OREGON STATE UNIVERSITY
Extension Service

Annual Report of Accomplishments

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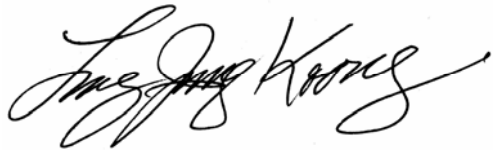

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Overview

Oregon State University Extension programs are conducted in 36 counties statewide. Faculty are housed in county extension offices, at experiment stations, on-campus, and with partner agencies such as the Oregon Food Bank and the Multnomah County Education Service District. Programming is conducted in five areas: Agriculture, 4-H Youth Development, Forestry, Family and Community Development, and Sea Grant. In addition, faculty perform multi-disciplinary activities such as the statewide watershed program.

This report documents the rationale for programming, activities conducted and impacts of programming during the past year.

Summary of Program Activities and Impacts

Note: The following includes programs selected by Extension program leadership for inclusion in this report. Each program described in the following pages was deemed to be representative of the broader programming conducted by the Oregon State University Extension Service and to have significant and documented impacts on target audiences.

Goal 1: An agricultural system that is highly competitive in a global economy.

A. Key Theme: Agricultural Production Efficiency

1. Title: Improving Economic Efficiency by Optimizing Beef Cattle Winter Feeding

Issue: Supplemental feed is the single largest expense for livestock producers, accounting for up to 50% of variable production costs. A producer going into winter feeding with inadequate knowledge of nutrition tends to overfeed (at greater cost) or underfeed (with resulting reproductive and other health problems). Most beef producers have not taken advantage of modern technologies that could improve their feeding efficiency.

Target audience: Oregon beef cattle producers.

What was done: Extension livestock specialists are teaching beef producers to more scientifically feed their animals by using: (1) ration formulation software now in the hands of Extension livestock agents who have been trained in its use; (2) a library of Oregon feeds and forages, developed for use in the computer program; and (3) other resources such as the new "Winter Feeding Workbook."

Impact: Participating producers report saving an average of $18/head as a result of application of these technologies. Examples include a producer who reduced feed cost by $38/cow by substituting low-quality grass seed straw for 25% of his feed; another sold 90 tons of high-quality hay he determined he would not need; a third reduced the cost per pound gain on weaned calves by adding barley to a forage-based program. A producer in Malheur County purchased orchardgrass straw, sold alfalfa, and profited by $4,000.

Optimizing inputs in relation to outputs has an even greater impact on profitability than reducing costs. For example, a Klamath Falls producer sold his higher quality hay to buy feed that better met his animals' requirements at a lower cost; another on the south coast sold his farm-raised, low-quality hay, bought higher quality hay, and thereby increased his cows' body-condition scores, which potentially increases profitability. In Lake County, a producer weighed his feeders monthly and adjusted feed rations accordingly, using some 50 tons less of alfalfa than in the previous year. In Malheur County, a producer balanced his mineral program and lowered retained-placenta incidence from 10% to zero, reducing next year's calving interval.

So far, 105 ranches across Oregon are participating in the program with an estimated net profit gain of $6,000/ranch/year. Therefore the total savings for ranches in the pilot phase of the program is approximately $630,000. As other ranches join the program, benefits statewide will increase. Extension data for 2004 show 645,900 head of beef cattle in the state. If $18/head were saved on only 10% of Oregon cattle ranches, producers would save almost $1.2 million/year.

Scope of Impact: Statewide

Funding: Smith Lever 3(b)(c)
State Extension Funds
County Extension Funds

B. Key Theme: Plant Health

1. Title: Center to Expedite Registration of Pest Management Substances for Minor Crops

Issue: Oregon produces over 50 horticultural food crops with combined annual sales exceeding $500 million, yet each is a "minor" crop in terms of total U.S. production. Growers of minor crops have limited pest-management options due to (1) the 1996 federal Food Quality Protection Act (FQPA), and (2) the economics of manufacturing and registering pest controls for very small numbers of growers. Limited availability of approved chemicals for safe and effective control of agricultural pests increases potential for crop damage and/or failure directly impacting this important segment of Oregon agriculture.

Target audience: Oregon producers of "minor" crops

What is being done: Oregon grower groups and commodity commissions work with manufacturers, state agencies, IR-4 (USDA's Interregional Research Project No. 4), and the U.S. Environmental Protection Agency to maintain pesticide registrations and obtain new ones. The "Center" was established in 1995 to expedite registration of minor crop pest management substances. The Center develops performance data to support grower requests to the IR-4 Project, and it monitors the progress of requests. It also conducts residue field studies to determine whether a substance meets EPA standards for food products. It also prepares Section 18 and Special Local Need Requests to submit to the Oregon Department of Agriculture.

Impacts:
Environmental: Given the FQPA, more emphasis is on new pesticides that are more environmentally friendly. Many are target specific, rather than broad spectrum, and suitable for Integrated Pest Management (IPM) programs. Unlike older products, new compounds have short residual lives (thus do not persist in the environment or pollute water sources); most also are not toxic to beneficial insects and use significantly less, or no, organophosphates or carbamates, thereby meeting an important EPA goal. Therefore,

employment of new materials using IPM methodologies greatly reduces potential impact to the environment.

Economic: Without some of these newly registered substances, crops yields would fall or be lost entirely. Section 18 and SLN 24c (Special Local Need Requests) registrations alone document potential losses of $22 million annually if minor crop pesticides and herbicides are not available. Re-registered herbicides avoid costly hand weeding and crop losses from weed competition. Other products avoid losses from insects and diseases while generating gains in higher quality produce. Examples of annual savings include:

- Re-registration of 2,4-D for sucker control in hazelnuts: [$2.1 million (hand weeding) - $258,930 (3 applications of 2,4-D to 28,770 acres)] = **$1.8 million**.
- Lorox for 100 acres of celery: [$700/acre (hand weeding) - $20/acre (Lorox)] = **$68,000**.
- Command in cucurbit crops: {[$71/acre (expensive compound) - $6/acre (Command)] x 2,300 acres of cucumbers} = **$149,500**.
- Goal for transplanted cauliflower, broccoli, Brussels sprouts, and cabbage: If weed competition reduced yields by 25%, loss to growers would be ($16 million ÷ 4) = **$4 million.**
- Poast to control grass in 1,000 acres of rhubarb: [$500/acre (hand weeding, plus Kerb and Devrion applications) - $22/acre (Goal)] = **$428,000.**
- Malathion for aphid control in rutabaga and turnips: If aphids and viruses reduced yields by 25%, loss to growers would be ($1.8 million ÷ 4) = **$450,000.**
- MCPA re-registered for weed control on 1,000 acres of pea seed and 2,500 acres of processing peas: Without this, these crops would not be grown.
- Bifenthrin insecticide emergency registration for root weevils in raspberries: Based on 90% control with bifenthrin, growers avoid a **$690,228 loss/year.**
- Fenbuconazole to control mummy berry disease in blueberries: Potential loss without fenbuconazole is **$6 million** (85% yield loss on 2,700 acres).
- Goal emergency-use registration for primocane burning on 4,000 acres of raspberries: (4,340 lb/acre yield using Goal - 2,952/lb without Goal) x 60¢/lb = **$3.3 million.**
- Goal for primocane burning on 5,700 acres of blackberries: Without Goal, an 18% yield reduction = a loss of $530/acre or **$3 million.**

Conservatively, at least half the almost $20 million/year saved can be attributed directly to the Center's work. And this estimate does not consider the additional value of better quality produce.

Social: Public benefits, beyond those to growers, are easy to see in the variety and quality of food available to consumers in Oregon and other states as well as abroad. Also, rural communities in the state benefit from profitable production of these many minor crops. New pest control materials being registered are more environmentally friendly than older products, and the food supply is safer because of this work on Oregon's minor crops.

Scope of Impact: Statewide

Funding: Smith-Lever 3(b)(c) Funds
State Extension Funds
County Extension Funds

Goal 2: A safe and secure food and fiber system.

A. Key Theme: Food Safety

1. Title: 2004 Queso Fresco Programming

Issue: Queso fresco, a soft cheese, traditionally made in Mexico with raw milk. This technique has been brought to the US with Mexican migrants. A foodborne illness outbreak in the late 1990s among Hispanics in Washington's Yakima Valley was linked to queso fresco. Oregon initiated programming for Hispanics in response to that incident. In 2004, additional in-kind support was secured from the Oregon Dairy Products Commission to facilitate this programming.

Target audience: Low-income Hispanic adults

Goals: To teach how to make queso fresco safely at home (by pasteurizing raw milk to kill pathogenic bacteria that cause listeriosis and salmonellosis)

What was done: Queso fresco workshops were offered either as part of a series or as single events to low-income Hispanics in the Oregon Family Nutrition Program. 275 Hispanics participated in either single queso fresco classes (57) or as part of nutrition education series (218) in 7 counties as well as in the North Willamette metro area. A sample of participants (68) was later surveyed by phone to evaluate the impact.

Impact: 90% of those surveyed correctly believed you can get sick if you use milk from a dairy without heating it first. 65% reported making queso fresco using the recipe provided in class. All had used milk from the grocery store and had used the thermometer to make the cheese; 46% had also used the thermometer to check the temperature of other foods including poultry (68%) cooked meat, stew, and flan (a desirable food safety practice), 56% of class participants had given the queso fresco recipe to at least several others. Comments (translated) about the queso fresco class included "It was useful because we Hispanics eat much of the cheese and it's very expensive in the store and now learning the recipe is more economical and healthier."

Scope of impact: 9 Oregon counties

Funding:
Smith-Lever
Food and Nutrition Service
State and local Extension funds
Community partner matching funds
Oregon Dairy Products Commission

2. Title: Food Safety/Preservation Programming

Issue: In 2003, there was an increase in cases of campylobacterosis and salmonellosis in Oregon. In 2004, a case of botulism was linked to home-canned food. Education leading to safe home food preparation and preservation techniques averts illness and food waste.

Target Audience: Home food preparers and home food preservers

Goals: To prepare and preserve food safely

What was done: 23 Lane County Family Food Education (FFE) volunteers were trained to assist 36 veteran volunteers with staffing the statewide Food Safety/Preservation Hotline that operated from July 15 to October 15. A local hotline also operated from June 16 to July 15. In 2004, over 66 new and continuing FFE volunteers in 5 counties contributed over 5,800 hours. They made over 16,700 contacts educating Oregonians about safe food handling/preservation. Over 6,600 of these contacts were calls to the hotline from Oregonians in all 36 counties. A written evaluation was sent to a sample of hotline callers (146 of the 6,600).

Impact: 89% of 94 questionnaire respondents were female. 95% reported using the information that they had received about canning and food preparation/storage. Of these, 66% had done something differently as a result, including saving money by avoiding food waste (N = 4) and using safe canning techniques (N = 22). 77% of callers had shared the information with about 3 other people. 80% had recommended the hotline to someone else. Comments included "Very informative, cordial, fast…"; "It's a great service to the community."; "You are worth every dime spent."

Scope of impact: Statewide

Funding: Smith-Lever 3(b)(c) Funds
State Extension Funds
County Extension Funds

Goal 3: A healthy well-nourished population.

A. Key Theme: Human Nutrition

1. Title: Nutrition Education Program (NEP)

Issue: Poor nutrition and physical inactivity are linked to chronic illnesses such as cancer, heart disease, diabetes and obesity. In 2003, 58% of adult Oregonians were obese or overweight; 23% of eighth graders were overweight or at risk for becoming so. Only 50% of adult Oregonians met minimum recommendations for physical activity levels in 2003. 25% of adults, eighth graders and eleventh graders reported eating five or more servings of fruits and vegetables each day. Current costs of obesity-related disease are estimated at $781 million statewide. But because obesity is spreading to an increasingly younger population, costs are expected to increase dramatically. (Oregon ranks seventh among the states for percentage of overweight low-income children ages 2–5.)

Target audience: Low-income adults and youth; most receive some type of public assistance (e.g., Food Stamps, TANF, WIC, Head Start, Free/Reduced Price Meals, emergency foods).

Goals: 1) Improve health and reduce risk of chronic diseases through healthy eating combined with daily physical activity; 2) Improve food safety practices.

What was done: Adults learned practical skills in food budgeting and feeding young children on a limited budget. Adults and youth learned about food safety, food preparation and other topics. NEP staff and trained volunteers reached adults and youth through series of classes, single events, exhibits, and newsletters. They used a variety of community settings, such as state agency offices, community centers, churches, schools, low-income apartment complexes, food pantries, migrant camps, family shelters, teen-parent programs, and USDA Summer Food Service sites. Extension and NEP community partners pledged $1,788,317 in match funding in FFY 2004 to support programming efforts. This resulted in equivalent support from the federal Food Stamp program.

Impacts: NEP directly reached 27,789 participants in FFY2004. Another 36,374 individuals were reached indirectly through displays, newsletters and a kiosk.

NEP takes surveys before and after a series of classes to determine behavioral change; for single classes NEP takes an after–before retrospective survey of intent to improve in several indicators.

Results from adults completing a series of classes:

- 419 (83% of 505) improved food resource management, such as meal planning/budgeting
- 367 (88% of 417) improved nutrition practices, such as choosing healthy food and reading labels

- 254 (61% of 417) improved food safety practices, such as storing and thawing foods properly
- Of those who completed 24-hour diet recalls, 330 (92% of 359) showed a positive change in any food group at exit

Results from adults in a single-event class:

- 348 (69% of 502) now intend to use the Food Guide Pyramid to plan and prepare family meals (improve dietary quality). One participant wrote, "Before the class I ate a lot of fat. I didn't know what a serving size is and I ate too much. In the classes I learned how to prepare foods safely, eat more fruits and vegetables and healthy things. Now I feel better physically."

Results from youth completing a series of classes:

- 74% of 222 youth now eat a variety of foods
- 75% of 858 youth increased nutrition knowledge
- 63% of 233 youth increased ability to select low-cost, nutritious foods
- 80% of 447 youth improved practices in food preparation and safety

Scope of impact: 27 Oregon counties

Funding: Smith-Lever
Food & Nutrition Service
State and local Extension Funds
Community partner matching funds

2. Title: Food Security Programming

Issue: A community is food insecure when residents do not have access to safe, nutritious, affordable, adequate, and culturally appropriate food from non-emergency sources at all times. Oregon has high rates of both hunger and food insecurity. In response, emergency and other food assistance programs for low-income families is necessary and critical. Additionally, steps must be taken to assure that these foods are utilized properly to provide adequate nutrition for target audiences.

Target audience: Food pantry clientele; Nutrition Education Program clientele; Family Food Education (FFE) volunteers; Family and Community Education (FCE) groups

Goals:

- To increase public awareness about hunger issues
- To train volunteers to help food pantry clientele improve diet quality, food security, food safety, and food resource management
- To increase skills of food-insecure clientele in utilizing low-cost, nutritious foods

What was done: A lesson on "Oregon: A State of Hunger" was developed for statewide use by Family and Community Education (FCE) groups. 43 Lane County volunteers were trained to demonstrate use of emergency foods at pantry sites; volunteers reached over

2,500 clientele at 16 food pantry sites. NEP staff in 6 counties made over 400 short educational contacts at food pantry sites; over 10,000 indirect contacts were made through displays, exhibits or newsletters in 8 counties. Pantry workers from 19 sites participated in a "Putting Together a Food Bag: Special Requests" training.

Impact: "Oregon: A State of Hunger" lesson evaluations were completed by 370 FCE members in 9 counties. The number of participants who planned to regularly stay abreast of hunger and food insecurity issues in Oregon went from 24% to 71%; the number regularly supporting local soup kitchen or food pantries went from 36% to 65%; the number advocating for community members in need of food/ housing assistance went from 15% to 49%. Of the pantry workers trained, 47% intended to include nutritional handouts in food boxes; 42% intended to encourage fresh product donations when possible; and 37% planned to compare labels for clients who request specific foods.

Scope of impact: Statewide

Funding: Smith-Lever
State Extension Funds
County Extension Funds
USDA Food Stamp Funds

Goal 4: An agricultural system that protects natural resources and the environment.

A. Key Theme: Integrated Pest Management

1. Title: Integrated Pest Management in Hazelnut Production

Issue: Pesticides have increased agricultural productivity enormously, but their adverse effects include contamination of the environment, agriculture workers, and the human food supply, as well as creation of pest resistance to pesticides. Integrated pest management practices can vastly reduce the amount of pesticides applied while greatly improving the efficacy of materials used.

Target audience: Oregon hazelnut growers

What was done: Early in the IPM effort, sampling schemes and action thresholds were refined for the four main hazelnut pests: the filbertworm, filbert aphid, filbert leafroller, and obliquebanded leafroller. A biological approach in the mid-1980s imported the filbert aphid parasitoid, *Trioxys palidus*. Synthetic pyrethroids were registered for filbertworm control; pheromone trapping also is used to indentify thresholds. New leafroller controls have had strong success, and current research is on developing an even "softer" program, using insect growth regulators on filbertworm and leafroller. But the most serious hazelnut disease is Eastern Filbert Blight (EFB), a fungus that now affects two-thirds of the Oregon industry and seriously threatens its survival. Current OSU recommendations include preventive fungicide sprays in the spring, scouting for and cutting out blight infections, and replacing the most susceptible varieties. The long-term solution is developing EFB-immune varieties.

Impact: Two grower surveys were conducted, in 1980 and 1997. In that period, the amount of pesticides applied for filbert aphid fell by 94%, from 15,010 lb to 970 lb on acres surveyed. Similarly, registration of synthetic pyrethroids for filbertworm control, plus pheromone trapping reduced the amount of active ingredient applied by about 96% from 88,000 lb in 1980 to only 3,200 lb. Informal surveys since 1997 indicate that pesticide usage under IPM remains at about the 1997 levels.

Extension continues to work alongside the researchers doing field testing, reporting results, and making recommendations to growers. Adoption rates have been excellent with the result that nearly all Oregon's 28,770 acres of hazelnuts (in 2004) now use one or more of these IPM methods with their significant environmental and economic benefits.

Scope of Impact: Western Oregon

Funding: Smith-Lever 3(b)(c)
State Extension Funds
County Extension Funds

B. Key Theme: Water Quality

1. Title: Reusing Water from Food Processing to Extract Nutrients

Issue: Food processing plants in Oregon produce nutrient-laden waste water that contains chemicals such as nitrates that can damage surface and groundwater resources. For example, a single potato-processing plant in Umatilla County produces 800,000 pounds of nitrogen annually. Similarly, onion, vegetable, milk and cheese processors produce waste water with high nitrogen contents.

Waste water can also be a valuable resource for growing crops because nitrogen and other processing byproducts can be readily extracted and utilized by growing plants. The challenge is to apply those nutrients to the crops at the rate that plants can take up the nutrients, leaving no excess to leach to groundwater or run off to surface water.

Target audience: Food processors in Morrow and Umatilla counties
Growers that apply the water to their crops
Power generators that use land application of waste water
Regulators from the Oregon Department of Environmental Quality

What was done: This program is part of a statewide effort to appropriately use processing waste waters while avoiding environmental damage. The main goal is to find the optimum agronomic rates at which to apply the water to various crops, and then inform growers. Extension has played a key role in developing the Water Reuse Consortium, a group that meets regularly to determine precise amounts of nutrients needed by particular crops and to discuss various regulatory issues. Extension specialists have assisted in development of science-based water use plans designed to optimize use of waste water while minimizing environmental impacts. In addition, this program encourages better communication among participants and provides education about, for example, the value of the resource. It also establishes a framework for current and future research needs.

Impact: Waste water from food processing plants now is applied at agronomic and environmentally sustainable rates. This has turned nutrient-rich waste water, formerly an environmental liability, into plant-nutrient assets valued at $500,000 a year. If regulation had forced processors to investing in alternative technology for treating waste water, additional annual operating costs likely would have been $4.5 to $6 million. Meanwhile, growers receiving the effluent enjoy a triple benefit: it benefits their crops, it saves fertilizer costs, and it helps keep growers' markets viable, i.e., it helps the processors who contract with them. Also, there are considerable environmental benefits which have not been estimated in dollar terms.

Scope of impact: Statewide

Funding: Smith-Lever 3(b)(c)
State Extension Funds
County Extension Funds

C. Key Theme: Natural Resources Management

1. Title: Watershed Stewardship Education in Oregon

Issue: In the late 1990s, Oregon's governor led a statewide effort to create a homegrown response to the listings of coho and other salmon species under the federal Endangered Species Act. One result was the Oregon Plan for Salmon and Watersheds, which emphasizes the importance of healthy watersheds that support the economy and quality of life of Oregon. The plan emphasized the need for education to help citizens and communities understand water quality issues and work together to improve water quality and quantity and restore habitat. The Oregon State University Extension Service joined in this effort by launching a Watershed Stewardship Education Program.

Target Audience: Watershed groups
Soil and water conservation districts
Foresters
Farmers
Urban and rural land owners
State agencies
Non-profit groups
General community members

What Was Done: OSU Watershed Extension faculty, which encompasses Sea Grant, Forestry, and Agriculture Extension Service faculty, deliver watershed stewardship education to a variety of audiences in response to the watershed education needs of Oregonians. The core program of OSU Watershed Extension is called the Master Watershed Steward (MWS) program, an eight-topic curriculum followed by an optional, hands-on 40-hr. project. Learners in the program take part in eight classroom sessions and four field trips. The comprehensive curriculum features topics including: watershed and stream processes, riparian area ecology and management, water quality monitoring, group processes and conflict resolution, salmonid biology, stream habitat, and wetlands and estuaries. After finishing the program coursework, participants work on completing a 40-hour local watershed improvement project on their own land or in their community.

Impact: The MWS program, now in its fourth year, is in demand throughout Oregon. Over 960 Oregonians have participated in programs statewide and over half completed on-the-ground projects to become Master Watershed Stewards, volunteering over 13,000 hours of work to completing watershed improvements. A survey of program participants showed significant increase in awareness, knowledge, confidence and skills, including an increase in acceptance of people with different values. This is significant, because the many people who care about watersheds are often a diverse group of individuals with conflicting values. Over 96 percent of the Master Watershed Stewards surveyed to date

say they will complete at least one new watershed-related practice or activity within the next year. The MWS program is also reaching new audiences. In 2004, 27 Oregon State Police officers successfully completed a Master Watershed Steward program called "Watersheds and Watershed Law," tailored to the needs of Oregon's Department of Fish and Wildlife. In addition, members of the Confederated Tribes of the Umatilla Indian Reservation are also participating in MWS programs and activities. The MWS program's success has incited the launch of similar efforts in OK, VA, AZ, TX, AK, MD, India, and Pakistan.

Scope of Impact: Statewide, national, international

Funding: Smith Lever 3 (b)(c)
State Extension Funds
County Extension Funds
Grant from Oregon Watershed Enhancement Board (OWEB)
Grant from Oregon Forest Resources Institute (OFRI)
Sea Grant Extension

D. Key Theme: Forest Resource Management

1. Title: Master Woodland Manager Program

Issue: An estimated 165,000 non-industrial private land owners own approximately 16% of the forestland in Oregon. Over 90% of ownerships are parcels of 100 acres or less, and the proportion of small parcels is growing. As the demand for timber shifts from public to private lands, the number of landowners who will harvest timber sometime in the near future will increase. In addition, the current Oregon landowner population is aging, suggesting a large shift of forest landowners within the next 20 years. These trends show a strong need for assistance and basic forest education for thousands of landowners of various socioeconomic backgrounds and management objectives. In response, OSU began the Master Woodland Manager (MWM) project in 1983 to train qualified landowners to be effective volunteers and community leaders, thus increasing dissemination of education among a large, diverse audience.

Target audience: Small family forestland owners (between 1 and 5,000 acres)

What was done: Major accomplishments for 2004 include an impact survey of 280 current and past MWMs. 141 surveys (50%) were returned. Results of the survey are being used to guide future trainings and programming. On a local level, MWMs support their county Extension foresters and participate in a variety of events, such as "Kids Day for Conservation" and "Tree School." A Benton County MWM, an advocate of planning for intergenerational transfer, has given talks throughout Oregon in collaboration with the Austin Family Business Program in OSU's College of Business, and is working with OSU Extension faculty to develop curriculum on the topic.

Impact:

Since the inception of the MWM project, volunteers have served nearly 56,000 hours and made over 68,000 contacts with other landowners throughout Oregon. Over 90% of the MWMs stated that they plan on continuing their volunteer service past the mandatory 80 hours and approximately 84% have received additional training since becoming a MWM. The MWM training has helped individuals complete about 2,500 acres of reforestation projects, 4,000 acres of thinning operations, and nearly 4,700 acres of stream enhancement. Results of impact surveys in 1991, 1998, and 2004 indicate an increase in volunteer service per individual MWM. In 2004, MWMs provided 22,907 hours of volunteer service, the equivalent of more than 12 full-time Extension foresters.

Scope of Impact: Statewide

Funding: Grant from Oregon Forest Resources Institute
State Extension Funds
Smith-Lever 3 (b)(c)

1. **Title: Wood Magic—Forestry and Forest Products Program for Elementary-age Students and Their Teachers**

Issue: Elementary-school-age children and elementary school teachers often receive mixed messages about conservation and intelligent use of natural resources. They need information to make better decisions about the products they use every day and how wood products, a renewable natural resource, compare to other products. The objective is to provide accurate information about forestry, and wood products in particular, in an educational setting.

Target audience: Fourth- and fifth-grade elementary students, their teachers and parents.

What was done: Wood Magic (Demonstration) workshops are offered twice per year, at Oregon State University's Corvallis campus (a 3-day event) and at the World Forestry Center in Portland (a 2-day event). Nine stations (most hands-on) are set up to demonstrate the usability of wood as a material and how wood is processed into useful products, and to identify the multitude of products made from wood that the students use every day. Teachers receive sets of lesson plans tied to the Oregon State Curriculum Benchmarks for use prior to and following the program.

Impact: Evaluations show the programs are enjoyable learning experiences for students and adults (a post-evaluation rating of 5 out of a possible 5 for all stations is not uncommon). Also, a short-answer test using a pre/post/delayed post-test design was used to evaluate students' retention of key concepts from the program. About 700 students took the test prior to attending the program and then took the test again after the field trip, usually about a week later. Three months later, these students took a third test to assess long-term retention. Paired t-tests, at a confidence level of 97.5% (repeated use of the

same test) showed that student test scores significantly increased ($P<0.001$) from the first to the second administration. There was less than a half-point loss in mean scores after re-testing 3 months later, suggesting that students not only increased their knowledge but also retained that knowledge.

Scope of impact: Statewide and beyond. Each year approximately 3,000 students, teachers and chaperones attend these programs in Oregon.

Funding: State Extension Funds
Smith-Lever 3 (b)(c)
Smith-Lever 3 (d) - RREA

Goal 5: Enhanced economic opportunity and quality of life for Americans.

A. Key Theme: Leadership Training and Development

1. Title: Oregon's 4-H Youth Leadership Program

Issue: Research shows that developing self-esteem, autonomy and proactive coping skills are important aspects of healthy youth development. One of the key ways these important life skills are developed is through programs that enhance leadership skills, particularly programs that offer hands-on, real-life experience in using developing leadership skills.

Target audience: Oregon teens

What was done: Teen leadership opportunities and programs are an essential ingredient of the 4-H youth development program in Oregon. Offered statewide, these leadership programs include projects, retreats and trainings that focus on leadership; Junior and/or Teen 4-H Leader programs; and active leadership in advisory boards, councils, planning committees and local commissions. Local program design may vary, but all have the goal of increasing leadership skills, confidence and self-esteem in youth.

2,828 youth in 31 of Oregon's 36 counties participated in a 4-H leadership project or training program in 2004. Of these, 1964 youth served as Junior or Teen 4-H Leaders, and 496 youth served on planning boards or local commissions.

Impact: A 2004 study measured the impact of participation in 4-H leadership programs in Oregon. Respondents were drawn from a random sample (stratified by county) of 957 4-H members, ages 12–18, from 6 representative northwest Oregon counties. Results showed that youth who participated 4-H leadership programming showed significantly ($P<.05$) greater levels of self-esteem, proactive coping skills, and sense of contribution, and cared more about others than 4-H youth who did not participate in leadership programs. These analyses were conducted using regression techniques that accounted for differences in parental income, education and location (county).

Scope of impact: Statewide

Funding: Smith Lever 3 (b)(c) Funds
State Extension Funds
County Extension Funds

B. Key Theme: 4-H Youth Development

1. Title: Oregon's 4-H Residential Camp Program

Issue: Positive youth development programs increase a young person's exposure to supportive and empowering environments where there are activities that provide opportunities for skill development and the broadening on one's horizons (Roth & Brooks-Gunn, 2004). These programs also reduce risk and promote resiliency among youth.

4-H residential camps allow youth to experience growth while living in a natural, communal setting that provides abundant opportunities for the development of knowledge, independence, responsibility, self-esteem, self-efficacy, and teamwork. Campers also learn about nature and the outdoors, often returning from camp with a wider awareness and appreciation of the natural world. In addition, a recent national study of youth residential camping programs revealed that camp programs increase self-esteem, independence, leadership, social skills, decision making and environmental awareness in youth, all important developmental factors in helping youth thrive (ACA, 2005).

Target audience: Students grades 4–9

What was done: In 2004, over 840 youth entering grades 4–9 participated in one of 13 residential camps. In addition to paid 4-H staff who hosted the camps, 94 adult volunteers spent 6,887 hours helping plan camp, and 159 adult volunteers spent 9,600 hours at camp in Oregon. 227 youth spent 8,055 hours planning, and 263 youth volunteered 19,082 hours at camp. Others provided substantial financial support for the camps, including individuals and corporations ($17,628); grants from private foundations and public agencies ($23,150); and local 4-H leaders associations ($8,212) for a total of $48,990 in financial support for the 13 camps.

Impact: All 840 campers were surveyed; 90% reported that going to 4-H camp helped t hem discover new things they liked to do.

- 88% reported that camp helped them work better with others as a team.
- 87% said that 4-H camp helped them feel better about themselves.
- 87% said camp helped them cooperate better with others.
- 85% reported that going to 4-H camp helped them develop responsibility.
- 82% felt camp helped them meet new friends and talk to others more easily.

Campers were also asked about the ways in which they changed during the time they were at camp. The campers reported statistically significant changes in:

- Their comfort level being away from home
- Their knowledge about nature
- Their ability to manage their free time
- Making presentations in front of others
- Their enjoyment of the outdoors

- Their ability to make new friends

These results show that 4-H summer camp plays an important role in the development of young people. The results show that camp provides an experience for youth to grow socially, to develop important life skills, and experience nature, all in a fun, hands-on setting.

Scope of impact: Statewide

Funding: Smith Lever 3(b)(c) Funds
State Extension Funds
County Extension Funds

1. Title: 4-H Wildlife Stewards Program

Issue: Oregon's educational system has been under considerable strain in the past decade. As budgets shrink, class sizes grow and teachers have less time to use innovative teaching techniques. These and other factors have significantly affected the way science is taught in schools.

Target audience: Elementary students

What was done: *4-H Wildlife Stewards, a Master Science Educator's Program* was developed in response to these emerging concerns in science education. The program is based on the premise that trained parent and community volunteer Master Science Educators, called 4-H Wildlife Stewards, can provide science learning opportunities that teachers cannot because time and funding limitations. 4-H Wildlife Stewards:

- Work with teachers, students, parents, and other volunteers to develop a habitat or other natural science projects on school grounds. The habitat is then used as an outdoor science laboratory.
- Help youth develop and evaluate research projects in the habitat.
- Assist teachers by providing materials, curricula and science expertise.
- Teach and lead science inquiry lessons in the habitat.

The 4-H Wildlife Stewards Master Science Educators program began in 1996 in the Portland area. Supported by a $750,000 grant from the National Science Foundation, the program grew and is now in 15 of Oregon's 36 counties. In 2003-04, 129 active trained 4-H Wildlife Stewards volunteers reached 48 schools, 377 teachers, and, ultimately, over 11,000 students.

Impact: A formal evaluation conducted as part of the NSF funding in 2003-4 showed the program had a significant impact on students' interest and skills in science. On a scale of 1-4 with 1 indicating that the statement is not true and 4 indicating that the statement is true,

- students reported that the program helped make science learning fun (mean score of 3.36);

- that using the habitat increased their science learning (mean score of 3.2);
- and that the program helped them to get better at making science observations (mean score of 3.23) and collecting data (mean score of 3.50)

Students were also asked how much the 4-H Wildlife Stewards program helped them to like science and to do better in science. On a 1-5 scale with 1 indicating none and 5 indicating a lot;

- students indicated that they liked science as a result of the program with a mean score of 3.98,
- and students indicated that they were better at science with a mean score of 3.91.

An additional survey of students participating in a Wildlife Stewards "Summit" evaluated the following on a 4-point scale with 1 indicating no and 4 indicating yes.

- Gained presentation skills (mean score = 3.39)
- Learned to work as a team (mean score = 3.28)
- Gained skill speaking before others (mean score = 3.26)
- Leaned about plants and animals (mean score = 3.30)

Teachers reported that the presence of trained adult volunteers and easy access to a natural learning lab have made huge impacts in how they teach science.

"Our program became more hands-on, building bird houses, bird feeders, and mason bee nests. We also did vegetable seed plantings with related science activities. Having the 4-H Wildlife Stewards allowed us to work closer with each student!"

"Connecting science lessons and content with the wildlife and native plant habitat makes science far more meaningful to the children."

"I'm involved in several science projects and believe in hands-on experience but the 4-H Wildlife Stewards are very adept at teaching in a very professional manner yet providing activities that students enjoy and learn from."

Scope of impact: 15 Oregon counties

Funding: National Science Foundation
Smith Lever 3(b)(c) Funds
State Extension Funds
County Extension Funds

A. Key Theme: Community Development and Family Resource Management

1. Title: Small-scale Sawing and Drying

Issue: Small scale processors of logs and lumber often lack knowledge about how to best saw logs into lumber and how to easily and correctly dry lumber. This lack of knowledge results in losses due to wasted resources and low quality end-products.

Target audience: Small woodland owners
Portable sawmill operators
Others (homeowners, entrepreneurs) interested in sawing and drying lumber on a small scale

What was done: A series of small-scale sawing and drying workshops were presented throughout Oregon over the past several years. Workshop information included: Types of portable mill and pros and cons of the different types; safety issues when operating small mills; wood characteristics that related to lumber characteristics and quality; different methods of producing quarter-sawn vs. flat-sawn lumber and why you would want to produce one or the other; sawing for value; understanding how wood dries; differences between hardwoods and softwoods; types of drying including air, solar and dehumidification; recognizing defects that can and cannot be prevented during drying. One or more demonstration mills usually were included during these 1-day events.

Impact: In spring 2004, an impact evaluation was conducted of a workshop held in September 2003. 11 of 18 participants (61%) responded.

- 85% reported making better sawing decisions and obtaining higher lumber volume due to information presented at the session
- 38% said they planned to buy a mill
- 64% planned to buy or build a dry kiln.

Written comments included:

- "Much valuable information by presenters & attendees. Much of what I learned will be used in the future"
- "Very valuable information. You all did a very effective job of presenting it. The trip to Pender's place was very valuable. Having both Mobile Dimension and WoodMizer mills set up and demonstrated was very helpful to see the differences. I have recommended this class to several people…"

Scope of impact: Polk County, Oregon

Funding: State Extension Funds
Smith-Lever 3 (b)(c)
Smith-Lever 3(d) – RREA

2. <u>Title: Groundfish Disaster Outreach Program</u>

Issue: Oregon communities that rely heavily on commercial fisheries are in crisis. Changing ocean conditions, increasing management restrictions and uncertain market conditions threaten the economic viability of coastal communities and families. For instance, in Newport all sectors of the groundfishing industry contributed an average of about $80 million annually to the local economy. By 2001, harvest levels had fallen more than 60% and the federal government declared a disaster in the West Coast groundfish fishery.

Target audiences: Fishers

Local business persons involved in fishing industries
Fish processors
Service providers
Vessel owners and crews
Community resource providers

What was done: Oregon Sea Grant Extension staff had anticipated the effects of the decline and were poised to marshall quick responses. They briefed state and federal officials several times and created a team from the fishing community and community resources agencies to advocate for the emergency declaration and to seek funds. The group's spending plan was approved, and in January 2001 Congress appropriated $1.75 million to Oregon.

Oregon Sea Grant Extension staff and partners created the Groundfish Disaster Outreach Program (GDOP) to help fishing community businesses and families access support and resources and train for new jobs outside the fishing industry.

Earlier Oregon Sea Grant Extension research showed fishermen had difficulty connecting with "social service agencies," so GDOP hired outreach workers from within the fishing community. Workers reached some 5,000 people through mailings and media and more than 1,500 groundfishing-dependent people were contacted directly. The GDOP also developed a website, www.heads-up.net/gdop, with information about application processes, application forms, news releases, and peer contact and success story information. The website also links to partner sites on employment, transition and finances including links to California and Washington resources.

Impacts: Oregon's Congressional delegation, impressed by the readiness and results of the GDOP, secured an additional $1 million in federal appropriations for continued work and additional funds for the next 2 years. Oregon was the only West Coast state receiving additional funds. In total, GDOP has pulled $3.95 million to Oregon in the past 4 years. Additional funds went to other training agencies that delivered the re-employment program.

Though preliminary needs assessment indicated 70% of the coastal 187 vessels (about 400 people) would be impacted by the groundfish crisis and perhaps would access transition resources, in fact more than 800 people did so. That included over 300 accessing re-employment programs and over 350 accessing non-work-related services such as assistance with food, housing, mental health, licenses/legalities, and financial counseling.

- 89 fishermen and onshore support workers were tracked through the transition. As of February 2004, all but two were either employed or continuing their education. After training, they have blue collar jobs such as truck drivers, welders and heavy equipment operators. Some people started businesses such as landscaping, groundskeeping and dog-grooming; others completed special training or are in

college in fields such as medical and health services, computer programming and specialty contracting.

- Extension's reputation for innovation and responsiveness was enhanced by much favorable media coverage—including at least one major story in each of the coastal newspapers (a three-part series in Astoria) and radio interviews (including National Public Radio)—and by invitations to speak at industry, community and political meetings.

Scope of impact: Lincoln, Clatsop, Coos, Curry counties. A slightly modified version of GDOP was adopted by the State of Alaska; several other states have shown interest, and materials have been shared with them.

Funding: Federal Emergency Funds
Oregon Sea Grant Funds
Extension State Funds
Smith Lever 3(b)(c) Funds
State Agency Funds

1. Title: Forest Landowner Tax Education Project

Issue: The 2003 Oregon Legislature dramatically changed the property tax structure for forestland owners and directed the Department of Revenue to provide education on tax options available so that taxpayers could make informed choices. The Department of Revenue lacks the capacity, resources and skills to educate the approximately 41,000 forest landowners impacted. Thus, it engaged the OSU Extension Forestry Program's established educational resources in a joint venture.

Target audience: Private and family forest owners

What was done: The Oregon Department of Forestry, Oregon Small Woodlands Association, and Oregon State Association of County Assessors collaborated to develop a prioritized communications plan and series of educational workshops. Two letters were sent to landowners to prepare them for the tax changes. 177 volunteer educators received group training; surveyed later, 98% of them indicated the training sessions had helped prepare them to educate landowners. OSU Extension Foresters led 50 workshops that reached over 2,500 landowner participants with the new information. Of 558 evaluation surveys returned, 94% of landowners said the training was effective for their tax decision. Throughout the project, a website served landowners and trainers as a repository for training materials and as a "bulletin board" for questions and answers after the training.

Impact: All 177 trainers and a strategic sample of 931 landowners were given an intensive survey. 76% of trainers and 63% of landowners responded. Trainers said resoundingly that the training session was key to their performance in subsequent

educational workshops. More than 73% indicated receiving meaningful long-term benefits, and 95% said they would attend a similar future training session.

Of the landowners responding, 41% planned to choose a different taxation option as a result of the workshops. 44% said they anticipated a positive effect either through tax savings, improved cash flow or having forest financial and tax planning made easier. 40% of respondents had *not* formerly been served by OSU Extension Forestry programs, so the workshops enabled Extension to reach new audiences.

Scope of impact: Statewide

Funding: State Extension Funds
Smith-Lever 3 (b)(c)
Grant from Oregon Department of Labor.

D. Key Theme: Aging

1. Title: Don't Let Your Golden Years be Tarnished: Financial Management for Seniors

Issue: With advances in medicine, Americans have the potential to live 20 to 25 years after retirement. Unfortunately, living longer means seniors often are at risk of outliving their income and assets. They must figure out how to stretch savings and maximize their investments—not an easy job, given increased cost of living and escalating costs of prescription medicines and health care.

Target Audience: Older adults and retirees

What was done: Extension Family and Community Development faculty researched seniors' financial needs by holding focus groups with retired seniors, financial planners and staff of senior-social-service agencies. Based on findings, Extension staff developed a workshop series, "*Don't Let Your Golden Years be Tarnished: Financial Management for Seniors."* Each of the six sessions focused on one priority area: basic money management, achieving financial security, maximizing dividends and reducing tax exposure, putting legal house in order and maximizing quality of life in the senior years. At the final session, participants identified goals for the next 6 and 12 weeks. In 2004, the series was piloted in Lane, Linn and Benton counties.

Impact: An evaluation was designed to measure changes in participant knowledge, comfort level making financial decisions and plans to use information gained. At the end of the series, 100% of participants reported feeling more confident about making financial decisions as a result of the class and 100% of participants indicated they felt more prepared to handle later-life events.

Four months later, participants were surveyed about their financial health:

- 86% of participants reported that as a result of the training they now had a plan to protect and distribute their assets
- Participants increased their monthly savings by $50 to $500 a month. Half of participants had established an emergency reserve account; of those who already had an emergency account, 21% increased the amount in the account.
- 64% of participants had consulted a legal professional about their finances

- 57% had prepared a power of attorney
- 86% had established advanced directive for medical care
- 64% had updated their beneficiary list

Participants indicated a wide range of changes they had made in their lives including reducing debt, reducing monthly cash expenditures, adjusting insurance coverage and making plans for long term care.

Scope of Impact: Lane, Linn, Benton counties, Oregon

Funding: Smith-Lever 3(b)(c)
State Extension Funds
County Extension Funds

Summary of FTE and Funding Sources for Goals 1-5

National Goal	FTE	Smith Lever 3(b)(c) Funds	State Appropriated Funds	County Appropriated Funds
1	41.63	$934,185	$3,645,221	$1,276,197
2	8.50	$190,670	$744,000	$260,475
3	8.21	$184,174	$718,651	$251,601
4	45.70	$1,025,460	$4,001,378	$1,400,888
5	40.70	$913,721	$3,565,371	$1,248,241
Totals	**144.72**	**$3,248,210**	**12,674,620**	**$4,437,402**

Stakeholder Input Processes

The Oregon State University Extension Service utilizes numerous approaches to garner input from stakeholders statewide. These are summarized as follows:

A. The Extension Citizen Advisory Network.

- Actions taken to seek input and encourage participation.
  - The Network is composed of stakeholders form each county in the state and includes both representatives with specific program foci and representatives from county government. The Network meets twice annually with Extension leadership (Dean and Director, Assistant Directors, and Program Leaders) to provide input on programming and Extension policy issues. Extension provides travel reimbursements, meals and a desirable meeting location to encourage participation. In addition, members are contacted throughout the year by email to solicit input on critical issues.
- Process used to identify individuals and groups that are stakeholders and to collect input from them.
  - Members are nominated for service on the Network by county Staff Chairs in consultation with local stakeholders. Often these consultations include conversations with recipients of Extension programming, local political leadership, and representatives of organizations with linkages to Extension. Care is taken to assure that membership is capable of representing the broad interests of Oregon society and that they are capable of providing input from very divergent viewpoints such as youth and adults, urban and rural, agriculture/forestry/fisheries and environmental stewardship, large production systems and small production systems, small county government and large county government, traditional audiences and new, emerging (including ethnic) audiences etc. In addition, special efforts are employed to assure that meetings are relevant to each member. The Network is involved in very key discussions related to the management, funding, and impacts of Extension in Oregon.
- How input from the Network is considered in decision-making processes.
  - Input comes to Extension from the Network through several processes. During the semiannual meetings, key decision-makers within Extension and the university are invited to participate. Discussions are very active and input is often immediate as issues are discussed. In addition, input is solicited throughout the year on key issues. This is often done through email and telephone contacts. Finally, local faculty and Staff Chairs have close contact with Network members in their counties. This permits local feedback on issues. Input from the Network is frequently considered by the Dean and Director, the Extension Cabinet and Program Leaders in guiding the development and execution of programming statewide.

B. College-based Advisory Structures.

- Actions taken to seek input and encourage participation.
    - Because Extension at OSU is integrated into colleges and respective academic departments, there are numerous mechanisms used to garner stakeholder input at this level. Most colleges and many departments with Extension faculty have a formal advisory council that is charged with providing input on research, teaching and Extension programs. These meet at least once per year with additional input sought via email and teleconferences between meetings. In addition, there are more Extension specific advisory structures for the 4-H, Forestry, Sea Grant, and FCD programs. These are highly targeted efforts that seek specific input on Extension programs. In addition, the Forestry Extension Program has listening sessions in at least one county per year. The general public is invited to these sessions.
- Process used to identify individuals and groups that are stakeholders and to collect input from them.
    - Generally, a broad representation of individuals is sought for these committees and advisory forums. Membership is often based on a desire to have representation from key stakeholder groups that include agricultural, forestry, and marine commodity producers; federal, state, and local agencies; persons with keen understanding about the needs of ethnic minorities and other diverse audiences; representatives of various environmental groups; educators; local government leadership; OSU faculty and staff; etc. In many cases, strategic planning processes have been used to identify appropriate representation on respective advisory committees.
- How input from advisory groups is considered in decision-making processes.
    - Input from these groups has been used in university-wide strategic planning efforts, in program design, and in allocation of resources. In addition, feedback from advisors has been used to better understand political realities and steps necessary for garnering support from local, state, and private sources.

C. County-based Advisory Structures.

- Actions taken to seek input and encourage participation.
    - Each faculty member is encouraged to maintain an advisory function for their programming. In addition, most counties maintain a formal advisory committee. Most structures utilize regularly scheduled meetings with stakeholder representatives to garner input.
- Process used to identify individuals and groups that are stakeholders and to collect input from them.
    - Staff Chairs and faculty members are encouraged to identify stakeholders that represent the needs and perspectives of a broadly defined community. Membership tends to represent current clientele, potential clientele, other agencies, county leadership, and representatives form the private sector. Input

is collected during regularly scheduled meetings, special meetings, and through periodic contact via email, telephone, mail and personal interaction.

- How input from advisory groups is considered in decision-making processes.
  - Input from local stakeholders is utilized to develop local priorities. These are reflected in local programming designs and outcomes. Additionally, input flows up through the organization and is considered and utilized in the development of statewide and regional efforts. Input from local groups is also extremely valuable in developing administrative structures and delivery systems that are compatible with local needs, customs, and skill sets.

Program Review Process

There have been no significant changes in the program review process submitted in the 5-Year Plan of Work.

Evaluation of Success of Multi-state and Joint (Integrated) Activities

Oregon State University has long-standing interactions with surrounding states, and each Extension program area and every Extension faculty member is expected to develop a professional network that includes peers in other states. These networks, whether formal or informal, involve information sharing, opportunities for professional development, curriculum and educational material development, and joint program development and delivery. Additionally, Oregon State University was a pioneer in integrating Extension with the teaching and research functions of the institution. All Extension faculty are members of campus-based departments. They actively participate in departmental activities including planning and promotion and tenure processes. Many faculty now have joint Extension/research appointments.

Processes are in place to gather important input from key stakeholders and to assure that critical issues are recognized and addressed. Input from stakeholders is incorporated into the development of both outreach and research programs. For example, advisory committees meet regularly with extension faculty, faculty and staff at agricultural research stations, and with departments and college and extension leadership. Stakeholders are very engaged in exchange of ideas, evaluating effectiveness of existing projects and in the creation of new efforts. As a result of this collaboration, extension and research efforts are very responsive to the needs of society. Integrated programs are very commonplace in Oregon with extension faculty engaged in applied research trials throughout the state in collaboration with experiment station and Forest Research Laboratory scientists. Multi-state programs are addressing key issues such as disease problems in potatoes and onions; erosion and weed control in dryland cropping systems; adding value through introduction of new crops, varieties and root stocks; water usage and protection of threatened and endangered species; reducing pesticide use through integrated pest management strategies; and development of new irrigation techniques. Additionally, multi-state programs are

improving the efficiency of outreach processes through the joint production of educational materials and other resources such as plant disease, weed and insect control handbooks.

Planned programs are designed to meet the needs of both under-served and under-represented populations of the state. Specific steps have been taken to reach out to Latino populations through the development of Spanish language materials, providing training in both English and Spanish, and by developing programs that are sensitive to the specific cultures within the Latino communities. Latino mid-managers have also been leveraged to educate farm workers about proper handling of pesticides and other hazardous materials. Watershed restoration efforts have involved tribal leaders to assure that educational efforts are pursued in manners that are culturally sensitive and compatible with tribal goals and objectives. For example, research and outreach efforts initiated in response to the water crises in the Klamath Basin not only examined the natural resource and economic issues associated with reduced water availability but also closely examined both legal and cultural issues from tribal perspectives.

Efforts have been made to assure that outcomes and impacts from both multi-state and integrated programming are well documented and communicated to key stakeholders. For example, multi-state efforts focused on improving disease and pest management in key fruit and vegetable species have reduced production costs dramatically (by $300/acre in onions, $60/acre in potatoes, and $50/acre in cherries). New introductions of root stock, varieties and species have resulted in improved production efficiency. For example, new root stocks have reduced the time needed to achieve return on investment associated with planting new cherry trees from 15 years to only 7 years. Fully 70% of all new cherry trees in Oregon are on these new root stocks. New fruit and vegetable varieties are also improving the bottom line for producers by enhancing product quality and yields. Changes in cherry varieties as a result of efforts by OSU and WSU extension and research faculty have resulted in increases of $.08 to $.81 per pound in cherry prices in the Mid-Columbia region. More specific examples of impacts are described in the following sections.

Planned programs have also resulted in tremendous improvements in programming efficiency. Expertise is readily shared across state borders with Washington, Idaho and California. In addition, the Pacific Northwest Publications series generate tremendous efficiency by jointly publishing extension materials with Washington and Idaho. The integration of extension faculty into academic departments also creates improved efficiencies by enhancing communication between extension and research faculty. As a result, research is more targeted to the needs of society and extension programming is more effectively tied to the latest science.

Multi-state Activities and Impacts

The Oregon State University Extension Service has created an audit trail for funds supporting the following multi-state activities. Descriptions of these activities and outcomes/impacts are listed in the following narratives.

1. The Pacific Northwest Publications

The Pacific Northwest publication series continue to address critical issues by supporting and encouraging individuals and groups of potential authors to produce materials that are appropriate for a multi-state audience. To date, this structure has supported the creation of 579 publications, software, and videos addressing critical issues in the region. During 2004, publications were developed that address the needs of the wheat producers, 4-H volunteer leaders, forest land owners, family and caregivers for elderly with depression, pesticide applicators, and general agricultural producers. The PNW Publication effort continues to deliver important impacts as realized by reduced publication costs, creation of appropriate materials for target audiences, and by leveraging the skills of authors across three states to assure production of publications of high quality and appropriate content.

2. Northwest Berry and Grape Information Network

The Northwest Berry and Grape Information Network offers a comprehensive information and communications resource for researchers, Extension educators, processor field representatives, and growers. They can access market reports and production statistics, search databases and libraries, and discuss issues with one another. Environmental impacts of production practices are among the issues discussed on the internet—e.g., ways to reduce pesticide applications, recommendations about "softer" pesticides, use of biological control agents, ecological (and economic) benefits of cover crops, etc. Computer predictions of pest problems (e.g., from information such as heat accumulation) allow growers to reduce pesticide applications, spraying only when necessary rather than on a regular basis. Growers can monitor changes in daily market prices and storage volumes, giving them better knowledge of current market conditions and the value of their crop. Latest research updates are also on-line, encouraging more rapid adoption of research results. Email discussion groups synthesize the collective wisdom of those with similar interests from all over the world and facilitate group learning. Two of these mail-groups have more than 300 subscribers from at least 20 countries. OR and WA are very active in this effort.

3. The Pacific Northwest Plant Disease, Weed, and Insect Control Handbooks

The Pacific Northwest Plant Disease, Weed and Insect Control Handbooks are Extension's primary method of delivering pest control information to clientele in the Pacific Northwest. This is a collaborative effort among Oregon, Washington, and Idaho. The clientele, which includes university faculty (both state and county personnel), consultants, field scouts, Oregon Department of Agriculture inspectors, field and nursery people, Master Gardeners, and chemical industry representatives, consider this publication their primary source of plant disease information. Home gardeners and Master Gardeners use the information in the handbook, generally in consultation with their county Extension agent. Use of the handbook facilitates growers' using the most efficient method of treating diseases affecting their plants, thereby improving yields, saving crops, and reducing production costs. Correct identification of plant problems aids in using the best and most efficacious management tactics. Although chemical tactics are recommended, non-chemical cultural control tactics are highlighted including organic techniques. Use of this book throughout the northwest region (WA, ID, OR) has greatly reduced pesticide applications.

4. Pea Production and Walla Walla Watershed

OSU faculty are working jointly with USDA scientists and others in Washington to resolve issues endemic to the Walla Walla watershed. Projects have been designed and delivered to evaluate tillage practices and most appropriate green pea varieties for the region. Additionally, cooperative efforts are underway to assess the impact of reduced irrigation water as farmers relinquish water to increase in-steam flow and endangered fish habitat. In both cases, critical data are being collected and results are expected at the end of 2005.

5. Onion Production

Significant onion production occurs in the Snake River Basin that straddles the Oregon/Idaho border. Regional extension personnel and researchers collaborate to deliver joint programming in the region. This includes a joint newsletter, and Idaho/Oregon annual educational meeting, and individual crop consulting across state lines. One area of focus has been control of onion thrips in the region. Efforts have resulted in improved yields and reduced pesticide costs. Improved net returns from application of these techniques are $300/acre. It is estimated that ¼ of the acreage is under this new management strategy. Therefore, estimated impact of this program is almost $900,000 annually.

6. Water Allocation and Endangered Species

In the summer of 2001, the Klamath Basin in Oregon and California experienced a crisis when a federal decision eliminated irrigation water to over 1200 Oregon families farming more than 170,000 acres to protect endangered fish. With the help of Extension and experiment stations located in the Upper Klamath Basin, faculty from three campuses at Oregon State University and University of California collaborated to document the impact of this decision. As a result of this project, a joint report entitled "Water Allocation in the Klamath Basin: An Assessment of Natural Resource, Economic, Social, and Institutional Issues," was published in December 2002. The purpose of this report was to provide a non-advocacy account of a wide range of issues related to water allocation decisions in 2001 through contributions of a multidisciplinary team. Faculty represented on the team included wildlife and fish ecologists, economists, agricultural scientists, sociologists and extension educators. To ensure a high level of quality, extensive internal reviews were instituted in writing the report. The report was useful in identifying what is known and what is uncertain. It also provided an extensive number of references on the issues, examined alternatives and suggested future areas of research. Information contained in the report has been used by decision makers, elected officials, agriculture producers, Native American Tribes, and the general public in managing resources and developing policy in the Klamath Watershed. Assessment of the impacts of these decisions is on-going.

7. Cherry Production

Sweet cherry growers in the Columbia River Basin (Oregon and Washington) are trained by OSU and WSU faculty to use Integrated Fruit Production (IFP) strategies to control pests in their orchards. This includes strategies such as spraying pesticides only when pests exceed specified threshold levels and using soft-control options. Less disruptive control methods are also replacing aerial spraying, and growers are learning to control spray drift and reduce pesticide

contamination of water. Reduction in spraying levels result in savings of up to $50/acre. An estimated 1,000 acres are affected annually, making the total saved each year about $50,000. Additionally, a network of weather stations was established to help implement IFP methods. This system also significantly reduces potential for frost damage. Frost has historically resulted in significant harm to crops once every five years. But with information from the weather stations, growers will be able to save at least 20% of their crop every 5 years. In the north-central cherry production area of Oregon, there were 9,013 acres of sweet cherries in 2003 with a total in gross sales of over $42 million. Therefore, the weather station network should save growers $1.68 million/year ((20%x $42 million)/ 5years). Finally, OSU and WSU faculty have cooperated in evaluation of new cherry varieties and root stocks. As a direct result, new varieties are being produced in the region. In Wasco County, Oregon alone, these varieties are yielding up to $.48 per pound more than Bing cherries. It is estimated that total returns to farmers in the region have been increased by over $5.8 million annually as a result of new variety introductions. Dwarfing root stocks have also been widely accepted with approximately 70% of new trees in Oregon and 30% of new trees in Washington are on dwarfing root stocks. Research conducted at the OSU Mid-Columbia Agricultural Experiment Station indicate that return on investment is achieved 7 years earlier with dwarfing root stock contrasted to non-dwarfing root stock (8 vs. 15 years).

8. Irrigated Agriculture

The Columbia River Basin encompasses a large region of north-central Oregon and south-central Washington. Most issues in the region transcend state boundaries. Extension specialists at the Hermiston Agricultural Research and Experiment Station work closely with counterparts from Washington (WSU, Univ. of Idaho, USDA/ARS, and industry representatives) to resolve issues in the region. Virtually all aspects of the irrigated agriculture program at the station have multi-state components. This includes development of joint publications on Christmas tree production (OR, WA), soil acidification (OR, WA), and onion production (OR, WA, ID). In addition, the Pacific Northwest Vegetable Association is a consortium of organizations that supports research and outreach efforts in the tri-state region. OSU faculty serve as advisory members and have collaborated with other states on projects funded by PNVA. This organization also hosts tri-state meetings for producers. These events general attract approximately 450 growers from Oregon, Washington and Idaho. OSU faculty also participate in regional grants examining Auxi-grow potatoes (OR, WA) and best management practices for potato production (ID, OR, WA). The latter has already yielded impacts in Idaho where there have been documented reductions in fertilization and pesticide usage by program participants. Proposals for additional multi-state programming are being developed including one focusing on reducing water inputs for potato and onion production by using drip irrigation technologies.

9. PNW Potato Production

OSU research and extension personnel along with USDA/ARS scientists from Prosser, Washington have conducted outreach and applied research leading to integrated pest management strategies for potato producers. Conventional control of the Colorado potato beetle and the green peach aphid cost approximately $150/acre. Today, IPM strategies reduce the cost to about $90/acre saving producers approximately $60/acre. Concurrently, yields have increased

by 4.5 tons/acre. Estimated net impact of the program in two counties in north-eastern Oregon is $2 million annually.

10. Dyrland Crop Production and STEEP Solutions.

Researchers and extension personnel in Oregon, Washington and Idaho have been engaged in a long-term research and outreach effort focused on reducing erosion in the region (NE Oregon, Eastern Washington, and N. Idaho). The effort includes long-term research trials, demonstration projects, a web site, publications, and other educational programming. Outcomes and impacts of this program are listed below.

1. Adapted soil erosion prediction technology for the climate conditions, soils, landscape, and production systems unique to the PNW.

2. Developed and tested many of the conservation options producers are using to meet conservation compliance requirements of recent Farm Bills.

3. Documented the impacts of cropland soil erosion on long-term soil productivity, environmental quality and farm and regional economics, and increased producer and public awareness of the problem.

4. Increased producer use of conservation tillage systems and supporting conservation practices in the PNW

5. Developed technology and prototype equipment for improving residue placement, fertilizer use efficiency, seed placement, and overall success of conservation tillage systems.

6. Increased number of agricultural service industries and producers building or modifying their equipment for direct application of fertilizer with little or no prior tillage under "shank and seed" minimum tillage systems, which provides cost-effective conservation options.

7. Improved understanding of the interactions between crop pests and tillage systems, crop rotations and other production practices has lead to the development of more successful pest management systems in conservation tillage and reduced the reliance on pesticides.

8. Breeding of new crop cultivars with improved pest resistance has facilitated the adoption of conservation practices and reduced pesticide use.

9. Adaptation and evaluation of predictive models to help develop effective pesticide and nutrient management practices for increased protection of surface and groundwater quality.

10. Development of alternative crops and their production practices have improved the success of conservation tillage systems through improved pest control and economic stability.

11. Increased producer access to new technologies for improved effectiveness and profitability of conservation farming systems.

11. Weed Control in Dryland Crop Production

Extension faculty at the Columbia Basin Agricultural Research Center work jointly with counterparts at Washington State University and the University of Idaho to provide research-based information to producers about effective and sustainable weed control processes. Cooperative studies are conducted in multiple locations throughout the three state region and provide information on benefical weed management practices for dryland crop producers throughout the region. This project has increased efficiency of herbicide use and reduced losses from weed competition in wheat. As a result, wheat farmers in the Columbia Basin in Oregon and Washington are realizing an average 1% yield increase for winter wheat. An additional improvement in has resulted from enhanced quality due to use of newly developed herbicide-resistant wheat. This quality differential has provided producers with approximately .5% enhancement in net returns. In 2002, the region had 807,950 acres in wheat, yielding 27 bu/acre, sold at $3.97/bu. A 1% yield increase and a .5% in value due to improved quality results in an estimated increase in revenues of $1.2 million/year.

12. Small Fruits

Oregon researchers and extension professionals working closely with counterparts at Washington State University are conducting variety trials, optimizing water usage, developing mulching strategies, optimizing nitrogen fertilization rates, and developing mechanical harvesting strategies for blueberries and cane berries. Additionally, research and outreach efforts have focused on introduction of Hardi kiwi.

As a result of these programs, blueberry growers are not using as much surface sawdust mulch and are saving over $350/acre or ($350 x 500 acres) = $175,000/year. Blueberry growers in the Pacific Northwest are also using the Highbush Blueberry Pruning video (VTP002) to train pruning crews. Hardi kiwi, despite high production costs, is showing economic promise on land that was formerly pasture, grass seed, or other berries. A newly revised Extension publication is also helping the commercial kiwi industry. The current gross production/sales value of this new industry is about $600,000/year.

Joint (Integrated) Activities and Impacts

The Oregon State University Extension Service has created an audit trail for funds supporting the following integrated activities. Descriptions of these activities and outcomes/impacts are listed in the following narratives.

1. NRSP-4 Pesticide Registration for Minor Crops

After implementation of the 1996 Food Quality Protection Act, critical pest management substances became unavailable to many minor crop producers. Many of the high value crops in Oregon fall into this category. Sales of these crops contribute over $500 million to the Oregon

economy annually and represent a significant part of the agricultural production of the state. A center was established at the North Willamette Research and Extension Center to aid in submission of materials for registration of products, monitor residues, and report appropriate data. The Center has facilitated approval of numerous materials for application in minor crops in a responsible and sustainable manner. Section 18 and SLN 24c (Special Local Need Requests) registrations alone document that $22 million/year would be lost if these materials were not available to farmers. Approximately one-half of this amount is directly attributed to the efforts of the center and its expedition of registration of pest management substances for minor crops.

2. IPM for Nursery & Berry Crops

The OSU Integrated Plant Protection Center has developed a database of Integrated Pest Management (IPM) resources on the World Wide Web (http://ippc.orst.edu/dir/). This database is continuously being updated and expanded. As a retrieval and referral system, it links researchers and practitioners. The system disseminates IPM information, raises awareness about new and emerging techniques in pest control, and supports IPM decision making. Integrated Pest Management promotes judicious use of pesticides and generally reduces the amount of agricultural chemicals used. Thus, this database that disseminates IPM information has indirect, but substantial, environmental benefits. When agricultural or forest operators obtain and apply relevant information from the IPM resources database, farm and forest workers experience less risk of exposure to potentially toxic chemicals, and consumers benefit from reduced pesticide residue on food. The North Willamette Research and Extension Center is engaged in research on integrated management of Phytophthora species, honey locust pod gall midge, and lygus bug. Results are communicated to growers through newsletters, presentations, and websites. A survey of growers indicated a savings to the Oregon nursery industry of $829,800 in 2004.

3. New Landscape Plant Introduction.

The Central Oregon Horticulture Program home segment evaluates new landscape strategies and conducts workshops, provides educational materials on such topics as fire-resistant materials and encourages home gardeners to develop defensible space around their homes that may help protect their homes. Xeriscaping results in more efficient use of water in landscaping. The research-based information on gardening and plant health distributed by this program educates consumers about appropriate, timely use of pesticides and fertilizers, discouraging their over-use. This research and outreach allows home gardeners may achieve their gardening goals while using more environmentally friendly methods.

4. Berry Production Systems

This program develops new knowledge and disseminates research-based information to members of the strawberry, raspberry, blackberry, and blueberry industries through newsletters, articles, publications, and presentations. Related research emphasizes biological, rather than chemical, control of berry pests, but when chemicals are still needed, effective control with more environmentally friendly materials and fewer applications is sought. Getting these research results and associated recommendations out to growers can have profound environmental benefits, as well as impressive economic results. For example, at the herbicide presentation to the

Willamette Valley berry growers of Russian descent, the cost per acre for each of the registered herbicides was compared to the benefits in terms of quality of weed control and the range of weeds controlled. Growers who adopted the recommendations are now saving money by making sound weed control choices and by applying the correct amount of each product. Biological pest control methods and other "softer," more environmentally friendly pesticides, plus using all materials at appropriate rates, reduce human exposure to harmful, toxic chemicals. Blueberry growers are using up to 25 percent less nitrogen fertilizer, a savings of $40,000 annually, as a result of a greater understanding of how to encourage mycorrhizal colonization of blueberry roots.

5. Greenhouse Systems

Liverwort (*Marchantia polymorpha*) is the most problematic weed in greenhouses. Liverwort infestations dramatically reduce the value of ornamental crops. Until recently, there were no best management practices (BMPs) for controlling this troublesome weed. Applied research at Oregon State University by Extension faculty has led to several cultural and herbicidal methods for controlling the weed. Our research has identified herbicides that are most effective at preventing liverwort infestations. Even more exciting, our research has identified rates for using a commercially available application of hydrogen peroxide for killing liverwort spores and preventing their colonization in containers. In this application, hydrogen peroxide can be injected through irrigation systems for easy and safe application. An extension delivery program was developed based on controlling liverwort with sound management practices, BMPs, and proper herbicide use. Our extension efforts included presentations at 12 greenhouse/nursery workshops, publications in several trade magazines, and development of a website. Our applied research, along with a vigorous extension delivery effort, is changing the way greenhouse and nursery growers manage this troublesome weed.

Appendix A

U.S. Department of Agriculture
Cooperative State Research, Education, and Extension Service
Supplement to the Annual Report of Accomplishments and Results
Multistate Extension Activities and Integrated Activities
(Attach Brief Summaries)

Institution___Oregon State University
State_____Oregon

Check one: __X_ Multistate Extension Activities
____ Integrated Activities (Hatch Act Funds)
____ Integrated Activities (Smith-Lever Act Funds)

	Actual Expenditures				
Title of Planned Program/Activity	**FY 2000**	**FY 2001**	**FY 2002**	**FY 2003**	**FY 2004**
Pacific Northwest Publications _____	**_____**	**$69,329**	**_$79,395_**	**$104,520**	**$30,400**
NW Berry & Grape INFONET _____	**_____**	**$5,392 _**	**_____**	**_____**	**$13,780**
NW Ornamental Seminars and Tours____	**_____**	**$9,690 __**	**$13,002**	**$10,768**	**_____**
National Pesticide and Info Network	**_____**	**_____**	**_____**	**_____**	**$ 1,530**
Pea Production and Walla Walla Watershed	**_____**	**_____**	**_____**	**_____**	**$19,559**
Onion Production	**_____**	**_____**	**_____**	**_____**	**$17,114**
Water Allocation and Endangered Species	**_____**	**_____**	**_____**	**_____**	**$21,230**
Cherry Production	**_____**	**_____**	**_____**	**_____**	**$18,080**
Irrigated Agriculture	**_____**	**_____**	**_____**	**_____**	**$14,815**
Pacific NW Potato Production	**_____**	**_____**	**_____**	**_____**	**$30,855**
Dryland Crop Production and STEEP Solutions	**_____**	**_____**	**_____**	**_____**	**$18,741**
Weed Control in Dryland Crops	**_____**	**_____**	**_____**	**_____**	**$15,192**
Small Fruits	**_____**	**_____**	**_____**	**_____**	**$24,506**
Total	**___0___**	**$84,411**	**_$92,397**	**$115,288**	**$225,802**

_____ _____3/14/04_____

Director ***Date***

Form CSREES-REPT (2/00)

Appendix B

U.S. Department of Agriculture
Cooperative State Research, Education, and Extension Service
Supplement to the Annual Report of Accomplishments and Results
Multistate Extension Activities and Integrated Activities
(Attach Brief Summaries)

Institution__Oregon State University
State_____Oregon

Check one: ____ Multistate Extension Activities
____ Integrated Activities (Hatch Act Funds)
__X_ Integrated Activities (Smith-Lever Act Funds)

	Actual Expenditures				
Title of Planned Program/Activity	**FY 2000**	**FY 2001**	**FY 2002**	**FY 2003**	**FY 2004**
NRSP-4 Pesticide Registration for Minor Crops	**___0___**	**$58,006**	**$77,690**	**$81,845**	**$84,470**
IPM for Nursery & Berry Crops	**___0___**	**$38,760**	**$52,008**	**$43,073**	**$44,245**
New Landscape Plant Introduction	**___0___**	**$54,946**	**$73,967**	**$77,394**	**$75,967**
Berry Production Systems	**___0___**	**$49,246**	**$65,931**	**$69,586**	**$68,535**
Greenhouse Systems	**___0___**	**$16,476**	_____	_____	**$27,443**
_____	_____	_____	_____		
_____	_____	_____	_____		
_____	_____	_____	_____		
_____	_____	_____	_____		
_____	_____	_____	_____		
_____	_____	_____	_____		
Total	**___0___**	**$217,434**	**__269,596**	**$271,898**	**$300,660**

Director

3/22/05
Date

Form CSREES-REPT (2/00)

Appendix C: 2004 OSU Extension Service Annual Contact Report

	White	Black	Hispanic	American Indian	Asian	Total	Total by Gender		Staff Contacts w/ Support Volunteer*	Staff Contacts w/ Program Volunteer*	Clientele Contacts by Program Volunteers
							Male	Female			
Agriculture	268,742	2,630	11,502	2,911	3,175	288,960	177,863	111,097	5,261	16,439	97,136
Other	14,736	106	306	67	291	15,506	7,930	7,576	967	544	46,847
4-H Youth	247,375	1,328	20,681	9,816	2,340	281,540	109,390	172,150	16,767	48,089	1,009,098
Forestry	46,787	395	1,562	563	623	49,930	33,769	16,161	731	612	4,408
FCD	66,042	974	7,648	2,774	1,053	78,491	21,511	56,980	6,854	17,070	49,559
Sea Grant	10,302	97	326	499	284	11,508	6,843	4,665	28	5	43
Administration	12,965	44	552	1,324	133	15,018	8,237	6,781	375	372	595
Totals	666,949	5,567	42,495	17,948	7,873	740,832	365,543	375,289	30,983	83,131	1,207,686

Uses of Mass Media:

Number of satellite downlinks hosted	Number of news releases	Number of radio programs	Number of television programs
51	4,374	639	275

Individual Contacts Through:

Number of newsletters distributed (circulation)	Number of website hits
3,102,480	4,873,363

Only direct contacts are recorded for race, gender and volunteers. Those include face to face, telephone, email, fax and personal letters. Each contact is listed under the most appropriate program area. Contacts with Extension Faculty are not included. To avoid duplicate counts when more than one Extension Faculty member teaches at an event, only the event host reports the contacts. * Report your direct contacts with volunteers. Program Volunteers are volunteers who have been trained to give an educational program or certified to provide educational information (e.g., master program volunteers, 4-H leaders, FCE leader-teachers). Support Volunteers include all other Extension volunteers (e.g., advisory groups, committee members, program development committees, office volunteers, field plot volunteers).