
2012	0.0	0.0	4.4	0.0

V(F). Planned Program (Activity)

1. Activity for the Program

- Conduct Research Experiments.
- Develop Models and Protocols
- Conduct GIS analysis- Develop Products, Curriculum, Resources.- Assessments.- Partnering. - - team development

2. Type(s) of methods to be used to reach direct and indirect contacts

Extension	
Direct Methods	**Indirect Methods**
• Education Class • One-on-One Intervention • Group Discussion • Demonstrations • Workshop	• Web sites • Public Service Announcement • TV Media Programs • Newsletters

3. Description of targeted audience

- peers
- ranchers
- land managers
- policy makers.

V(G). Planned Program (Outputs)

1. Standard output measures

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

	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	Target	Target	Target	Target
2008	26000	57400	525	35050
2009	51000	11750	15525	50050
2010	101200	207600	30252	80050
2011	151300	507000	50525	120050
2012	100100	200500	15500	50050

2. (Standard Research Target) Number of Patents

Expected Patents

2008 :0 **2009 :**0 **2010 :** 0 **2011 :**0 **2012 :**0

3. Expected Peer Review Publications

Year	Research Target	Extension Target
2008	3	0
2009	3	0
2010	4	0
2011	1	0
2012	3	0

V(H). State Defined Outputs

1. Output Target

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

2008 : 6 **2009 :** 5 **2010 :** 5 **2011 :** 5 **2012 :** 5

- 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

2008 : 10 **2009 :** 20 **2010 :** 10 **2011 :** 10 **2012 :** 10

V(I). State Defined Outcome

1. Outcome Target

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. Outcome Type : Change in Knowledge Outcome Measure

2008 : 5 **2009 :** 5 **2010 :** 5 **2011 :** 5 **2012 :** 5

3. Associated Knowledge Area(s)

- 121 - Management of Range Resources
- 125 - Agroforestry

1. Outcome Target

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. Outcome Type : Change in Action Outcome Measure

2008 : 0	**2009 :** 2	**2010 :** 0	**2011 :** 2	**2012 :** 1

3. Associated Knowledge Area(s)

- 121 - Management of Range Resources

1. Outcome Target

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. Outcome Type : Change in Condition Outcome Measure

2008 : 0	**2009 :** 0	**2010 :** 0	**2011 :** 0	**2012 :** 5

3. Associated Knowledge Area(s)

- 121 - Management of Range Resources
- 125 - Agroforestry

V(J). Planned Program (External Factors)

1. External Factors which may affect Outcomes

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

Description

All of the field work in Rangeland Ecology and Management is influenced by annual weather patterns and studies are designed to account for that. Consequently long term studies need to be the foundation for ecological work. Funding cycles in the College and granting agencies drive the work and if there is a reduction of interest in natural resources research we would expect a reduction of funding that will slow or eliminate progress in areas of the research program.

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

1. Evaluation Studies Planned

- Other (peer process)

Description

Evaluation of the research program will be based on monitoring publications and incorporation of results into extension programming. Each faculty member is evaluated annually on their research productivity and relevance of the research program

2. Data Collection Methods

- {NO DATA ENTERED}

Description

{NO DATA ENTERED}

V(A). Planned Program (Summary)

1. Name of the Planned Program

Reproductive Performance of Animals

2. Brief summary about Planned Program

Limits in reproductive efficiency in domestic animal and birds, continues to be one of the major inefficiencies in production agriculture. Research at this station is addressing this issue in three primary ways. The first is to understand the biology and underlying mechanisms of gamete development, fertilization and embryogenesis. The second is to provide fundamental information about the interactions between the immune and reproductive systems in dairy cattle, with specific focus on the presence and function of cells of the immune system at the maternal/fetal interface, the affects of reproductive hormones on the various types of immune cells, the expression of the suppressors of cytokine signaling (SOCS) genes in uterine and placental tissue, and also the actions of prostaglandins at the level of the uterus and placenta. The final objective is the identification of genes that determine male fitness. Proteomics and cDNA microarray analysis are being used to address this goal. An additional programmatic goal is the study of sperm cell energetics to provide a new insight into a long-term problem that has limited cryopreservation technology of avian sperm.

3. Program existence : Intermediate (One to five years)

4. Program duration : Long-Term (More than five years)

5. Expending formula funds or state-matching funds : Yes

6. Expending other than formula funds or state-matching funds : Yes

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

- 301 60% Reproductive Performance of Animals
- 304 40% Animal Genome

V(C). Planned Program (Situation and Scope)

1. Situation and priorities

Reproductive inefficiencies in all food animal species continue to be a primary economic challenge in production situations. Among the issues targeted by this program are: factors affecting bovine endodermal cells, bacterial infections and health of the bovine uterus, male fitness in poultry, and sperm cell energetics.

Little is known about the factors affecting differentiation and outgrowth of endodermal cells from the bovine inner cell mass (ICM) during the formation of extraembryonic endoderm. Previous work from our laboratory has demonstrated that fibronectin is superior to either laminin or collagen IV as a support for endodermal cell outgrowth and bovine endodermal cells produce plasminogen activator (PA) during migration in vitro (Schilperoort-Haun and Menino, 2002). We have recently demonstrated that bovine endodermal cells utilize specifc integrins for migration on fibronectin and vitronectin supports cellular outgrowth from the ICM (Singleton and Menino, 2005).

It is estimated that early postpartum bacterial infections of the uterus affect 10 to 50% of dairy cattle annually In addition,significant bacterial contamination of the uterus occurs in greater than 90% of dairy cows during the first 28 days postpartum. Detection of estrus is lower in cows exhibiting postpartum uterine infections, conception rates are approximately 20% lower than in healthy cows, and the interval between calving and conception (days open) is extended by as much as 30 days. In addition, while uterine infection is rarely a direct reason for culling, fertility is reduced in affected animals, and more animals are culled for poor reproductive performance than any other single reason. Dairy cattle clinically diagnosed with uterine infections are approximately 1.7 times more likely than unaffected herd mates to be culled for reproductive failure.

A larger physiological issue affecting dairy cattle is the steady decline in fertility associated with the steady increases in milk production over the last 30 years. A greater understanding of uterine function in dairy cattle will provide additional information that may allow the development of new and novel methods by which to improve fertility.

Whereas genes have been reported to affect male fitness in poultry, such work has been limited to the effect of single genes and underlying mechanisms have remained largely unexplored. The primary limitations have been reliable objective means of measuring sperm cell motility and understanding the cellular mechanisms that initiate and maintain the motile state. Likewise, poultry breeding has been limited to

copulation or artificial insemination of fresh semen, since poultry semen has a short shelf-life. Long-term maintenance of genetic stock depends upon the availability of flocks rather than cryopreserved gametes.

Research at Oregon State University has generated proof of concept that poultry sperm – and perhaps sperm from many other vertebrate species – can be preserved providing that intracellular calcium is controlled beforehand. Gamete preservation was listed as a USDA research priority for FY 2006. If this research is successful, it will be possible for poultry semen to become a commodity.

2. Scope of the Program

- In-State Research
- Multistate Research

V(D). Planned Program (Assumptions and Goals)

1. Assumptions made for the Program

Limits in reproductive efficiency in domestic animal and birds, continues to be one of the major inefficiencies in production agriculture. Knowledge about the biology and underlying mechanisms of gamete development, fertilization and embryogenesis, as well as the identification of genes that determine male fitness will improve reproductive capacity. Additionally, fundamental information about the interactions between the immune and reproductive systems will allow the development of new and novel methods by which to improve fertility.

2. Ultimate goal(s) of this Program

Ultimately, this program will overcome limits in reproductive efficiency in domestic animal and bird production agriculture through three primary goals. The first is to understand the biology and underlying mechanisms of gamete development, fertilization and embryogenesis. The second is to provide fundamental information about the interactions between the immune and reproductive systems in dairy cattle, with specific focus on the presence and function of cells of the immune system at the maternal/fetal interface, the affects of reproductive hormones on the various types of immune cells, the expression of the suppressors of cytokine signaling (SOCS) genes in uterine and placental tissue, and also the actions of prostaglandins at the level of the uterus and placenta. The final goal is the identification of genes that determine male fitness. An additional programmatic goal is the study of sperm cell energetics to provide a new insight into a long-term problem that has limited cryopreservation technology of avian sperm.

Program Goal 1: Based on previous work, we have developed four specific aims for research under this objective: 1) determine the temporal expression pattern of integrins in ICM involved in cellular migration on fibronectin, laminin and vitronectin using RT-PCR, 2) evaluate fibronectin and vitronectin for chemotactic effects on bovine endodermal cells, 3) determine if the appearance of laminin serves as a “stop” signal for endodermal cell migration, and 4) evaluate the role of the PA system in bovine endodermal cell migration on vitronectin.

Program Goal 2:

1) Examination of immune cell phenotypes present in the uterus during placentation and throughout pregnancy in cattle.
2) Determination of the affects of reproductive hormones on immune cells, with regard to regulation gene expression and cell function.
3) Determination of the presence, expression patterns and regulation of the SOCS genes in uterine and placental tissues during embryo implantation/attachment and throughout pregnancy.
4) Analysis of regulation of gene expression in uterine and placental tissues and cell types by prostaglandins.

Program Goal 3:

1) Test the effect of caspase inhibitor I on motile concentration and VSL. Apoptosis can be induced by activation of a family of proteolytic enzymes known as caspases. Caspase inhibitor I is a highly specific, cell-permeable, irreversible inhibitor of downstream effector caspases.
2) Test the effect of cyclosporin A on motile concentration and VSL. Cyclosporin A inhibits formation of the mitochondrial permeability transition pore, which forms in response to excessive Ca2+ accumulation in the mitochondrial matrix.
3) Determine if rate of sperm cell Ca2+ depletion is affected by extracellular BAPTA concentration.
4) Test whether glycine augments the effect of glutamate when Ca2+ depletion is facilitated by activation of NMDA glutamate receptors.
5) Test the effect of DMSO on reactivation of Ca2+-depleted sperm using a concentration of DMSO proven effective as a cryoprotectant.
6) Measure fertilizing ability of fowl sperm treated with BAPTA prior to freezing and exogenous Ca2+ after thawing.

V(E). Planned Program (Inputs)

1. Estimated Number of professional FTE/SYs to be budgeted for this Program

Year	Extension		Research	
	1862	1890	1862	1890
2008	0.0	0.0	1.2	0.0
2009	0.0	0.0	1.2	0.0
2010	0.0	0.0	1.2	0.0
2011	0.0	0.0	1.2	0.0
2012	0.0	0.0	1.2	0.0

V(F). Planned Program (Activity)

1. Activity for the Program

- Conduct Research Experiments.- Deliver Services.- Develop Products, Curriculum, Resources.- Assessments.- Partnering.

2. Type(s) of methods to be used to reach direct and indirect contacts

Extension	
Direct Methods	Indirect Methods
• Other 1 (journals) • Other 2 (presentations) • Education Class • Workshop	• Web sites • Public Service Announcement • Newsletters

3. Description of targeted audience

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

V(G). Planned Program (Outputs)

1. Standard output measures

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

	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	Target	Target	Target	Target
2008	100	300	0	0
2009	100	300	0	0
2010	100	300	0	0
2011	100	300	0	0
2012	100	300	0	0

2. (Standard Research Target) Number of Patents

Expected Patents

2008 : 0 **2009 :** 0 **2010 :** 0 **2011 :** 1 **2012 :** 0

3. Expected Peer Review Publications

Year	Research Target	Extension Target
2008	2	0
2009	2	0
2010	2	0
2011	2	0
2012	2	0

V(H). State Defined Outputs

1. Output Target

- 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

  2008 : 10 **2009 :** 10 **2010 :** 10 **2011 :** 10 **2012 :** 10

- 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

  2008 : 0 **2009 :** 0 **2010 :** 0 **2011 :** 3 **2012 :** 1

V(I). State Defined Outcome

1. Outcome Target

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. Outcome Type : Change in Knowledge Outcome Measure

2008 : 10 **2009 :** 10 **2010 :** 10 **2011 :** 10 **2012 :** 10

3. Associated Knowledge Area(s)

- 301 - Reproductive Performance of Animals
- 304 - Animal Genome

1. Outcome Target

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. Outcome Type : Change in Action Outcome Measure

2008 : 0	**2009 :** 0	**2010 :** 0	**2011 :** 0	**2012 :** 5

3. Associated Knowledge Area(s)

- 301 - Reproductive Performance of Animals
- 304 - Animal Genome

1. Outcome Target

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. Outcome Type : Change in Condition Outcome Measure

2008 : 0	**2009 :** 0	**2010 :** 0	**2011 :** 0	**2012 :** 10

3. Associated Knowledge Area(s)

- 301 - Reproductive Performance of Animals

V(J). Planned Program (External Factors)

1. External Factors which may affect Outcomes

- Government Regulations
- Economy

Description

{NO DATA ENTERED}

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

1. Evaluation Studies Planned

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

Description

{NO DATA ENTERED}

2. Data Collection Methods

- Structured
- Unstructured
- Case Study
- On-Site
- Sampling
- Mail
- Observation

Description
{NO DATA ENTERED}

V(A). Planned Program (Summary)

1. Name of the Planned Program

Social Change in the Marketplace: Producers, Retailers and Consumers

2. Brief summary about Planned Program

As a multi-state project, NCCC-TEMP065 "Social Change in the Marketplace: Producers, Retailer and Consumers" focuses on key areas of various social changes in the marketplace impacting producers, retailers and consumers. From 2006 to 2011, this multi-state research aims to determine (1) how technology impacts producers/retailers/consumers in the market place, with a special emphasis on rural markets in America; (2) how society impacts consumer demand for goods and services with a goal of improving the well-being of consumers; and (3) how to develop economic linkages among producers, retailers, and consumers for the community development. Aligned with research objectives of the multi-state project, my own research program focuses on promoting the adoption of Internet technology among rural retailers to improve their economic competitiveness.

3. Program existence : New (One year or less)

4. Program duration : Medium Term (One to five years)

5. Expending formula funds or state-matching funds : Yes

6. Expending other than formula funds or state-matching funds : Yes

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

- 607 20% Consumer Economics
- 803 80% Sociological and Technological Change Affecting Individuals, Families and Communities

V(C). Planned Program (Situation and Scope)

1. Situation and priorities

The nation is going through many changes in the market, environment, economy, and politics, leading various social changes in the marketplace. Drastic changes in the marketplace, especially in rural America, have threatened the well-being of rural community residents and the economic survival of rural producers and retailers. In order to improve the economic vitality of rural America and thus well-being of the community, research is needed to identify the current problems faced by rural businesses and consumers and further to develop the business strategy to assist rural businesses to gain economic competitiveness. Rapid technology development has been a critical change that has threatened the survival of rural communities that lack resources and knowledge to be responsive to changes in technology. Thus, there is a pressing need to address how rural communities can respond to the changes in the marketplace as a result of technological development. As the contribution of agriculture and manufacturing to rural community has declined, the importance of rural retail business to improve the economic well-being of community becomes critical.

2. Scope of the Program

- In-State Research
- Multistate Research

V(D). Planned Program (Assumptions and Goals)

1. Assumptions made for the Program

We assume that social changes in the marketplace will continue to occur and affect producers, retailers and consumers. In particular, we assume that urban communities are better equipped with responding to social changes than rural communities in general. To a large extent, rural America has suffered from declining population and loss of economic vibrancy.

2. Ultimate goal(s) of this Program

The goal of the multi-state project is to improve the well-being of rural communities. More specifically, by enhancing the economic competitiveness of rural retailers, the ultimate goal of the project is to improve the vibrancy of rural communities.

This planned program will focus on the impact of technology on rural communities, iIn particular, the adoption/rejection of Internet technology among rural retailers. The three research objectives of this program are to:

1. Identify factors that potentially influence decisions of rural retailers to engage in Internet retailing.

2. Determine primary factors that have played a significant role in rural retailers' adoption or rejection of the Internet for retailing purposes.
3. Develop a business model of e-retail cooperative to facilitate and enhance rural retailers' adoption of Internet retailing.

V(E). Planned Program (Inputs)

1. Estimated Number of professional FTE/SYs to be budgeted for this Program

Year	Extension		Research	
	1862	1890	1862	1890
2008	0.0	0.0	0.3	0.0
2009	0.0	0.0	0.3	0.0
2010	0.0	0.0	0.3	0.0
2011	0.0	0.0	0.3	0.0
2012	0.0	0.0	0.3	0.0

V(F). Planned Program (Activity)

1. Activity for the Program

- Conduct Research Experiments.- Conduct Workshops, meetings.- Develop Products, Curriculum, Resources.- Assessments.- Partnering.- Facilitating.

2. Type(s) of methods to be used to reach direct and indirect contacts

Extension	
Direct Methods	Indirect Methods
• Other 1 (partnerships) • Workshop	• Web sites • Public Service Announcement • Newsletters • TV Media Programs

3. Description of targeted 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(G). Planned Program (Outputs)

1. Standard output measures

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

	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	Target	Target	Target	Target
2008	50	0	0	0
2009	50	0	0	0
2010	50	0	0	0
2011	50	0	0	0
2012	50	0	0	0

2. (Standard Research Target) Number of Patents

Expected Patents

2008 :0 **2009 :**0 **2010 :** 0 **2011 :**0 **2012 :**0

3. Expected Peer Review Publications

Year	Research Target	Extension Target
2008	3	0
2009	3	0
2010	5	0
2011	5	0
2012	5	0

V(H). State Defined Outputs

1. Output Target

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

2008 :3 **2009 :**3 **2010 :** 5 **2011 :**5 **2012 :**5

V(I). State Defined Outcome

1. Outcome Target

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. Outcome Type : Change in Knowledge Outcome Measure

2008 :10 **2009 :** 10 **2010 :** 10 **2011 :**10 **2012 :** 10

3. Associated Knowledge Area(s)

- 607 - Consumer Economics
- 803 - Sociological and Technological Change Affecting Individuals, Families and Communities

1. Outcome Target

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.

2. Outcome Type : Change in Action Outcome Measure

2008 : 0	**2009 :** 1	**2010 :** 1	**2011 :** 2	**2012 :** 2

3. Associated Knowledge Area(s)

- 607 - Consumer Economics
- 803 - Sociological and Technological Change Affecting Individuals, Families and Communities

1. Outcome Target

In the long run, Collaborations result in more and better ideas and projects

2. Outcome Type : Change in Condition Outcome Measure

2008 : 0	**2009 :** 1	**2010 :** 1	**2011 :** 1	**2012 :** 2

3. Associated Knowledge Area(s)

- 607 - Consumer Economics
- 803 - Sociological and Technological Change Affecting Individuals, Families and Communities

V(J). Planned Program (External Factors)

1. External Factors which may affect Outcomes

- Competing Public priorities
- Competing Programatic Challenges

Description

Competition for scarce funding resources may hinder collaborations

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

1. Evaluation Studies Planned

- Other ()

Description

{NO DATA ENTERED}

2. Data Collection Methods

- {NO DATA ENTERED}

Description

{NO DATA ENTERED}

V(A). Planned Program (Summary)

1. Name of the Planned Program

Soil and Water Resource Conservation, Management and Engineering

2. Brief summary about Planned Program

The program will address a wide range of concerns involving the allocation, management and engineering of natural soil and water resources. This includes field determination of soil physical properties, optimum irrigation management, wetland construction and restoration, river restoration and environmental flows, watershed protection, modeling, and management for small and large-scale water resource systems, analysis of weather and climatic data to evaluate gas and water exchange at the plant-atmosphere boundary layer, reuse of treated wastewater for agricultural production, instrument design and instrumentation system design to monitor soil and water resources, and the design of irrigation and drainage systems.

3. Program existence : Mature (More then five years)

4. Program duration : Long-Term (More than five years)

5. Expending formula funds or state-matching funds : Yes

6. Expending other than formula funds or state-matching funds : Yes

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

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

V(C). Planned Program (Situation and Scope)

1. Situation and priorities

Water resources in Oregon are over-subscribed and face competing demands from urban, industrial, agricultural, hydroelectric, environmental and First Nation users. Historically, a large portion of the state's water resources were devoted to agriculture. At the same time, Oregonians have always prided themselves on the quality of life, in particular the natural beauty, afforded by this state. In some regions, groundwater resources are closed to further exploitation. Endangered species issues, including salmon and sucker fish, involve available flow quantities, stream temperatures, toxin levels, and the magnitude and quality of stream habitat. Water resources in the state are typically allocated on an either / or basis, e.g. water can be used either for irrigation or hydroelectric power generation, water can be used either for maintenance of downstream habitat or for irrigation, All aspects of society are affected by the distribution and allocation of water resources. The urban centers and relatively plentiful rainfall areas west of the Cascade Mountains offers a distinct contrast with the sparsely populated, arid regions east of the Cascades. In Oregon, in contrast with more highly urbanized and industrialized locations, the society appears to take a greater interest in and have a better understanding of natural resource issues.

2. Scope of the Program

- In-State Extension
- In-State Research
- Integrated Research and Extension
- Multistate Extension
- Multistate Integrated Research and Extension
- Multistate Research

V(D). Planned Program (Assumptions and Goals)

1. Assumptions made for the Program

The program assumes that water resource issues will become even more important to society and that water scarcity, or completing uses for finite water resources, will only increase in the future. The program attempts to identify the major resource constraint issues and develop funding support to address these issues in a logical and well planned research program. The wide range of topics covered within the program precludes specific review of literature relevant to each issue. But the overall mission is to apply the most appropriate technological tools to understand, evaluate and make management suggestions relevant to optimum multiple uses of the state's water resources.

2. Ultimate goal(s) of this Program

The program goal is to provide the best scientific information available for informing water resource management decisions at the local, i.e. city or watershed council, state, and even national level.

Program Objectives and associated investigators

Develop experimental hydraulics and sediment transport test facility applicable to watershed management – Tullos
Develop instrumentation and apply instrumentation systems to monitoring soil moisture content and soil hydraulic properties – Selker and Cuenca
Evaluate evapotranspiration estimating methods for application in state-wide water resource management – Cuenca
Develop treated wastewater optimization model for application to agronomic production – Hagimoto
Develop watershed scale and river basin scale water resource simulation models – Bolte, Berger, Guzy and Cuenca
Investigate microbiological responses and interaction in contaminated sites – Selker
Investigate ecological responses and interactions in aquatic environments under natural and anthropogenitically-influenced conditions– Tullos
Administer and evaluate program resource allocation – Dobbie
Develop optimum irrigation design and management strategies – Cuenca and Selker

V(E). Planned Program (Inputs)

1. Estimated Number of professional FTE/SYs to be budgeted for this Program

Year	Extension		Research	
	1862	1890	1862	1890
2008	0.5	0.0	6.0	0.0
2009	0.5	0.0	5.8	0.0
2010	0.5	0.0	5.8	0.0
2011	0.5	0.0	5.8	0.0
2012	0.5	0.0	5.8	0.0

V(F). Planned Program (Activity)

1. Activity for the Program

- Conduct Research Experiments.- Construct Research Facilities.
- Monitor and evaluate- Conduct Workshops, meetings.- Deliver Services.- Develop Products, Curriculum, Resources.- Provide Training.- Assessments.- Partnering.

2. Type(s) of methods to be used to reach direct and indirect contacts

Extension	
Direct Methods	**Indirect Methods**
• Group Discussion • Other 2 (seminars) • Education Class • Demonstrations • Other 1 (journals) • Workshop	• Web sites • Newsletters

3. Description of targeted 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(G). Planned Program (Outputs)

1. Standard output measures

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

	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	Target	Target	Target	Target
2008	200	300	50	100
2009	200	300	50	100
2010	200	300	50	100
2011	200	300	50	100
2012	200	300	50	100

2. (Standard Research Target) Number of Patents

Expected Patents

2008 : 2 **2009 :** 0 **2010 :** 2 **2011 :** 0 **2012 :** 0

3. Expected Peer Review Publications

Year	Research Target	Extension Target
2008	2	0
2009	2	0
2010	2	0
2011	2	0
2012	2	0

V(H). State Defined Outputs

1. Output Target

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

2008 : 2 **2009 :** 2 **2010 :** 2 **2011 :** 2 **2012 :** 2

- 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.

2008 : 10 **2009 :** 10 **2010 :** 10 **2011 :** 10 **2012 :** 10

V(I). State Defined Outcome

1. Outcome Target

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. Outcome Type : Change in Knowledge Outcome Measure

2008 : 5 **2009 :** 5 **2010 :** 5 **2011 :** 5 **2012 :** 5

3. Associated Knowledge Area(s)

- 101 - Appraisal of Soil Resources
- 102 - Soil, Plant, Water, Nutrient Relationships
- 111 - Conservation and Efficient Use of Water
- 112 - Watershed Protection and Management
- 404 - Instrumentation and Control Systems
- 405 - Drainage and Irrigation Systems and Facilities
- 902 - Administration of Projects and Programs

1. Outcome Target

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.

2. Outcome Type : Change in Action Outcome Measure

2008 :	2009 :	2010 :	2011 :	2012 :
0	10	0	20	0

3. Associated Knowledge Area(s)

- 102 - Soil, Plant, Water, Nutrient Relationships
- 111 - Conservation and Efficient Use of Water
- 112 - Watershed Protection and Management
- 132 - Weather and Climate
- 133 - Pollution Prevention and Mitigation
- 403 - Waste Disposal, Recycling, and Reuse
- 404 - Instrumentation and Control Systems
- 405 - Drainage and Irrigation Systems and Facilities
- 902 - Administration of Projects and Programs

1. Outcome Target

National and international impact as evidenced by the past record of professional publications and the cooperative international programs this group is involved with.

2. Outcome Type : Change in Condition Outcome Measure

2008 :	2009 :	2010 :	2011 :	2012 :
1	2	2	3	3

3. Associated Knowledge Area(s)

- 101 - Appraisal of Soil Resources
- 102 - Soil, Plant, Water, Nutrient Relationships
- 111 - Conservation and Efficient Use of Water
- 112 - Watershed Protection and Management
- 132 - Weather and Climate
- 133 - Pollution Prevention and Mitigation
- 403 - Waste Disposal, Recycling, and Reuse
- 404 - Instrumentation and Control Systems
- 405 - Drainage and Irrigation Systems and Facilities
- 902 - Administration of Projects and Programs

V(J). Planned Program (External Factors)

1. External Factors which may affect Outcomes

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

Description

The Oregon Water Resources Department has limited funding, compared to other states, to sponsor applied research beneficial to water resource conservation in the state. Therefore outside, federal funding must be sought for these studies and there is continuously less discretionary funding available at the federal level. Changes in public policy and under-funding of environmental programs are external factors that affect the program outcomes.

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

1. Evaluation Studies Planned

- Before-After (before and after program)

Description

Studies will be made of net radiation and evapotranspiration estimating methods using meteorological data from different climate regimes and latitudes. The results of various types of estimating methods will be compared with high quality net radiometer and precise weighing lysimeter data records for evaluation.

2. Data Collection Methods

- Tests

Description

Data for meteorological parameters, net radiation and evapotranspiration from cooperating research sites in different countries, climates and latitudes will be combined with field data collected by the Hydrologic Science Team in Oregon.
All the data records will be quality controlled using standard procedures and combined into a very large database for analysis.

V(A). Planned Program (Summary)

1. Name of the Planned Program

Soil, Water, and Environmental Systems

2. Brief summary about Planned Program

Contemporary tools in soil physics, chemistry, biology, and geographical information analysis will be developed, refined, and used to create basic knowledge and to inform decisions on the best use of Oregon's soil resources. Our ultimate goal is to make significant contributions toward providing a stable, sustainable, and healthy supply of food, fuel, and fiber for the nation while strengthening Oregon's rural communities.

3. Program existence : Mature (More then five years)

4. Program duration : Long-Term (More than five years)

5. Expending formula funds or state-matching funds : Yes

6. Expending other than formula funds or state-matching funds : Yes

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

- 101 15% Appraisal of Soil Resources
- 102 40% Soil, Plant, Water, Nutrient Relationships
- 103 15% Management of Saline and Sodic Soils and Salinity
- 136 30% Conservation of Biological Diversity

V(C). Planned Program (Situation and Scope)

1. Situation and priorities

Water, food, clothing, and shelter are the necessities of life for all people. All four are dependent on soils–soils as water filters and carriers, soils for food and fiber production, and soils as the foundations for structures of all types. In this program, researchers are developing basic and applied knowledge to better understand the roles soils play in meeting these life necessities and how soils function in their natural environment. Work spans a wide range of spatial scales from studies on water movement in soil pores and the assimilation of carbon and nitrogen by individual microbial cells to soil development processes on a continental landscape scale. OSU scientists are part of state, national, and international multidisciplinary teams that address these issues.

2. Scope of the Program

- In-State Research
- Multistate Research

V(D). Planned Program (Assumptions and Goals)

1. Assumptions made for the Program

Crop and Soil Science faculty are in on-going contact with professional peers across the OSU campus, around the state of Oregon, the country, and world. They work in cooperation with peers in state, regional, and federal agencies. They work with county extension and branch research station faculty. They are members of successful national competitive grants. Through this array of contacts they have a keen awareness of local, state, regional, national, and international research needs in the soil sciences.

2. Ultimate goal(s) of this Program

The goal of this program is to develop our basic soil science knowledge base so that current and future issues related to the functioning of soils in our world can be addressed in a scientifically sound manner.

Program Objectives and associated investigators

1. Fluxes of energy and mass in soils – Baham, Bottomley, Dragila, Myrold, Sulzman
2. Microbial community dynamics in soil – Bottomley, Myrold
3. Soil-landscape relations and processes – Baham, Noller, Sulzman

V(E). Planned Program (Inputs)

1. Estimated Number of professional FTE/SYs to be budgeted for this Program

Year	Extension		Research	
	1862	1890	1862	1890
2008	0.0	0.0	5.7	0.0
2009	0.0	0.0	5.7	0.0
2010	0.0	0.0	5.7	0.0
2011	0.0	0.0	5.7	0.0
2012	0.0	0.0	5.7	0.0

V(F). Planned Program (Activity)

1. Activity for the Program

- Conduct Research Experiments.- Conduct Workshops, meetings.- Develop Products, Curriculum, Resources.- Provide Training.- Assessments.

2. Type(s) of methods to be used to reach direct and indirect contacts

Extension	
Direct Methods	Indirect Methods
• Education Class • Group Discussion • One-on-One Intervention	• Other 1 (professional journals) • Web sites

3. Description of targeted 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(G). Planned Program (Outputs)

1. Standard output measures

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

	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	Target	Target	Target	Target
2008	500	1000	0	0
2009	500	1000	0	0
2010	500	1000	0	0
2011	500	1000	0	0
2012	500	1000	0	0

2. (Standard Research Target) Number of Patents

Expected Patents

2008 :0 **2009 :**0 **2010 :**0 **2011 :**0 **2012 :**0

3. Expected Peer Review Publications

Year	Research Target	Extension Target
2008	12	0
2009	12	0
2010	12	0
2011	12	0
2012	12	0

V(H). State Defined Outputs

1. Output Target

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

2008 :18 **2009 :**18 **2010 :**18 **2011 :**18 **2012 :**18

- 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

2008 :900 **2009 :**900 **2010 :**900 **2011 :**900 **2012 :**900

V(I). State Defined Outcome

1. Outcome Target

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. Outcome Type : Change in Knowledge Outcome Measure

2008 :	2009 :	2010 :	2011 :	2012 :
300	300	300	300	300

3. Associated Knowledge Area(s)

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

1. Outcome Target

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. Outcome Type : Change in Action Outcome Measure

2008 :	2009 :	2010 :	2011 :	2012 :
0	1	1	1	1

3. Associated Knowledge Area(s)

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

1. Outcome Target

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. Outcome Type : Change in Condition Outcome Measure

2008 :	2009 :	2010 :	2011 :	2012 :
0	0	2	3	4

3. Associated Knowledge Area(s)

- 101 - Appraisal of Soil Resources
- 102 - Soil, Plant, Water, Nutrient Relationships
- 103 - Management of Saline and Sodic Soils and Salinity

V(J). Planned Program (External Factors)

1. External Factors which may affect Outcomes

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

Description

US immigration policy affects the ability of students to come to the US for advanced study.

The short-term nature of many funding sources and rapidity with which research priorities seem to change does not allow for long-term research or research with longer-term economic benefit.

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

1. Evaluation Studies Planned

- {NO DATA ENTERED}

Description

{NO DATA ENTERED}

2. Data Collection Methods

- {NO DATA ENTERED}

Description

{NO DATA ENTERED}

V(A). Planned Program (Summary)

1. Name of the Planned Program

Sustainable Agricultural Systems for Eastern Oregon

2. Brief summary about Planned Program

This program, Sustainable Agricultural Systems for Eastern Oregon, is focused on research that promotes the long-term productivity of agricultural systems in eastern Oregon that, in turn, are environmental conserving and economic viability. To accomplish this, our research should address questions regarding the management and maintenance of values pertaining to the sagebrush steppe and mixed conifer forested rangelands of Eastern Oregon. Issues of particular importance to this region include the control of invasive species, the role and reintroduction of fire to rangeland systems, sustaining plant and animal diversity, and the economic viability of beef production systems that are the cornerstone of regional rural economies. This program represents a multidisciplinary research effort and team of scientists that will work together to address complex biological systems issues that relate to the sustainable use of natural resources. This research will provide for the economic well being of rural areas while still maintaining the long-term ecological integrity of the rangeland areas.

The range, forest, and wildlife ecologist will focus on issues that are important to the area and these issues may, in turn, have an interface with regional agricultural systems. In turn, the animal scientists will address issues that influence the sustainability of beef production in the region. These issues will range from production research that may offer alternatives that improve the economic advantage of regional beef production to research that addresses the ecological sustainability of beef production systems. All the research will be dependent on the ability of our economists to summarize the findings into models that define the relative success of the alternative production practice or change in natural resource policy. The magnitude of research impact will be improved by planned cooperation with multiple agencies that will include the Bureau of Land Management, USDA Forest Service Pacific Northwest Station, Oregon Department of Fish & Wildlife, USDA Natural Resource Conservation Service, Oregon Department of Agriculture, and The Nature Conservancy.

3. Program existence : Intermediate (One to five years)

4. Program duration : Long-Term (More than five years)

5. Expending formula funds or state-matching funds : Yes

6. Expending other than formula funds or state-matching funds : Yes

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

- 121 10% Management of Range Resources
- 122 10% Management and Control of Forest and Range Fires
- 123 10% Management and Sustainability of Forest Resources
- 131 10% Alternative Uses of Land
- 135 10% Aquatic and Terrestrial Wildlife
- 136 10% Conservation of Biological Diversity
- 302 10% Nutrient Utilization in Animals
- 307 10% Animal Management Systems
- 601 10% Economics of Agricultural Production and Farm Management
- 605 10% Natural Resource and Environmental Economics

V(C). Planned Program (Situation and Scope)

1. Situation and priorities

Rangelands comprise a significant proportion of public and private land in Oregon. These lands are generally too rough, rocky, steep, or dry for most forms of intensive agriculture and, from a human standpoint, have traditionally been used for domestic livestock grazing. More recently, emphasis is being placed on noncommodity resource uses such as recreation, fish and wildlife habitat, aesthetics, and water quality and quantity. While this list is not exhaustive, and is not the focus of this proposal, the pressures put on the land to satisfy society's wants

and needs are growing and provide the context for this research. Further, all of these uses of rangelands are being affected by the presence and potential spread of invasive plant species.

Rangelands contribute especially to the economies in the eastern two-thirds and the southwestern portions of the state. On a statewide basis, cattle and calves have historically been one of the leading agricultural commodities produced. Beef cattle remain the leading agricultural commodity in many counties of eastern Oregon where rangelands supply a critical proportion of the yearlong feed supply. At the same time, many different groups and individuals on both public and private lands are calling the impacts of domestic livestock grazing on and its relationship to natural resources into question. Information on the tradeoffs among traditional and newer uses is required for ranchers and government agency employees to make informed decisions.

Many eastern Oregon rangelands are being stressed by conditions that have developed since the late 19th century. Fire exclusion has caused changes in vegetation composition and structure, manifested in a change in rangelands from grass-dominated land to shrubs and trees while on forest lands the change has been from open, park-like, pine stands on drier sites to overstocked Douglas fir and true firs on the same sites. Drought, overgrazing, timber harvest, and wildlife populations have also had an effect. The result is an ecosystem that may not produce the sustainable amounts or mix of goods and services that society desires. Both the USDA Forest Service and USDI Bureau of Land Management are shifting emphasis towards ecosystem management. While this is consistent with the concept of multiple use management, it is a shift in emphasis away from a product view and towards a nature view.

The research and outreach education needed for the eastern regions of Oregon must be proactive and focused on sustainable practices that maintain or enhance agricultural economies and ecological integrity of the natural resource base. Our research will be designed to provide scientific data that addresses current issues and potential concerns relative to agriculture and sustainable environments. While we have no desire to enter into the often political arena of public/private land policy at either the state or federal level, we do hope that our research provides a scientific backdrop so that these decisions have an opportunity to be grounded in science. We also believe that by addressing issues that are critical to the economic survival of the beef production sector in Eastern Oregon, we can provide information that helps regional producers compete in national and world food markets. The sustainable maintenance of rural agricultural economies as found in the Eastern region of Oregon is, in turn, important in maintaining the quality of life in the region, and, perhaps, the quality of the environment.

2. Scope of the Program

- Multistate Research
- In-State Research
- In-State Extension
- Multistate Extension
- Multistate Integrated Research and Extension
- Integrated Research and Extension

V(D). Planned Program (Assumptions and Goals)

1. Assumptions made for the Program

The basis for our research effort is that collectively we will provide management tools to maintain or enhance the biological diversity of our plant and/or animal populations, while still maintaining or enhancing the economic opportunity for beef production in this region. Multiple use values and, in turn, public opinion of natural resource uses on public lands may outweigh the long-standing dependence of beef production on public lands. While our science may help in addressing issues of compatibility with other values such as wildlife/plant biodiversity, the ultimate decision will be based on values rather than science. Likewise, changes in the national and world food markets may impact beef production systems in a manner that override regional manager's ability to stay competitive. Beef producers in the inland Pacific Northwest already operate at a competitive disadvantage in that they have to provide greater supplemental inputs that other areas of the US and Canada. High elevation landscapes and limited precipitation combine to create short growing seasons and limited production on private and public lands. In addition, continuing controversy exists with "threatened and endangered" fish species, in stream water rights and judicated water use for pasture and crop irrigation. Furthermore, the current expansion of biofuels production has had an immediate impact on beef markets with lower prices paid for feeder cattle. Long term effects of biofuels may actually offer advantages for beef production because other competing animal meat industries (swine and poultry) are much more dependent on corn and soybeans.

The success of our multidisciplinary research efforts will depend on our ability to address regional needs. We need to have the vision to identify issues before the issue has created economic hardship. Simply put, we need to be proactive in anticipating agricultural/land use problems and design research to address these issues. Furthermore, we need to have the courage to address these issues using scientific principles that are above subjective interpretation.

2. Ultimate goal(s) of this Program

To address issues relative to the sustainable management of range/forest resources for biological diversity and the maintenance of rural economies that depend upon natural resources for industry.

V(E). Planned Program (Inputs)

1. Estimated Number of professional FTE/SYs to be budgeted for this Program

Year	Extension		Research	
	1862	1890	1862	1890
2008	0.0	0.0	12.0	0.0
2009	0.0	0.0	15.0	0.0
2010	0.0	0.0	15.0	0.0
2011	0.0	0.0	15.0	0.0
2012	0.0	0.0	15.0	0.0

V(F). Planned Program (Activity)

1. Activity for the Program

- Conduct Research Experiments
- Deliver services
- Develop Products, Curriculum, Resources
- Assessments
- Partnering

2. Type(s) of methods to be used to reach direct and indirect contacts

Extension	
Direct Methods	Indirect Methods
• Other 2 (conferences, seminars) • Other 1 (field days) • Education Class • Workshop • Group Discussion • Demonstrations	• Public Service Announcement • Newsletters • Web sites

3. Description of targeted 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(G). Planned Program (Outputs)

1. Standard output measures

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

	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	Target	Target	Target	Target
2008	500	5000	0	0
2009	500	5000	0	0
2010	500	5000	0	0
2011	500	5000	0	0
2012	500	5000	0	0

2. (Standard Research Target) Number of Patents

Expected Patents

2008 :0 **2009 :**0 **2010 :** 0 **2011 :**0 **2012 :**0

3. Expected Peer Review Publications

Year	Research Target	Extension Target
2008	14	4
2009	14	4
2010	14	4
2011	14	4
2012	14	4

V(H). State Defined Outputs

1. Output Target

- 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

  2008 :6 **2009 :**4 **2010 :** 1 **2011 :**0 **2012 :**0

- 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

2008 : 3 **2009 :** 2 **2010 :** 1 **2011 :** 0 **2012 :** 1

- 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

2008 : 1 **2009 :** 1 **2010 :** 1 **2011 :** 0 **2012 :** 1

- 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

2008 : 2 **2009 :** 2 **2010 :** 2 **2011 :** 0 **2012 :** 2

V(I). State Defined Outcome

1. Outcome Target

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. Outcome Type : Change in Knowledge Outcome Measure

2008 : 1 **2009 :** 2 **2010 :** 3 **2011 :** 4 **2012 :** 3

3. Associated Knowledge Area(s)

- 121 - Management of Range Resources
- 122 - Management and Control of Forest and Range Fires
- 123 - Management and Sustainability of Forest Resources
- 131 - Alternative Uses of Land
- 135 - Aquatic and Terrestrial Wildlife
- 136 - Conservation of Biological Diversity
- 302 - Nutrient Utilization in Animals
- 307 - Animal Management Systems
- 601 - Economics of Agricultural Production and Farm Management

- 605 - Natural Resource and Environmental Economics

1. Outcome Target

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. Outcome Type : Change in Action Outcome Measure

2008 : 0 **2009 :** 0 **2010 :** 1 **2011 :** 2 **2012 :** 2

3. Associated Knowledge Area(s)

- 121 - Management of Range Resources
- 123 - Management and Sustainability of Forest Resources
- 131 - Alternative Uses of Land
- 135 - Aquatic and Terrestrial Wildlife
- 136 - Conservation of Biological Diversity
- 302 - Nutrient Utilization in Animals
- 307 - Animal Management Systems
- 601 - Economics of Agricultural Production and Farm Management
- 605 - Natural Resource and Environmental Economics

1. Outcome Target

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. Outcome Type : Change in Condition Outcome Measure

2008 : 0 **2009 :** 0 **2010 :** 0 **2011 :** 1 **2012 :** 1

3. Associated Knowledge Area(s)

- 121 - Management of Range Resources
- 122 - Management and Control of Forest and Range Fires
- 123 - Management and Sustainability of Forest Resources
- 131 - Alternative Uses of Land
- 135 - Aquatic and Terrestrial Wildlife

- 136 - Conservation of Biological Diversity
- 302 - Nutrient Utilization in Animals
- 307 - Animal Management Systems
- 601 - Economics of Agricultural Production and Farm Management
- 605 - Natural Resource and Environmental Economics

V(J). Planned Program (External Factors)

1. External Factors which may affect Outcomes

- Competing Programatic Challenges
- Competing Public priorities
- Economy
- Appropriations changes
- Populations changes (immigration,new cultural groupings,etc.)
- Government Regulations
- Public Policy changes

Description

This research effort will depend, in part, on our ability to partner with regional land management agencies to pool resources and expertise to expand the scope and impact of our research. As such, the level of funding or relative importance that these agencies put on research will be important for our continued success. For example, changes in funding for the USDA FS/NRCS or the BLM could have a dramatic effect on the success of our research programs and funding for these programs.

Likewise, we are also dependent on competitive grant funds such as USDA SARE/NRI. As a result, our continuing success and productivity will depend on the success of each subprogram in remaining competitive. Success with competitive grants will depend on our publication track record, relevance of proposed research and the ability of the federal government to continue funding these important research programs.

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

1. Evaluation Studies Planned

- {NO DATA ENTERED}

Description

{NO DATA ENTERED}

2. Data Collection Methods

- {NO DATA ENTERED}

Description

{NO DATA ENTERED}

V(A). Planned Program (Summary)

1. Name of the Planned Program

Sustainable Animal Production Systems

2. Brief summary about Planned Program

Sustainable animal production systems and maintenance of the natural resources that support animal production are important to the long term health and survivability of meat, milk and egg production. Animal waste is a by-product of animal production systems that does impact the sustainability of these production systems. This project is designed to look at sustainable production systems for beef and dairy, sheep and poultry. Specific objectives are: (1) develop field studies of nutrient dynamics and cropping systems to calibrate predictions for different geographic locations and to evaluate model components; (2) model refinements and software development to enable use of the models on individual farms throughout the U.S.; (3) expand model prediction capacity to more accurately partition nutrient losses into those from volatilization, leaching, runoff and denitrification ; (4) apply models to planning of dairy and beef production systems to reduce or eliminate problems associated with nutrient management and profitability; (5) examine genetic and management factors that influence embryonic/pre-natal loss of potential lambs in commercial ewes; identify physiological parameters that may be indicative of propensity for loss; (6) develop a system of Reduced Input (RI) sheep production focused on spring pasture lambing with minimal labor requirements; identify/evaluate ewe genotypes suitable for such a management system and determine timing of lambing and other relevant parameters to make such a system feasible; (7) improve sustainability of natural resources and economic viability of beef production systems in Oregon; and (8) determine the genetic mode of transmission for unreported single locus genes responsible for embryonic failures uncovered in the poultry genome of commercially important bird types.

3. Program existence : Intermediate (One to five years)

4. Program duration : Long-Term (More than five years)

5. Expending formula funds or state-matching funds : Yes

6. Expending other than formula funds or state-matching funds : Yes

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

- 307 100% Animal Management Systems

V(C). Planned Program (Situation and Scope)

1. Situation and priorities

Animal production is a major contributor to the U.S. economy, but increasing costs of production, the decline of real prices towards a world market price, and environmental issues may jeopardize the long-term sustainability of these farms. Integrated research and technology transfer programs are needed to help dairy and beef farmers manage their farms in a cost effective and environmentally acceptable manner. Most research focuses on one or relatively few components of the production system, providing a narrow view. Modeling and computer simulation provide an effective research strategy for integrating component-level effects and interactions to predict farm level or higher outcomes or for conducting assessments of which farm characteristics or management practices are most effective on specific farms.

More efficient, economical, and environmentally sound production systems are needed to maintain a viable agricultural industry. For example, allowing cows to graze forage, important natural resource in Oregon, costs less than mechanically harvesting and feeding preserved forages. Forage quality is dynamic and knowledge of forage quality changes would allow for better matching of cow nutrient requirements with grazed forage rather than compensating for deficiencies with preserved forages. On the other hand, a continuing trend in dairy and beef production is toward larger farms concentrated in certain geographic locations. Attention has focused recently on animal production systems as non-point sources of pollution affecting the quality of air and water resources; of particular concern are nitrogen and phosphorus.

The overall goal of the beef industry is to produce a wholesome, safe and high quality protein source. Numerous studies have shown that pre-harvest management can dramatically effect the final carcass composition, which is an indicator of beef quality. Data revolves around individual practices and often fails to focus on the overall production system. Data has indicated that management practices incorporated as far back as the pregnant cow can impact the final beef product obtained from the offspring. Therefore, research needs to focus on how various pre-harvest management practices impacts carcass quality.

Similar issues face other production systems. Sustainability of sheep production has become increasingly dependent on production efficiency, i.e. value of product relative to input costs. The single largest biological element of the input equation is reproductive efficiency and the single largest management element is typically labor/facility cost which may be relatively low throughout the year but peaks at lambing time.

The opportunity to differentiate between transmissible early embryonic failures and those resulting due to environment would benefit the Oregon and global poultry industries. Primary poultry breeders with the knowledge of the failure's mode of transmission could remove carriers of the deleterious genes from their breeding populations - improving reproductive performance and reducing production costs sustained by the chick suppliers.

2. Scope of the Program

- In-State Extension
- In-State Research
- Integrated Research and Extension
- Multistate Integrated Research and Extension
- Multistate Research

V(D). Planned Program (Assumptions and Goals)

1. Assumptions made for the Program

This project is designed to look at sustainable production systems for beef and dairy, sheep and poultry. Sustainable animal production systems and maintenance of the natural resources that support animal production are important to the long term health and survivability of meat, milk and egg production. Animal waste is a by-product of animal production systems that does impact the sustainability of these production systems. The single largest biological element of the input equation is reproductive efficiency and survivability of offspring.

2. Ultimate goal(s) of this Program

Improve sustainability of natural resources and economic viability of animal production systems in Oregon

Program Objectives and associated investigators

Objective 1: Determine the genetic mode of transmission for unreported single locus genes responsible for embryonic failures uncovered in the poultry genome of commercially important bird types. (Savage)

Objective 2: Examine genetic and management factors that influence embryonic/pre-natal loss of potential lambs in commercial ewes; identify physiological parameters that may be indicative of propensity for loss. (Meyer)

Objective 3: Develop a system of Reduced Input (RI) sheep production focused on spring pasture lambing with minimal labor requirements; identify/evaluate ewe genotypes suitable for such a management system and determine timing of lambing and other relevant parameters to make such a system feasible. (Meyer)

Objective 4: Enhance cropping, grazing, and feeding management systems to improve animal nutrient utilization and reduce nutrient excretion. (Gamroth)

Objective 5: Evaluate and develop efficient animal, manure, and cropping systems for reduced nutrient flow, cycling, transformation and loss to the environment. (Gamroth)

Objective 6: Refine, evaluate, and apply integrated quantitative models of dairy and beef farms to predict profitability and nutrient losses to the environment. (Gamroth)

Objective 7: Develop science-based tools and educational materials to promote environmental stewardship in US dairy and beef industries.

(Gamroth)

Objective 8: Grazed forage management (Mueller/Stalker)

Objective 9: Cow/calf management (Mueller/Stalker)

Objective 10: Pre-weaning management (Mueller/Stalker)

Objective 11: Post-weaning management (Mueller/Stalker)

Objective 12: Carcass quality / characteristics (Mueller/Stalker)

V(E). Planned Program (Inputs)

1. Estimated Number of professional FTE/SYs to be budgeted for this Program

Year	Extension		Research	
	1862	1890	1862	1890
2008	1.0	0.0	1.6	0.0
2009	1.0	0.0	1.6	0.0
2010	1.0	0.0	1.6	0.0
2011	1.0	0.0	1.6	0.0
2012	1.0	0.0	1.6	0.0

V(F). Planned Program (Activity)

1. Activity for the Program

- 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. Type(s) of methods to be used to reach direct and indirect contacts

Extension	
Direct Methods	Indirect Methods
• One-on-One Intervention • Other 1 (journal articles) • Education Class • Demonstrations • Group Discussion • Workshop	• Newsletters • Other 2 (popular/extension/trade) • Other 1 (journals) • Web sites

3. Description of targeted 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(G). Planned Program (Outputs)

1. Standard output measures

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

	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	Target	Target	Target	Target
2008	600	4300	100	100
2009	3050	5100	100	100
2010	550	1100	0	0
2011	550	1100	0	0
2012	550	1100	0	0

2. (Standard Research Target) Number of Patents

Expected Patents

2008 : 0 **2009 :** 0 **2010 :** 0 **2011 :** 0 **2012 :** 0

3. Expected Peer Review Publications

Year	Research Target	Extension Target
2008	3	0
2009	3	0
2010	3	0
2011	3	0
2012	3	0

V(H). State Defined Outputs

1. Output Target

- 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

2008 : 20 **2009 :** 20 **2010 :** 20 **2011 :** 20 **2012 :** 20

- 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.

2008 : 1 **2009 :** 1 **2010 :** 1 **2011 :** 1 **2012 :** 1

V(I). State Defined Outcome

1. Outcome Target

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. Outcome Type : Change in Knowledge Outcome Measure

2008 : 10 **2009 :** 10 **2010 :** 20 **2011 :** 20 **2012 :** 20

3. Associated Knowledge Area(s)

- 307 - Animal Management Systems

1. Outcome Target

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. Outcome Type : Change in Knowledge Outcome Measure

2008 : 5 **2009 :** 5 **2010 :** 10 **2011 :** 10 **2012 :** 10

3. Associated Knowledge Area(s)

- 307 - Animal Management Systems

1. Outcome Target

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.

2. Outcome Type : Change in Action Outcome Measure

2008 : 0 **2009 :** 0 **2010 :** 0 **2011 :** 0 **2012 :** 5

3. Associated Knowledge Area(s)

- 307 - Animal Management Systems

1. Outcome Target

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.

2. Outcome Type : Change in Action Outcome Measure

2008 :	2009 :	2010 :	2011 :	2012 :
0	0	5	0	5

3. Associated Knowledge Area(s)

- 307 - Animal Management Systems

1. Outcome Target

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. Outcome Type : Change in Condition Outcome Measure

2008 :	2009 :	2010 :	2011 :	2012 :
0	0	0	0	10

3. Associated Knowledge Area(s)

- 307 - Animal Management Systems

V(J). Planned Program (External Factors)

1. External Factors which may affect Outcomes

- Economy
- Public Policy changes
- Government Regulations

Description

These programs have been identified by stakeholders as priority research and Extension areas. There is considerable interest among producers for these programs.

Public policy requiring more intense nutrient balancing on livestock operations will add urgency to this work.

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

1. Evaluation Studies Planned

- Retrospective (post program)

Description

Beta test evaluations of software will determine functionality, usefulness.

Adoption and use of planning tools will be determined each year. Case study farm nutrient balances will account nutrient import/export before and after education

Most evaluation will be retrospective.

Publications, survey documents to assess adoption and Oregon Ag Invests will be utilized in Evaluation.

2. Data Collection Methods

- Sampling
- Mail
- Telephone
- On-Site

Description

farm nutrient balances
retrospective