Utah FY 2004

Report of Accomplishments and Results

UTAH STATE UNIVERSITY

Utah Agriculture Experiment Station

and

Utah State University Extension

March 2005

A. PROGRAMS

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

Utah State University Extension (CES) and Utah Agricultural Experiment Station (UAES)
Progress Report on Plan of Work Goals: 2004

Overview

USU's cooperative extension and the agricultural experiment station enables producers to remain competitive by providing tools to help them select improved plant varieties, manage their farms and ranches, and control pests and weeds. USU scientists and personnel conduct field trials to determine which variety is best suited to a given climate and geography. The return is further compounded when the product is fed to animals or processed for the enhanced value.

Production of vegetables is an excellent area for niche marketing of high quality produce. Onions, melons and tomatoes are just some of the current farm produce available from the state's producers. Both CES and UAES have provided information to improve and protect production that enables producers to prosper.

Cattle and calves provide the greatest contribution of all agricultural cash receipts in Utah. As a whole, agriculture contributes more towards the economy in Utah than any other single sector. Providing timely and relevant information and service to beef producers is imperative for their continued viability.

The marketing of farm products is risky business and producers need to take advantage of all the tools available to reduce those risks. CES and UAES personnel have been very active in researching and educating producers about the tools available and how to use them wisely and it has resulted in reduced risks.

State Assessment: *The programs offered with Goal 1 address critical issues in Utah. CES and UAES faculties on campus and in the counties are responding very well to local and statewide needs.*

CES Total Expenditures and FTE:
Smith-Lever: $532,790
State Match: $549,024
FTE: 15.13

UAES Total Expenditures and FTE:
Hatch: $68,800
Other: $1,601,983
FTE: 4.4

Program Title: Agronomy/Crop Production
Key Theme: Agricultural Competitiveness
Description: Alfalfa is the most-widely grown field crop in Utah, representing 55% of total Utah cropland area and approximately 9% of total Utah agricultural cash receipts. It contributes directly, and beyond reported cash receipts, to the success and value of Utah beef and dairy production enterprises.
Impact: Higher-performing varieties in alfalfa trials typically yield at least 0.75 ton/acre more alfalfa hay than lower-performing varieties which provides a potential increase in economic returns of at least $60/acre or $24 million annually to hay growers statewide.
Sources of Funds: Smith-Lever, State
Scope of Impact: UT

Program Title: Alternative Agriculture and Markets
Key Theme: Adding Value to New and Old Agricultural Products
Description: USU has started an annual diversified agricultural conference. Five areas of risk management are covered in addition to giving producers new ideas for more profitable enterprises.
Impact: Evaluations of the conference were very positive. All evaluations of the overall conference averaged above 4 on a 5 point scale. Participants gained knowledge on how to cope with various elements of risk in their operations as well as new ideas.
Sources of Funds: Smith-Lever, State
Scope of Impact: UT

Horticulture – Commercial Fruit and Vegetable Production
Key Theme: Agricultural Competitiveness
Description: Asparagus acreage from 1992 (no known acres) to 2003 (approximately 25 acres) has increased and there is continued interest in this alternative crop.
Impact: Asparagus growers are reporting strong consumer demand and good prices ($2/lb) with average farm yields of 3000-4000 lb/A when fields are in full production. Not all the acreage is yet being harvested or is in full production but for the 15 acres being harvested this would translate to approximately $75,000 prior to expenses for the farms.
Sources of Funds: Smith-Lever, State
Scope of Impact: UT
Key Theme: Agricultural Competitiveness
Description: Directions for providing frost protection with the use of floating row covers allowed tomato growers to protect the plants and take advantage of the high prices for the fruits.
Impact: One grower reported that he received $38 per box and that his production increased an additional 500 boxes. This resulted in an extra $20,000 of harvested product for one of many tomato producers and a loss of only 5% of the crop instead of 50% for a melon producer.
Sources of Funds: Smith-Lever, State
Scope of Impact: UT

Key Theme: Agricultural Competitiveness
Description: A producer in Hurricane grows 80 acres of transplanted watermelon but has suffered severe losses due to wind damage to the melons. At USU Extension's direction, he fall

seeded his fields to barley and in the spring, tilled out the areas where the melons were to be planted.
Impact: Less than 5% stand loss was experienced even after experiencing a 70 mile per hour wind storm. He estimated that this change in practices doubled his early yields (due to increased plant stands) and increased his early profitability by $1000 per acre for the first 20 acres planted in 2004 for a total of $20,000.
Sources of Funds: Smith-Lever, State
Scope of Impact: UT

Program Title: Livestock
Key Theme: Agricultural Profitability
Description: When Federal Order 135 was terminated on 1 April 2004 the federal government no longer collected or published data on milk prices in Utah. Therefore, it was collected and placed on the USU agribusiness web page. The first month after termination the difference in prices paid by the largest processors in the state diverged by more than $1.50 per cwt (they had been the same before termination), which reflected a reduction of perhaps $1 million in gross revenue for producers.
Impact: Since the data was published the differences have become smaller, thus helping to restore some of the $1 million in gross revenue for producers.
Sources of Funds: Smith-Lever, State
Scope of Impact: UT

Program Title: Gardening and Ornamental Horticulture
Key Theme: Home Lawn and Gardening
Description: In Utah, the Master Gardener Program covers most horticultural areas beginning with the basics of botany, soils and fertilizers, and instruction in different subjects including annuals, perennials, shrubs, trees, vegetables, fruit, insects, diseases, pesticides and turf grass. In return for the training, each participant is asked to volunteer 40 hours of their time back to the community. After 40 hours of volunteer time is completed, they are awarded the Master Gardener Certificate.
Impact: Utah citizens have taken the course and are giving many hours of service back to their communities. Many people go well above and beyond the 40 hours of service with 79 percent working many additional hours. Master gardeners over the years have spent hundreds of hours creating and maintaining community gardens.
Sources of Funds: Smith-Lever, State
Scope of Impact: UT

Utah Agricultural Experiment Station (UAES)
Progress Report on Plan of Work Goal 1: 2004

The UAES has a large number of projects in this goal area and those projects will be continued. The diverse nature of the work precluded identification of clear “Program Areas” under the FY2000-FY2004 Plan of Work. Expenditures related to these areas are, however, included in the budget summary. The FY2005-FY2007 Plan of Work has corrected this deficiency.

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

Utah State University Extension and Utah Agricultural Experiment Station
Progress Report for Plan of Work Goals: 2004

Overview

USU Extension specialists, county educators and UAES scientists address food safety issues on multiple levels. The county educators spearhead training of consumers in safe food preparation, preservation and storage through pressure canner lid testing, workshops, newsletters, newspaper articles, radio and TV shows. Web sites, phone-in messages and satellite training are increasing in use. Home Educators continue to be the primary source of information on home preservation methods in the state. USU Extension provides the only home food safety program in the state.

Children are especially prone to catch and carry illnesses. A well received program is teaching hand-washing methods to children using GloGerm, which 'glows" under UV light if hand washing is inadequate.

The USU Food Safety Manager Certification (FSMC) program is certifying food industry workers as certified food safety managers. This results in safer food establishments throughout Utah.

Applicators that successfully complete pesticide certification or re-certification training are more likely to calibrate sprayers properly and make pesticide applications at rates and times when a maximum number of pests can be controlled. The possibility for a pesticide residue on food is greatly reduced.

The use of a wasp that is parasitic to the cereal leaf beetle has resulted in a true success for a method of biological control. This control method is now becoming established as a self-propagating mechanism, with little added cost.

Utah Extension Training on West Nile Fever prevention has begun since it is expected to hit Utah in 2005. Our horse, turkey egg, and human population need to be protected from West Nile Fever.

Beef and dairy are major industries in the state and are vulnerable to BSE fears. Research and educational efforts on beef trace-back programs have been implemented and bio-security concepts are being incorporated into the Beef Quality Assurance training programs.

State Assessment: *The programs offered with Goal 2 address critical issues in Utah. Extension and UAES faculties on campus and in the counties are responding very well to local and statewide needs.*

Utah Extension Service
Total Expenditures and FTE:
Smith-Lever: $375,031
State Match: $386,458
FTE: 10.65

Utah Agricultural Experiment Station
Total expenditures and FTE:
Hatch: $221,018
Multi-State: 93,304
Other: $2,315,886
FTE: 12.5

Program Title: A Safe and Secure Food and Fiber System
Key Theme: Foodborne Illness
Description: In 1998, the Utah legislature passed a bill creating the Utah Food Safety Manager Certification Act. This Act requires that food service establishments in Utah have a certified food safety manager. With offices in 28 of the 29 counties of the state equipped with satellite downlink facilities, Extension became the most logical choice for providing education to solve the problem using combined satellite teaching with hands-on Extension agent training. The Food Safety Manager Certification program has had 1,197 participants.
Impact: Pass rates for the FSMC have averaged 80% to 88% depending on the method of determining the course.
Sources of Funds: Smith-Lever, State
Scope of Impact: UT

Program Title: Integrated Pest Management
Key Theme: Integrated Pest Management
Description: Integrated pest management (IPM) is the management of economically important pests (insects, diseases, weeds, vertebrate pests) using multiple tactics (biological, cultural, chemical) to minimize negative impacts to human and environmental safety. Weather data are collected from 14 sites to run phenology (pest predictive) models. Insects and diseases are scouted in over 20 sites in 4-5 counties per week.
Impact: Project records have shown many times that pesticide use can be reduced by obtaining weather and pest information and appropriate applied modeling. The total amount of savings is found to be over $100,000 for one of several crops and by a subset of producers for a single crop in a single location, with similar benefits occurring in other crops.
Sources of Funds: Smith-Lever, State
Scope of Impact: UT

Key Theme: Biological Control
Description: USU Extension has worked with at least 59 growers that have chosen not to use pesticides on their grain crops in Cache, Box Elder and Weber Counties. The best example of minimizing use of chemicals has been the work with grain farmers and the introduction of parasites to control the cereal leaf beetle. This represents a minimum of 115 fields and approximately 10,000 acres of grain that was not sprayed with pesticides.
Impact: With a cost of spraying at $10.00 per acre, there was a savings of at least $100,000.
Sources of Funds: Smith-Lever, State
Scope of Impact: UT

Program Title: Utah Pesticide Impact Assessment Program

Key Theme: Weed Control

Description: In cooperation with the weed board, county weed department and the 5 cities in the county, USU Extension conducted annual public weed awareness programs. In one county the program provided 5 gallons of a pre-mixed herbicide to program participants labeled giving details of the herbicides and instructions on using them. In 2004, 554 individuals picked up 2770 gallons of the mix.

Impact: Nearly 277 acres of weeds have been sprayed by the program participants. At a commercial rate of spraying around homes of $40.00 for .5 acres, $22,160.00 was saved by those participating in the program.

Sources of Funds: Smith-Lever, State

Scope of Impact: UT

Key Theme: Food Safety

Description: Home food preservation continues to be an area of interest to Utahns and Cooperative Extension is the only reliable source of information. Pretest data showed confusion on key safety concepts. This year, a Master Preserver workshop was offered to all 29 agents to be sure they had the latest information. In addition, a series of fact sheets, entitled "Preserve the Harvest" are being researched, written and published.

Impact: 1,992 people have attended food preservation classes or phoned local Extension offices with questions. There were 643 pressure canner gauges tested. Of these, 73 needed to be adjusted or replaced. Ninety-six percent of the counties in Utah must include altitude adjustments in order to process food safely. Without accurate gauges and altitude adjustments, food can be improperly processed and cause food poisoning. USU Extension provides the only home food preservation safety programs in the state.

Sources of Funds: Smith-Lever, State

Scope of Impact: UT

Program Title: Plant and Animal Health and Safety

Key Theme: Other – (a) Identification

Description: Plum curculio, Conotrachelus nenuphar, is a quarantine insect in western North America and a threat to Utah's fruit industry. Its presence in Box Elder County, Utah, threatens the states tree fruit production (7,680 acres and $5.0 million value of utilized production in 2002).

Impact: We determined effective monitoring and management techniques for home yard and wild plum thickets where the insect predominates. Entomopathogenic nematodes substantially suppressed prepupae in laboratory and field bioassays.

Source of Funds: Other

Scope of Impact: Intermountain West

Key Theme: Other – (b) Control

Description: Application of animal wastes in excess of plant needs can contribute to water pollution. Nitrogen transformations are of particular concern due to the potential for excess N to be transported off site. Appropriate use of animal wastes requires predictive ability for the release of nitrogen from organic forms and subsequent conversions.

Impact: As waste N content varied considerably, producers are being advised to base waste application rates on actual N analysis. Estimates of 10% mineralizable N in the first year and 5% in the following year were reasonable predictors of available N in compost based on yield comparisons. We suggest that careful management of dairy compost needs to account for soil accumulation of available P & K, mineralizable N and the timing of N release from these multiple year applications.
Sources of Funds: Hatch and Other
Scope of Impact: Western U.S.

Key Theme: Other – (b) Control
Description: Inflammation of the uterus (endometritis) appears to affect the majority of dairy cows and often extends into the breeding period, having a profound negative impact on reproductive performance, resulting in decreased income for dairy producers.
Impact: Impaired immune function is associated with nutrient deficiencies that occur prior to calving. It is estimated that delayed conception costs the dairy producer $3/day for each day conception is delayed. With 90,000 dairy cows in Utah, it is estimated that Utah producers loose $5.4 million annually due to reproductive inefficiency caused by persistent uterine infections. Reduction of persistent uterine infections could save Utah dairy producers $60 per cow by allowing cows to become pregnant sooner. These savings do not include savings associated with reductions in cost for treatment and culling.
Sources of Funds: Other
Scope of Impact: U.S.

Key Theme: Other – (b) Control
Description: Aflatoxin B1 (AFB1) is the most important mycotoxin in occurrence and toxic potency, and poultry, especially turkeys, are the most susceptible food animals to its effects. In the first phase of this project, we discovered that the safe food antioxidant butylated hydroxyanisole (BHT), when added to the diet of turkeys, protects against nearly all symptoms of aflatoxicosis. While BHT is FDA-approved in foods, it is not approved as a chemopreventive in animal feeds. In this phase of the project, we will establish the safety of BHT, determine the mechanism(s) by which it confers protection in turkeys, and also determine whether similar antioxidants, which are AFB1-protective in mammals, are likewise protective in turkeys.
Impact: Our project has identified safe feed additives that can actually protect animals against the adverse health effects of feed-borne toxins such as aflatoxin.
Sources of Funds: Other
Scope of Impact: U.S.

Key Theme: Other – (b) Control
Description: Currently, mass vaccination in poultry is administered through the water. We will explore the possibility of mass vaccination of poultry via a feed ingredient containing an immunogenic portion of a viral genome rather than through the water. Another important consideration is that the vaccine be completely non-viable and non-contagious. Our part of this project is to determine if an plant containing an immunogenic part of the Newcastle viral genome, when fed to turkeys, will elicit an immune response.

Impact: Mass application of non-contagious vaccine to poultry through feed would give a much more economic means of vaccination than through individual bird injection, or even through drinking water.
Sources of Funds: Other
Scope of Impact: **U.S.**

Key Theme: Other – (b) Control
Description: Utah farmers and ranchers lose over 30 million dollars annually directly attributable to weeds. Noxious weeds are particularly competitive and difficult to manage.
Impact: The potential savings to Utah agriculture through jointed goatgrass management is approximately $5 million annually. Conservative estimates put annual yield and quality losses in agronomic crops alone, due to weeds in Utah, at over 30 million dollars.
Sources of Funds: Other
Scope of Impact: **U.S.**

Key Theme: Other – (c) Safety Assurance
Description: Many pesticides and other chemicals are used in agriculture. Natural attenuation of these chemicals, and bioremediation of sites contaminated by these chemicals may be accomplished by fungi. The purpose of this research is to identify wood-rotting fungi for the biodegradation of a wide variety of chemicals, such as pesticides and other agrochemicals.
Impact: White-rot fungi, those fungi which can degrade lignin in wood, have many applications, from the biodegradation of environmental pollutants to bioconversion of agricultural wastes to useful products. The fungi were used for reclamation of a former hardwood sawmill plant located in the southeastern US which treated wood with pentachlorophenol (PCP) and lindane. Fungi were also used for bioremediation of a pesticide-contaminated aerial application site in California. Both sites were reclaimed following bioremediation. The fungus is also appropriate for on-farm hazardous waste treatment. The fungi can be used to naturally generate chemicals which degrade pesticides.
Source of Funds: **Other**
Scope of Impact: **U.S.**

Goal 3. A healthy, well-nourished population.

Utah State University Extension and Utah Agricultural Experiment Station
Progress Report on Plan of Work Goals: 2004

Overview

Eating behaviors in our current society have shifted from an emphasis on getting enough of the right foods to an emphasis on choosing healthy foods from abundant supplies of a wide variety of foods and controlling amounts to prevent over consumption. New scientific studies provide very specific information on nutrients and their interactions in the body. Skill is required to interpret these recommendations into food selection and recommendations for consumers. The importance of nutrition to health and prevention and delay of chronic disease is well established. Extension agents have traditionally provided nutrition information about

coronary heart disease and cancer but are now providing the public with ideas about food selection, serving sizes and increased physical activity to prevent overweight, obesity and diabetes, data that come from UAES scientists.

State Assessment: *The programs offered within Goal 3 addresses critical issues in Utah. CES and UAES faculties on campus and in the counties are responding very well to local and statewide needs. Work by UAES scientists is providing a solid foundation for Extension data needs.*

Utah Extension Service
Total Expenditure and FTE:
Smith Lever: $210,933
State Match: 217,360
FTE: 5.99

Utah Agricultural Experiment Station
Total Expenditure and FTE:
Hatch: $642,336
Regional: $281,1154
Other: $6,494,842
FTE: 19.6

Program Title: Nutrition and Health
Key Theme: Human Nutrition
Description: Sufficient nutritional knowledge to choose appropriate foods and to form desirable eating patterns is necessary for a healthy population. "Diabetes-Stepping Up to the Plate" is now available to each county in the state. This extension nutrition curriculum has been pilot-tested for 18 months with over 200 people.
Impact: Matched t-tests of participants have shown improved weight and anthropometric measures if above normal. The use of multiple formats will be tested to see which is most effective in transmitting the information.
Sources of Funds: Smith-Lever, State
Scope of Impact: UT

Key Theme: Human Health
Description: A series of nutrition classes focused on cardiac health has been developed called "Healthy Beat." It was taught to Salt Lake County residents as a pilot test.
Impact: Paired t-tests of the participants pre- and post-program showed an improvement in knowledge and skill development.
Sources of Funds: Smith-Lever, State
Scope of Impact: UT

Program Title: Expanded Food and Nutrition Education Program (EFNEP)
Key Theme: Human Nutrition

Description: The EFNEP (USDA) Expanded Food and Nutrition Education Program was created in 1969 for the purpose of improving the diet and health of low-income people. Supplemental funding comes from the state of Utah and, since 1998, a grant from the USDA Food Stamp Program. These combined resources target low-income families to utilize their food dollars and food stamps wisely to purchase and prepare nourishing foods and to provide a safe food environment.
Impact: Approximately 86% of USU EFNEP clients showed improvement in food resource management practices (plan meals, compares prices, does not run out of food or use grocery lists). Ninety-two percent improved in nutrition practices (plan meals), healthy food choices, foods without adding salt, nutrition labels or children eating breakfast. Fifty-nine percent of clients showed improvement in one or more of the food safety practices (thawing and storing foods properly).
Sources of Funds: Smith-Lever, State
Scope of Impact: UT

Program Title: A Healthy, Well Nourished Population
Key Theme: Agricultural Product Enhancement
Description: Callipyge sheep develop extreme muscling in their loin and hind quarters after birth, thereby providing a unique model of postnatal skeletal muscle growth and development.
Impact: Production of lean meat, or muscle, is the primary product driving animal agriculture. The Utah station studied several facets of muscle physiology in callipyge sheep because they demonstrate characteristics important to meat animals including increased size of the valuable muscles of the loin and leg, leaner carcasses, and increased feed efficiency. Long term impacts are expected from this research.
Sources of Funds: Hatch
Scope of Impact: U.S.

Key Theme: Agricultural Product Enhancement
Description: Much whey is sold as a commodity for use in animal feeds, which generates relatively little monetary return on this potentially valuable by-product. **Impact:** This project developed new technologies, including a patented method and product that will increase demand for whey proteins as an ingredient in human foods. Implementation of these technologies by the food industry will increase the value of whey protein up to 500% compared to its use in animal feed. Utah produces 140 million pound of whey protein per year and stands to gain $56 million per year in added value for each 10% its whey that is diverted from animal feed to human food.
Sources of Funds: Hatch, Other
Scope of Impact: U.S.

Key Theme: Agricultural Product Enhancement
Description: New apple cultivars with varying degrees of disease resistance are continuously being developed around the world. Utah's apple growers are looking for alternatives to the standard cultivars grown in the Northwest. Participating in a unified national approach to evaluating horticultural characteristics and pest susceptibility of new apple cultivars will provide a database to predict profitability of the new cultivars in a more efficient, rapid, and systematic evaluation of cultivar characteristics.

Impact: Five high quality apples of eighteen evaluated have been determined to be of potential value to Utah fruit growers because of tree quality, apple size, yield, resistance to diseases, and fruit quality. They are Ambrosia, Delblush, Hampshire, Jubilee Fuji, and CWR10T17. Plantings of these cultivars will enhance apple producer profits.
Sources of Funds: Multistate, Other
Scope of Impact: Intermountain West

Key Theme: Agricultural Product Enhancement
Description: Kentucky bluegrass (Poa pratensis L.) is one of the most widely grown turfgrasses worldwide. Transgenic turfgrasses, including Kentucky bluegrass, are being developed by numerous companies and universities. Wide-hybrids between Kentucky bluegrass and other bluegrasses, which might normally be genetically unstable (e.g. sterile), may produce seed asexually by way of apomixis. These plant materials will not be released into the market until the genetic and ecological consequences of transgene movement thru cultivated, naturalized, and native bluegrass species has been examined.
Impact: Hundreds of millions of acres of Kentucky bluegrass are grown as lawns, sports fields, and parks, but little is known about its genetics. Because of this, when genetically engineered varieties of Kentucky bluegrass are developed, there may be concerns about the movement of foreign genes into native grasses. Our study shows that some grass species are genetically more similar, i.e., P. secunda, P. interior, and P. nervosa, could hybridize with Kentucky bluegrass causing the movement of a foreign gene. The common weeds P. trivialis and P. annua are less similar, which reduces the chance of them receiving the foreign genes.
Sources of Funds: Other
Scope of Impact: U.S.

Key Theme: Agricultural Product Enhancement
Description: Projects range from cellular development to agricultural security. While the studies have a basic biology component, they also have a component that translates this information into publicly access information that is aimed at direct use by stakeholders. Specific examples of the breadth of projects in this work are: 1) gene expression in alfalfa during stress, 2) cellular events during fertilization, 3) geomapping of pathogenic species and genetic drift to assess spikes in outbreaks, 4) ecology of microbes in ready-to-eat foods, 5) molecular diagnostics of agriculturally relevant pathogens using arrays, and 6) regulatory networks for cellular communication to understand how cells regulate growth.
Impact: This work is focused on agriculturally important traits in plants, animals, and microbes. Work is being done in a number of areas related to these organisms. For example, alfalfa is being studied using gene expression arrays to determine the set of genes involved in drought resistance. Once defined, these genes can be modified or moved into other systems to improve their traits.
Sources of Funds: Other
Scope of Impact: U.S.

Key Theme: Agricultural Product Enhancement
Description: Radiation hybrid mapping is a method for producing high resolution genome maps, which can then be used for determining gene order. By mapping expressed sequence tags

(ESTs) that are common across species, a radiation hybrid panel can also serve as the comparative link across species. In this way, knowledge of the genome organization of a species is enhanced as well as integrated with other species maps.
Impact: We have constructed an ovine radiation hybrid (RH) panel that will be used for development of a framework/comprehensive RH map for sheep. This panel is being distributed to researchers interested in contributing to the ovine RH map. The resulting map will contribute substantially in the search for economically important genes in sheep because it creates a link between the genetic maps of human, cattle and mouse with that of sheep.
Sources of Funds: NRI Competitive, Other
Scope of Impact: U.S.

Key Theme: Agricultural Product Enhancement
Description: Beef cow body condition (body energy reserves) can vary greatly from year to year and within a given year depending on weather conditions and forage supply. Low body condition will reduce the overall performance of beef cows and may also reduce the ability of cows to utilize low-quality forage (LQF), the winter diet on many cow-calf operations.
Impact: When young, suckling calves were exposed to LQF via their mothers' diet, their subsequent utilization of LQF as adult cattle was improved. The body energy reserves or the body condition (BC) of cattle will affect LQF utilization. Those in a functionally acceptable BC exhibited a 1.4 percentage point improvement in dry matter digestibility and 1.1 kg increase in dry matter intake compared to cattle in poorer BC consuming the same LQF diet. Thus, there was not only a 15% increase in energy intake and resultant improvement in performance, but cost per unit of energy intake was reduced by about 2.6% .
Sources of Funds: Hatch, Other
Scope of Impact: Intermountain West

Goal 4: Greater harmony between agriculture and the environment.

Overview

The potential for the sage grouse to be listed as an endangered species is a very real threat to agricultural and grazing practices. Many agencies and individuals have worked very hard to find answers to assist these and other species and maintain the greater harmony. Extension has been a key player in the facilitation and education effort and the Utah Agricultural Experiment Station has been an active participate in applied research efforts.

Water is a limiting resource in Utah and much of the west. Improved use and efficiency of irrigation water is critical for sustained agricultural production. Great progress has been made in both the improvement of water quality and in the education of a diverse public of their role in the process. Much progress has been made through use of data, improved instruments and communication and applied demonstrations of how to apply all of those.

Noxious and invading weeds present one of the major, looming threats for the grazing and wild lands in Utah. Prevention of introduction is difficult, so early identification and eradication becomes critical.

State Assessment: *The programs offered with Goal 4 address critical issues in Utah. CES and UAES faculties on campus and in the counties are responding very well to local and statewide needs.*

Utah Extension Service
Total Expenditures and FTE:
Smith-Lever: $547,932
State Match: $564,628
FTE: 15.56

Utah Agricultural Experiment Station
Total Expenditures and FTE:
Hatch: $134,506
Multistate: $89,031
Other: $3,477,412
FTE: 18.7

Program Title: Fisheries and Wildlife
Key Theme: Wildlife Management

Description: Sage-grouse in the state currently occupy less than 50 percent of their previous habitat and are one-half as abundant as they were prior to the 1850s. These population declines have prompted several environmental organizations to petition to list the sage-grouse as endangered. Extension is working with local groups to assist state and local governments and private landowners in conserving these species while also achieving local, social, and economic objectives.
Impact: Through Extension's efforts with local groups there is improved sage-grouse habitat on over 5000 acres. The Parker Mountain Adaptive Resource Management Working Group has received a $350,000 wildlife habitat improvement grant. The grant will be used to implement management projects over the next 10 years to benefit sage-grouse.
Sources of Funds: Smith-Lever, State
Scope of Impact: UT

Key Theme: Wildlife Management
Description: Extension has published a manuscript evaluating the use of temporary signs to reduce deer-vehicle collisions. Extension developed a web site (www.wildlife crossing.info) on wildlife crossings to assist transportation and wildlife agencies to mitigate the impacts of transportation systems on wildlife.
Impact: The signs reduced deer-vehicle collisions by 50% in test areas resulting in costs saving in excess of $1 million.
Sources of Funds: Smith-Lever, State
Scope of Impact: UT

Program Title: Water Quality
Key Theme: Water Quality
Description: There is more storm water runoff in cities than in forests and fields as water can't soak through the pavement, rooftops, and concrete, like it can into the soil and flows straight into storm drains, which carry the water to local streams or lakes. The streams in watersheds with more than 10% impervious cover will probably have impacted water quality. The more impervious cover there is, the greater the risk.
Impact: The study has shown that total phosphorus, several metals, fecal coliforms and total suspended solids increase dramatically in receiving waters following storm events. The percent impervious area in that contributing landscape is highly correlated to phosphorus, lead, nitrogen and potentially other metals.
Sources of Funds: Smith-Lever, State
Scope of Impact: UT

Program Title: Irrigation Management
Key Theme: Drought Prevention and Mitigation
Description: The long term goal of the USU Irrigation Management program is to develop ongoing, proactive programming related to water quality and quantity issues in agriculture and landscape horticulture. The current priority was to address information and programming needs related to the drought situation in the West.
Impact: Extension's improved water measurement for PacifiCorp resulted in reduced likelihood of litigation and much better accounting of water availability. The value of water measurement improvements is estimated to be well over $150,000 a year.
Sources of Funds: Smith-Lever, State
Scope of Impact: UT

Key Theme: Drought Prevention and Mitigation
Description: Lysimeters were maintained by Extension for the third year at Murray Golf Course, Sunbrook Golf Course, and the BYU Spanish Fork turf grass plots, and for the 12th year at the Logan Golf and Country Club. The weekly water budget data are being used to determine crop coefficients for estimating turf ET state wide. Preliminary results have been used to estimate turf grass ET coefficients for use in Utah.
Impact: As a result, calculated turf irrigation water requirements indicate that many urban communities could reduce irrigation use by more than 40% and still supply adequate water to landscapes.
Sources of Funds: Smith-Lever, State
Scope of Impact: UT

Program Title: Noxious Weeds
Key Theme: Natural Resources Management
Description: The wildfire model for managing invasive wild land weeds developed at USU continues to guide both local and national strategies, including the National Invasive Species Management Plan developed by the National Invasive Species Council for federal agencies within the Departments of Interior, Agriculture, Defense, and Transportation. USU's fire model

for weed management has been influential in the development of the National Park Service's Exotic Plant Management Team program.
Impact: Weed identification and weed control skills of over 1200 BLM and other public land managers were improved through training received from USU Extension Weed Specialist.
Sources of Funds: Smith-Lever, State
Scope of Impact: UT

Program Title: Pasture Development, Reclamation, and Quality
Key Theme: Other – Intensive Pasture Management and Use
Description: Some livestock species have been shown to benefit from the intensive use of irrigated pasture land. Rotational grazing improves the quality of available forage, assures that a larger portion of the forage is utilized, and can result in higher returns per acre. This research attempts to identify the physical and fiscal feasibility of utilizing intensively rotated, irrigated pastures in Utah with application of new knowledge to the Intermountain West.
Impact: Improved pastures can potentially reduce feed costs by $12.5 million for Utahs dairy producers. Over $2 million in feed costs can be saved for dairy heifers. Irrigated pastures can potentially reduce cattle feed costs by $21 to $30 million.
Sources of Funds: Other
Scope of Impact: Intermountain West

Program Title: Human, Wildlife, and Domestic Livestock Interactions and Compatibility
Key Theme: Natural Resource Management
Description: Application of animal wastes in excess of plant needs can contribute to water pollution. Nitrogen transformations are of particular concern due to the potential for excess N to be transported off site. Appropriate use of animal wastes requires predictive ability for the release of nitrogen from organic forms and subsequent conversions.
Impact: As waste N content varies considerably, producers are being advised to base waste application rates on actual N analysis. Estimates of 10% mineralizable N in the first year and 5% in the following year were reasonable predictors of available N in compost based on yield comparisons. Peak plant N demand can easily be met by compost, but continued high N mineralization after harvest makes nitrate leaching post-growing season and the next spring likely. Careful management of dairy compost needs to account for soil accumulation of available P & K, mineralizable N and the timing of N release from these multiple year applications.
Sources of Funds: Hatch, Other
Scope of Impact: Intermountain West

Key Theme: Natural Resource Management
Description: Farmers/ranchers continually request research-based information on site-specific systems that conserve energy and natural resources. However, new methods must be developed that are less-expensive than those currently used in high-value crops.

Impact: Two farmers directly impacted by this project saved money as a result of the research based information. One saved over $10,000 in fertilizer and pesticide application costs due to geospatial technologies. A second saved over $16,000 by using the information generated by this project (malfunctioning center-pivot nozzles were identified with satellite imagery, and corrected). These are just two farmers of over twenty-four that were directly impacted by the results of this project.
Sources of Funds: Hatch, Other
Scope of Impact: Western U.S.

Key Theme: Natural Resource Management
Description: Severe drought, currently entering the sixth consecutive year, continues to plague Utah and much of the Western U.S. Demand for water to irrigate urban landscapes is increasing in the Intermountain West while water supply varies greatly with desert-driven climate conditions. Demand is driven largely by irrigation of residential, commercial and recreational landscapes. Many cities in the Intermountain West are adopting water conservation measures to reduce demand. Low-water-use landscaping with drought-adapted plants, is a major component of these water conservation measures.
Impact: Water audits conducted consistently show approximately two-thirds of water used is applied to outdoor landscapes. An impact of the pot-in-pot nursery project is the interest shown by a large, local nursery. They have invested in the continuation of the research at their facility and have partially funded a master's level research project for a Utah State University student. Initial results of the Big Tooth Maple mound layering propagation bed study indicate a strong potential to produce one plant per square foot per growing season.
Sources of Funds: Other
Scope of Impact: Western U.S.

Key Theme: Natural Resource Management
Description: Municipalities across the U.S. face increasing development pressures that can irreversibly alter the quality of life in their communities. The challenge is especially acute in Utah, where population is expected to increase more than 70% over the next 25 years. To assist stakeholders in assessing the impact of such growth pressures, USU researchers used satellite images of past development patterns to spatially predict the likely location of new development between 2000 & 2030. These projections were then used to spatially estimate the loss of prime agricultural soils, as well as identify areas of future conflict where ecologically important locations are likely to be displaced by development.
Impact: The open space plan developed by USU was recently adopted by the 5-county Wasatch Front Regional Council to guide open space planning across a region of nearly 10,000 square miles.
Sources of Funds: Other
Scope of Impact: Western U.S.

Key Theme: Natural Resource Management
Description: Public land managers should include input from society regarding natural resource use. Citizens in different parts of the U.S. respond differently to proposals for public land

management. Land managers are learning they must avoid "one-size-fits-all" approaches for public education about proposed activities.
Impact: Our study of a Colorado school for ranchers found that changes occurred not simply because of the school, which has been highly publicized in recent years, but also because federal range managers showed grazing permittees how the changes were both beneficial and necessary for public as well as private land. As a result, new efforts are being launched to teach public land managers in other states about the potential for fitting new grazing practices to specific federal lands.
Sources of Funds: Other
Scope of Impact: Western U.S.

Key Theme: Natural Resource Management
Description: Increasing demand for and use of water will tax available resources, could degrade water quality and quality of human life, and could harm ecosystems and wildlife habitat.
Impact: The optimization techniques developed typically provide management strategies that are 20 percent better than those developed using simulation modeling techniques alone. These techniques will be very beneficial and will save millions of dollars as they are applied worldwide for contamination remediation.
Sources of Funds: Other
Scope of Impact: Irrigated Areas Throughout U.S.

Key Theme: Natural Resource Management
Description: A variety of management practices are needed to reduce wildfires and rehabilitate burned rangelands in the Great Basin. Traditional wildfire rehabilitation practices in the Great Basin can be costly, and can replace diverse, native plant communities with very simple plant communities dominated by seeded species like crested wheatgrass.
Impact: Recently completed research indicates that cattle can be used to reduce the biomass of crested wheatgrass seedings and disperse seeds of desirable, native plant species (by eating and depositing seeds in dung) to gradually increase the diversity of the seedings.
Sources of Funds: Other
Scope of Impact: Western U.S.

Key Theme: Natural Resource Management
Description: Each year ranchers spend about $5 billion to control invasive non-indigenous weeds in pastures and rangelands.
Impact: The results of this model demonstrate that it is possible to develop a GIS-based model of invasive weed spread and management. Our simulation of a leafy spurge infestation in Boxelder County, Utah shows that managers can select alternative treatment strategies and technologies to find the most cost-effective treatment for the long-term. For leafy spurge in Boxelder county, it was found that the most cost-effective treatment for the entire infestation would be either 2,4-D at 1.5 quarts/acre or Imazapic at 7 oz./acre. The greater impact of this research is that such a simulation can be conducted and that alternative weed treatment strategies can be simulated on a landscape to determine the most efficient weed treatment strategy.
Sources of Funds: Other
Scope of Impact: Western U.S.

Key Theme: Natural Resource Management

Description: This research will show how simple strategies that incorporate behavioral principles in management can markedly improve efficiency and profitability of agriculture, the quality of life for managers and their animals, and the integrity of the environment.

Impact: Several producers are experimenting with using supplementation to alter use of sagebrush by livestock, with the potential to increase net profits on some sagebrush-steppe ranches as much as 30% as they realize previously unutilized forage, enhance grass and legume productivity, and reduce costly treatment expenses involved in mechanical and chemical means for controlling sagebrush. Changing the culture of cattle to use landscapes in a more sustainable manner at the Nature Conservancy's Red Canyon ranch in Wyoming saved that organization more than a million dollars compared to fencing the stream corridors. Training cattle to avoid eating larkspur on high mountain pastures or changing the timing of grazing in some areas can save an average rancher with about 300 cows as much as thirty thousand dollars a year in many parts of Utah and Idaho. A producer in Eastern Montana has used behavior to train his cattle to eat the best and leave the rest, resulting in improved rangeland health and his being offered grazing leases at well below market rates, resulting in a net financial benefit of around $70,000 per year on a 200 cow operation. Feeding bison has been notoriously problematic, but understanding behavior led one producer to explore alternative strategies that allowed animals to range more freely and select from a choice of alternative foods. The animals rewarded his efforts with above average gains and cost savings between twenty and twenty-five cents per pound of gain, or about $140 per animal.

Sources of Funds: Other

Scope of Impact: Intermountain West

Key Theme: Natural Resource Management

Description: The purpose of this project is to develop methods for animal feeding operation manure (wastewater and nutrients) management using integrated facultative ponds (IFP) in northern, arid climates.

Impact: Based upon the results of this project, two ponds have been designed, constructed and are being used in the state. These IFP systems are reducing the nutrient concentrations by 80 to 95%. Both owners have changed the way they operate their manure handling systems from manure input through final disposition. Due to nutrient reduction, the pond liquids can be applied to the farms land resources more uniformly and without exceeding the agronomic rate for the crops and soils.

Sources of Funds: Other

Scope of Impact: Western U.S.

Key Theme: Natural Resource Management

Description: Wildlife damage is a major problem for U.S. agricultural producers, who each year suffer over $2 billion in losses despite spending an additional $2 billion and 90 million hours trying to prevent the damage. Sandhill crane damage to newly planted cornfields was analyzed to see if it could be reduced by providing the birds with diversionary food.

Impact: In control fields, 23% of the sprouted corn seed were eaten by cranes and damage in four of them was so extensive that the farmer had to replant at least part of them. Crane damage to baited fields averaged 7%, and none of these fields required replanting. The benefit:cost ratio for this practice was 20:1 indicating that the use of diversionary food can be an effective method of reducing crane damage in fields where damage historically occurs. However, it cannot protect fields that are suffering from crane damage for the first time or where crane damage is sporadic.
Sources of Funds: Other
Scope of Impact: U.S.

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

Utah State University Extension (CES) and Utah Agricultural Experiment Station (UAES)
Progress Report on Plan of Work Goals: 2004

Overview

Extension and the Agricultural Experiment Station partner with key individuals, groups and agencies representing a variety of educational, research, business, public and private organizations to provide services that improve the quality of life for Utah families and communities. USU Extension is one of the founding partners in "Wingspan," a statewide policy dialogue on rural issues. This culminated in the Utah legislature creating the Governor's Rural Partnership Board, which includes a seat for USU Extension. The Board conducted an extensive issue surfacing activity throughout the state in 2004, which serves as an exemplary external needs assessment for Utah State University's programming pursuant to Goal 5.

Utah is number one in the nation in the number of personal and business bankruptcies. One program developed by USU Extension, the PowerPay program, is recognized nationally as a system for consumers to utilize in managing and reducing personal debt.

Utah's Youth and Families with Promise program is designed to address youth problems through early intervention with at-risk youth and their families. It is based on a two-level mentoring approach utilizing college age mentors who work directly with the identified youth and retirement-age mentor couples who work with the parents and other siblings.

Small manufacturing businesses in Utah benefit from the Utah Manufacturing Extension Program (MEP). Extension helps small manufacturing companies develop strategies, access the latest technologies, and implement the newest management and manufacturing practices.

Home-Based Business/Entrepreneurship is another area where Extension is assisting citizens in Utah. Since 1970, small businesses have accounted for nearly all the new jobs that have been created. The "Ca$hing in on Business Opportunities" curriculum was developed to provide business management information to potential and existing business owners. Extension agents are becoming business information providers to clients, helping them enhance the management of their businesses.

Extension helps business owners in rural communities with E-Commerce. Agents are teaching small/micro business owners to expand their market reach through the use of e-commerce.

The Western Region Community Development team (sponsored by CES and UAES) planned and implemented the Community Vitality Initiative training, which taught basic community and economic development principles to Extension agents and stakeholders through the western region. The Youth City Council program allows teens to experience and contribute to the success of their local municipal governments.

State Assessment: *The Goal 5 program areas are very effective in helping Utahans improve their quality of life. The demand for financial services, family life programs, 4-H, and community development remain strong in Utah. Extension and Agricultural Experiment Station faculties on campus and in the counties are responding well to local and statewide needs.*

Utah Extension Service
Total Expenditure and FTE:
Smith Lever: $472,574
State Match: $486,973
FTE: 13.42

Utah Agricultural Experiment Station
Total Expenditures and FTE:
Hatch: $143,046
Other: $939,519
FTE: 3.2

Program Title: Family Financial Management
Key Theme: Family Resource Management
Description: Utah is number one in the nation in the number of personal bankruptcies. A six unit curriculum entitled “Take Charge of Your Money” has been developed by USU Extension faculty
Impact: Evaluations from meetings associated with this curriculum indicated that 19 counties will facilitate the "Take Charge of Your Money" program; eleven counties intend to facilitate the TCOYM program in Spanish; fifteen counties will assist with the TCOYM over Distance Education, and sixteen counties will conduct a Money Camp for their 4-H youth.
Sources of Funds: Smith-Lever, State
Scope of Impact: UT

Program Title: Families and Youth at Risk
Key Theme: Children, Youth, and Families at Risk
Description: Utah's Youth and Families with Promise Program (YFP) is designed to address youth problems through early intervention with at-risk youth, ages 10-14, and their families. YFP is a two level mentoring program (young-adult individual mentors and grandparent-age mentor couples) designed to reduce and prevent delinquent behavior.

Impact: Parents, youth, mentors and teachers were surveyed using a post-then-pre design which showed statistically significant improvement ($p < 0.001$) in nearly every area surveyed. Focus groups held with parents and also with mentors revealed very positive impacts.
Sources of Funds: Smith-Lever, State
Scope of Impact: UT

Program Title: Business Retention and Expansion
Key Theme: Promoting Business Programs
Description: The Manufacturing Extension Partnership (MEP) is a non-profit organization chartered with raising the level of competitiveness, performance, and profitability of Utah's manufacturers. Small and mid-sized manufacturers account for more than half of U.S. production. The MEP leverages state and federal support, along with a network of Utah-based public and private resources to assist in providing services to manufacturers.
Impact: Fundamental to MEP's approach is the focus on their clients' bottom line impacts. The American Society for Training and Development completed an economic impact study for MEP Utah. The study evaluated the impact of 40 projects. The results showed that the MEP Utah could be credited with creating or retaining 1,055 jobs, retaining or increasing sales by $122 million, and $474 million in industrial output. These jobs and sales increases resulted in an increase in state tax revenues of $2.2 million.
Sources of Funds: Smith-Lever, State
Scope of Impact: UT

Program Title: Home Based Business Development
Key Theme: Home-based Business Education
Description: Business owners in rural communities do not have easy access to resources to help them develop or improve an Internet site, so a small core of Extension agents were trained to assist them.
Impact: Several small/micro business owners are expanding their market reach through the use of e-commerce.
Sources of Funds: Smith-Lever, State
Scope of Impact: UT

Program Title: Community Organization and Leadership Development
Key Theme: Youth Development/4-H
Description: Technical assistance and support have been given to the 100+ Youth Councils sponsored by Cities and Towns throughout Utah. Statewide Leadership Institutes are planned and carried out to bring Youth Council members from all parts of Utah together.
Impact: Ninety-three percent of the 2100 Youth City Council members who attended Leadership Institutes rated the Leadership Institutes as "excellent" or "good" and ninety-two percent indicated they planned to adopt practices taught at the Institutes.
Sources of Funds: Smith-Lever, State
Scope of Impact: UT

Program Title: Community Planning and Design
Key Theme: Youth Development/4-H
Description: Extension provides youth educational opportunities in design, planting, and maintenance of landscapes using real life landscape plans.
Impact: Hundreds of trees and shrubs were planted in Beaver County and drip irrigation was installed to each plant. Nearly all plants survived and students gained a valuable experience.
Sources of Funds: Smith-Lever, State
Scope of Impact: UT

Key Theme: Impact of Change on Rural Communities
Description: Extension provides rural communities with design services for parks, trails, open space and other recreation related facilities. Inputs required include base information, community needs, wants and concerns, committee representation, and progress reviews.
Impact: Communities throughout Utah are in various stages of implementing plans developed with the assistance of USU Extension. Fairgrounds, parks, nature centers, community entrances, parking and turnaround spots, picnic areas, public works facilities, and county sheriff's offices have benefited from USU's design services. These projects conserve water through water conserving landscapes and protect the environment by using sound design principles.
Sources of Funds: Smith-Lever, State
Scope of Impact: UT

Program Title: Economic Development
Key Theme: Jobs/Employment
Description: Sixteen workshops or presentations were taught involving 415 program participants in economic development strategies such as strategic planning, business retention and expansion, innovation and business incubator development, and heritage tourism.
Impact: Targeted economic development programs make a critical difference to Utah communities, businesses and individuals by providing information, expertise and assistance that is helpful in evaluating the impact of economic choices on strategic development options and opportunities such as business recruitment, entrepreneurship, innovation and business incubator development, heritage tourism, and business retention and expansion.
Sources of Funds: Smith-Lever, State
Scope of Impact: UT

Program Title: Youth and 4-H
Key Theme: Youth Development/4-H
Description: Extension agents and specialists are involved in providing a variety of traditional contests, camps, service opportunities, carnivals, fairs, classes and clubs including Family and Consumer Science, Environmental Science, Livestock, Horse, Dairy, and other clubs for Utah youth. The 4-H program is a "learn by doing," youth education program for boys and girls in the 3rd through 12th grades. Projects are chosen among 100 project areas or created by the youth and leader. During the past year, youth participated approximately 298,330 times in 4-H activities.
Impact: In an effort to document the impact of 4-H on the lives of 4-H members, 109 4-H stories were reviewed in 2004 and examples of asset development recorded for 12 developmental assets. According to these 4-H members, 4-H is makes a positive difference in

their lives. 79% of these 4-H members described being actively engaged in learning; 64% talked about adults who modeled positive, responsible behavior; 61% felt they had gained confidence in their personal abilities; 60% mentioned the support they felt from their families; 47% recognized the value of hard work; 46% felt more competent in relationships; and 46% described adults in their lives that encouraged them to do well.
Sources of Funds: Smith-Lever, State
Scope of Impact: UT

Program Title: Family Training, Development, and Assistance
Key Theme: Health
Description: Dietary calcium absorption by the intestine declines with age and may contribute to age-related problems with bone mineral metabolism.
Impact: Calcium and phosphate absorption by intestine decline with age. A significant portion of the decline is loss of the rapid vitamin D metabolite (1,25D)-induced stimulation that is mediated by a novel membrane receptor, rather than the classical nuclear receptor. For age-related onset of osteoporosis, the 1membrane receptor presents a new pharmacological target to enhance mineral absorption. The implications for agriculture are that this pathway should provide a target to increase phosphate absorption in production animals, and minimize the mineral in manure which leads to eutrophication of waterways.
Sources of Funds: Other
Scope of Impact: U.S.

Key Theme: Health
Description: Eighty-eight percent of children are regularly preparing food for themselves and others. Utah State University, Safe Food Institute, LetterPress Software, and the Partnership for Food Safety Education collaborated to develop Children Fight BAC!, a series of four comprehensive, instructional computer modules to teach 5th-8th grade students both "how" and "why" they need to handle food safely at home to protect themselves, their families, and their friends from foodborne illness.
Impact: One month after using the modules, sixth grade students had a 24% increase in retained food safety knowledge and an 80% increase in time spent washing hands during in-class food preparation activities.
Sources of Funds: Other
Scope of Impact: U.S.

Key Theme: Health
Description: EPA currently recommends no further treatment of water to be stored in the home if drawn from a chlorinated municipal source.
Impact: Samples of water which had been stored in Utah homes for emergency use were tested for microflora and residual chlorine. Water samples stored from 2 months to 40 years all showed some microbial counts. All samples had chlorine below detectable levels using the chemical strip test. Recommendations must be made that all stored water have chlorine added to ensure safety for emergency use regardless of source.
Sources of Funds: Other
Scope of Impact: Western U.S.

Key Theme: Family/Community Relationships

Description: The migration of young and middle-age adults into and out of rural places is known to affect the social and economic welfare of rural areas.

Impact: This study has shown that non-Hispanic blacks and Hispanics are much less likely than non-Hispanic whites to continue moving once they have arrived in a place and but are approximately equally likely to return to a place that they have lived in before. When there is a period of strong economic growth, movement into rural places with amenities (e.g. vacation-type areas) is much more likely than in periods of economic stagnation or decline. However, periods of economic growth are not associated with a reduced out-migration from rural areas without natural amenities.

Sources of Funds: Other

Scope of Impact: Western U.S.

Underserved Minority Output Indicators and Outcomes in 2004

In 2004, nine counties received Civil Rights update training and review. County training included an introduction of how to establish reasonable criteria for reaching the underserved with all reasonable effort. Demographic profiles detailing ethnic and minority parity goals were discussed with counties and information was utilized to establish county contact goals furthering the implementation of the 2004-2008 Civil Rights Performance Plan. Every county completed an annual report of accomplishments outlining their applications and plans for each of the performance goal areas.

Indicators of Success

The face to face contact data reported by Cooperative Extension faculty and staff has improved substantially over the past three years. The utility of the FOCIS reporting system has created a reliable database of information with which to make contact comparisons from year to year. Revised demographic data from the US Census projections of July 1, 2002 have provided baseline information from which to make comparisons. USU Extension is currently serving an equivalent of 33% of the Utah population. The Civil Rights goals have been to serve this same approximate percentage with every ethnicity represented in the general Utah population. During the past year Extension has made significant strides in reaching Hispanic populations 2003 – 19% 2004 – 29.8%, with the exception of Asian and Native American populations. The 2004 contact data indicate that we are serving with increasing equity both males and females in the Utah population Females 2003-55%, 2004-52.7% and Males 2003-45%, 2004-47.3%.

Face to Face Contact Reporting Summary 2004					
Ethnic Group	% Utah Total	UT Ethnic Population	% And Number Population Reached in USU Cooperative Extension Program – 2004 (Revised Census Figures July 1, 2002) Race alone or in combination with one or more races		
			% Served	**No. Served**	**Gender**
White	90.2%	2,199,291	29.3%	645,898	Males
Black	0.8%	29,814	27%	8,054	350,194 (47.3%)
Hispanic	9.7%	224,302	29.8%	66,930	Females
Am Indian	0.8%	43,027	20.7%	8,939	389,531 (52.7%)
Asian	1.8%	55,150	17.9%	9,904	

Other forms of Extension Contact

For the first time, USU Extension gathered non-face to face contact information. Increasingly Extension is conducting more of its business vicariously through electronic means (email and phone), newsletters and other non-electronic correspondence and program announcements. The table below provides an indication of the volume of these contacts statewide.

Electronic, Newsletter and Correspondence Contact Summary 2004						
Contact	Ag NR	ComDev	FamSci	4-H	CEd	Totals
Email	57,168	4,868	20,504	71,596	1,122	155,258
Phone	61,466	3,458	30,414	30,632	958	126,928
Newsletters	588,483	2,063	114,774	111,654	50	817,204
Nonelectronic/ Program Announcements etc	1,269,421	9,867	60,650	300,337	28,304	1,668,579

Representative highlights of some of the outstanding work conducted by Utah State University Extension faculty as they served the underserved and minority populations in the state are enumerated below.

Youth and Families with Promise Activities in Tooele County

The Tooele County staff initiated activities to encourage at-risk youth and families to spend time together in constructive activities. In October, family units decorated over forty pumpkins in a patriotic theme. The YFP used the pumpkins in an exhibit at the Bensen Grist Mill Pumpkin Walk. Other activities have included a served traditional thanksgiving dinner with the theme of "Gratitude." A service project was carried out by the youth of the 4-H club where they made decorations for a Christmas tree to be donated to the Festival of Trees.

Impact: The tree was sold and the money donated to Primary Children's Hospital.

Latino Heritage Club trip to Mexico
The Extension staff in Cache organized a 4-H club and planned a service-oriented trip to Mexico for Latino youth. They were involved in their own fundraising and planned the activities that they would engage in Mexico, including giving school supplies to a local school, working on a ranch and seeing the sites of Mexico.
Impact: Youth learn an important lesson in setting and achieving goals. Cultural understanding was promoted as these youth provided service to others in need.

Cache Employment and Training Center
The Extension staff in Cache County was involved with the underserved audience of adults with severe mental and physical disabilities. The clients who are involved at the Cache Employment and Training Center were invited to participate in Farm Field Days at the County Fairgrounds.
Impact: An identified underserved group received the opportunity to expand their understanding of the agricultural community predominant in this valley.

EFNEP/FNP Programs
In Weber and Davis Counties, the focus of the FNP program is towards limited income senior citizens. The staff primarily works with groups, but also teaches some clients individually. This year, classes were taught at six rent-subsidized apartment complexes and four community senior centers. All of the clients were on Social Security or Social Security Disability. Sixty-three were on food stamps and ninety-eight used commodities. EFNEP/FNP clients also have varied backgrounds. The Giving Your Body the Best curriculum that has been specifically written for these populations by the Utah Extension staff provided information in an easy to understand format and is culturally sensitive. A culturally sensitive foods and nutrition curriculum has been specifically written and presented to ethically diverse populations in Weber and Davis Counties which is meeting the needs of many of these underserved and economically disadvantaged populations for information to promote healthy life styles.
Impact: The responses by the participants are all positive and illustrate the life-changing nature of the courses. The majority of participants were from a lower socioeconomic background and included a broad array of diverse and ethnic populations in the community.

Hispanic Milking Schools in Cache County
In an effort to reach an underserved demographic in Cache County, staff organized a series of Hispanic Milking Schools which were held at different times at the USU Caine Dairy and delivered in Spanish. Each class was formatted with two major presenters who spoke about proper dairy calf care and taught participants about proper milking procedures. Participants were awarded with a Certificate of Participation which entitled them to free English classes at the English Language center.
Impact: These courses were extremely helpful to this underserved Hispanic working community in Cache County as it improved their job skills, helped improve their English competencies and connected them with the opportunity to attend future English classes.

Latino Dairy Workers Immigration Workshop
In April the Cache County staff reached out to individuals in the Cache County Latino community who wanted to become U S citizens. The Legal Immigration Family Equity Act provided a temporary opportunity for Latino workers to apply for US Citizenship.
Impact: Over 60 farmers and Latino farm workers met with them for most of the day. Much of that time was spent filling out forms and documenting employment status. Also assisting in the process were the Utah Office of Hispanic Affairs, the U S Department of Immigration Services, the Utah Hispanic Advisory Council and the law firm of Bearnson and Peck.

Sheep and Wool Field Day in San Juan County
The San Juan County staff organized a sheep and wool field day in June, 2004 at the historical Hubbell Trading Post which is now a National Park on the Navajo Nation. J.L. Hubbell was an innovator in marketing Navajo textiles during the late 1800's, and his presence is still felt in the Navajo weaving business.
Impact: There were 57 Navajo people in attendance, and also many tourists who stopped in at the proceedings while they visited the trading post. It was a very successful hands-on type of program for people interested in the weaving process. Collaboration and participation by Native American members demonstrated the usefulness of information received and helped to further solidify relationships which will facilitate additional programs in this community.

Centro De La Familia-USU Extension Agreement
The Cache County staff was instrumental in orchestrating an alliance between the Centro de la Familia de Utah and the Mexican Consulate in Salt Lake City to implement Plaza Comunitaria Community Learning Centers in seven Centro de la Familia Facilities in South, Center and Northern Utah. CLFDU will provide facilities and instructors and USU Extension will provide satellite antennas to send USU Extension education programs. **Impact:** These programs will be monumental in meeting some of the educational needs of the Hispanic community with native resource materials, language and technology skill improvement and facilitating collaborative relationships with other service providers to the Hispanic community.

4-H and Community Projects in Salt Lake County
The Salt Lake County Extension team has been extremely involved in serving the underserved members of Salt Lake County. Many of their projects were aimed at low-income, high-risk youth and families and included a rich representation of all ethnic groups. They partnered with the Utah Family Center to teach three sessions of Survival Skills for Healthy Families. The participants were referred through the court system to meet court ordered parenting/family training requirements. Additionally, their program included a 4-H community fishing club which was organized, implemented and offered twice in partnership with the Department of Wildlife Resources. The two club sessions included 71 youth ages 5-18, along with 20 adult volunteers, including African American, Native American, Hispanic, and Asian participants. This activity involved youth and parents of all backgrounds in developing an interesting hobby as well as a potentially valuable skill. Other programs included the Warm-Up America Project which reached out to the underserved group of youth residents in Decker Lake Youth Corrections Center. Since January of 2004, forty young men have volunteered in a 4-H project

led by senior volunteers. Youth and families at risk have been introduced to programs which will help them to give back to the communities they live in.

Impacts: The boys at Decker Lake have crocheted 254 blankets, 174 caps, 24 booties, and 8 miscellaneous items to be donated to10 community service organizations. The youth exhibited 30 of these crochet projects at the Salt Lake County Fair, and six of the exhibits went to the state fair, of which three received top honor awards.

B. STAKEHOLDER INPUT PROCESS - 2004

The Utah Accountability In Action Program was completed in 2004 for CES and UAES with 28 Utah counties participating in the stakeholder input process. Elements of the program included a customer needs survey; stakeholder reporting and listening session; under-served/civil rights training session; overall operations review session; and a concluding session on revising plans of work and writing better outcome and impact statements using the logic model as a guidance to improved program reporting.

Each of the 28 participating counties conducted a random sample survey of customers to determine customer satisfaction and their future needs based on relevant program issues. Customer satisfaction benchmarks from previous time periods were compared and analyzed. Respondents were asked to rate how important these identified issues were to them and their families in the next five years. Highest priority issues in rank order as identified by stakeholders include: [data from 1418 randomly selected Utah Extension customers 2001-2004]

1. 86% safe foods, healthy diets, sound health practices.
2. 84% strong families, sound parenting.
3. 84% water resources and water resource management.
4. 81% adult's ability and willingness to nurture and guide youth.
5. 80% youth ability to reason, make responsible choices, seek and apply knowledge in new situations.
6. 79% youth character building and life skills; preparation for family; student, work, and civic roles/responsibilities.
7. 78% informed consumers, family financial management.
8. 78% affordability of higher education programs.
9. 75% working with other citizens to address mutual concerns.
10. 71% securing and maintaining an adequate job and income; workforce preparation.
11. 69% retaining and expanding business in my community.
12. 68% participating in public-private activities in which cooperation is high.
13. 66% population pressure on agricultural lands, natural resources and communities; land use planning/management.
14. 66% quality of high tech (web-based, satellite) delivery of courses, degree programs, and training updates.
15. 62% safe/affordable options for child and elder care.

In 2004 the final two counties, Rich and Garfield, participated in the Accountability in Action Program to receive stakeholder input. County Extension staff shared with stakeholders' program output success markers and outcome achievements from their plans of work. The results of the county customer needs survey was shared with stakeholders. The culminating activity involved a listening session where stakeholders shared research agendas for the Experiment Station and gave input to Extension program areas and issues they would like considered. A cross section of program related issue areas identified by stakeholders and subsequently considered in the revisions of individual plans of work by staff in the two counties included:

1. Water quality and watershed management
2. Sustainable livestock and forage production
3. Pest management; gardening and landscape horticulture; noxious weed management
4. 4-H and Youth development
5. Food preservation and canner gauge testing
6. Family nutrition
7. Family financial management
8. Food safety
9. County fair organization and volunteer development
10. Marriage workshops working with adults and teens
11. Enhance extension communications
12. Technology education on beef production and management
13. Help producers of raspberries become more profitable and productive
14. Increase tourism potential

Special efforts were made by each county to insure that underserved populations were invited and made aware of the public stakeholder session. Newspaper advertisements and articles were written, flyers produced and distributed, personal letters sent, posters developed and posted to make the public aware of these stakeholder meetings. Forty-four participants attended the two meetings held in February, and March 2004. Attendance records from these stakeholder input sessions indicate that the majority of Utah's ethnic groups were represented in the discussions, although not in each county stakeholder session.
Based on stakeholder input, Extension staff reviewed and revised individual plans of work in the USU Extension reporting system called FOCIS (Friendly On line Compact Information System) designed to capture program outcomes. Stakeholder ideas were integrated into these plans of work with defined strategies for achieving outcomes in the future.

In addition to the Accountability in Action Program, Utah has developed an integrated process for securing regular stakeholder input into perceived needs, program implementation and assessment. Extension Advisory Councils function in nearly all of the 28 counties of Utah. Many counties have specialty councils involving commodities, issues, and other special interest groups. Now in its fourth year of operation, the statewide Extension Executive Council also meets quarterly to provide input into Utah programs and activities. A concerted effort is made by Extension administration to consider the views from these councils in designing, developing and orchestrating programs for the citizens of Utah. These councils provide representative views of the constituent groups they represent.

Stakeholder input into the programs of Utah Extension and the Utah Agricultural Experiment Station has been broad and varied. The elements of the Accountability in Action Program, Compact Planning, environmental scanning efforts, and advisory councils have all contributed to an open and fair process for stakeholder input in Utah. A new stakeholder process for succeeding years is now being developed which will engage the public in refining the programs being offered by Extension and the Utah Agricultural Experiment Station in the future.

C. PROGRAM REVIEW PROCESS

Merit Review Process – Extension Plan

There have been no significant changes in the merit or project review processes for the five-year plan of work.

Scientific Review Process – Agricultural Experiment Station

There have been no significant changes in the scientific review process employed by UAES. The procedures outlined in the five-year plan of work still are in effect.

D. EVALUATION OF THE SUCCESS OF MULTI AND JOINT ACTIVITIES

1) Did the planned programs address the critical issues of strategic importance, including those identified by the stakeholder?

The planned program areas for the Utah Agricultural Experiment station are: *(1) Plant and Animal Health and Safety, (2) Agricultural Product Enhancement, (3) Pasture Reclamation, Development, and Quality, (4) Human, Wildlife, and Domestic Livestock Interactions and Compatibility, and (5) Family Training, Development, Assistance, and Sociology.*

The planned program areas for the Utah State University Extension Service were *(6) Agronomy/Crop Production, (7) Horticulture, (8) Livestock, (9) Safe and Secure Food and Fiber System, (10) Nutrition and Health, (11) Rural and Community Forest Extension, (12) Sustainable Livestock Production, (13) Rangeland Resources Extension, (14) Noxious Weed Control, (15) Families and Youth at Risk, (16) Business Retention and Expansion, (17) Economic Development Planning, (18) Youth and 4-H, (19) Sustainable Agriculture, (20) Integrated Pest Management, (21) Utah Pesticide Impact Assessment Program, (22) Expanded Food and Nutrition Education Program, (23) Statewide Water Quality Education and Technical Support, (24) Non-point Source Pollution, (25) Renewable Resources Extension Act, and (26) Native American Programs.*

The relationship between the program areas identified above and the stakeholder issues identified below are indicated by various superscripts, where the superscript value corresponds to the number associated with the planned program area. These stakeholder issues were identified in the process described in this document, as well as the initial Plan of Work for Utah State University's Extension Service and Agricultural Experiment Station.

Improving production efficiency [1, 2, 6, 7, 8, 12, 13, 20]
Preserving farmland and open spaces [4]
Determining ways of enhancing quality of life and improving family life [5, 15, 16, 17, 18, 22, 26]
Identifying the important relationships between work and family [5, 15, 16, 17, 22, 26]
Developing socially acceptable methods of water conservation and use [4, 23, 24, 25]
Developing alternative crops and enhance existing crops [1, 2, 6, 7, 19, 20]
Expanding study of intensively managed pastures [3, 6, 8, 12, 20,. 23, 24]
Investigating best methods of waste control and disposal [4, 9, 12, 21, 22, 24, 25]
Expanding marketing options for farmers [2, 6, 7, 8, 9, 11, 12, 16, 17]
Developing better methods of weed control/management [1, 2, 3, 14]
Developing methods of identifying and controlling animal and plant diseases [1, 2, 6, 7, 8, 9, 12]

2) Did the planned programs address the needs of under-served and under-represented populations of the state(s)?

- Under-served Minority Output Indicators and Outcomes

Research, for the most part, is neutral with respect to majority versus minority output and outcome indicators.

- Output and Outcome Indicators

Where possible, we would prefer to utilize prices to reflect the value of various goods and services. Where no market prices exist, reliance on physical measures become necessary.

3) Did the planned programs describe the expected outcomes and impacts?

The planned programs, as developed in the 1999 Plan of Work submission does describe expected outcomes and impacts in sufficient detail to provide a means of evaluating their effectiveness. See original Plan of Work submitted by Utah, with the 2000 amendment provided by Utah State University Extension and the Utah Agricultural Experiment Station.

4) Did the planned programs result in improved effectiveness and/or efficiency?

There are many planned programs at USU that are resulting in improved effectiveness and efficiencies. For example, the livestock pooling programs, feed rationing, soil sampling, and agricultural research programs are all leading to more efficient and effective agricultural practices in Utah. The USU Food Safety Managers Certification Course has increased the effectiveness of mandated food safety manager training in Utah. The pest suppression efforts of USU and Utah's regulatory agency helped quarantine the Plum circulio (PC), insect pest in northern Utah, from other Utah counties in keeping their export markets open and is valued at $2.4 million/annually. The Expanded Food and Nutrition Education Program is helping people to improve their food resource management practices, nutrition practices, and food safety practices. Examples of a few of the Natural Resource/Environmental programs that are making a difference are the biosolids disposal (municipal waste) program; the water quality,

conservation, and education program; and the managing wildlife program, the latter having saved an estimated $200,00 for farmers and ranchers in wildlife damage. Programs improving the effectiveness of constituents include the financial management programs that are helping individuals and families to get out of unnecessary debt, the business programs that help new businesses get started and established business to expand. Overall, USU Extension and Experiment Station's planned programs have resulted in improved effectiveness and efficiency for government, the private sector, and in some cases, the nonprofit sectors of Utah's economy.

E. MULTISTATE EXTENSION ACTIVITIES 2004

Brief Outcome Summaries of Multistate Extension Activities

- Agronomy/Crops

Onion Pest Management Strategic Report: Extension staff organized meetings to discuss crop growth stages, production facts, regional expectations, pest management concerns, critical needs list, and formulate a working document that covers the NW USA onion production areas. The meeting addressed current needs to assist onion growers in gathering information to ensure that regional pest management issues (weeds, insects, diseases, etc) are adequately addressed. In addition to the meeting, additional assignments were generated and a timeline for completion was set for (summer 2004). The decisions affected onion growers, researchers, and extension personnel from Washington, Oregon, Idaho, Utah and Colorado. They met in Boise for two days to develop a PMSP for dry bulb onions. These plans are grower initiated and indicate what the critical needs are with regard to weeds, diseases, insects and pests of onions.

Tri-State (UT, AZ, NV) Extension Pesticide Project: Pesticide Applicator Training is a responsibility that is shared with the various state Departments of Agriculture. St. George is in close proximity to Las Vegas, Nevada as well as the Arizona border. Pest control operators may even work in all three states. Extension workers from Nevada and Arizona together with USU Extension, put together an educational training program in cooperation with Helena Chemical (sponsor). They identified topics that are of importance to the area as well as subjects that needed to be covered to assist in earning CEUs needed for the state PCO licenses. The program was well attended (115). It was an excellent multi-state collaboration effort and was helpful to all of the participants.

UT/AZ Gardening Workshop: Extension staff planned and coordinated a full day gardening workshop. Over 60 people including three American Indians attended the multi-county/multi-state workshop. USU Extension, University of Arizona Extension, Fredonia NRCS and SCD, and the Kanab Beatification committee sponsored and coordinated the workshop.

- Livestock

Kit Pharo Livestock Seminar: Extension staff coordinated a seminar featuring Kit Pharo. Kit is a regionally respected speaker on beef cattle production. His principal focus is matching cattle (size, performance, nutritional demand) with environmental resources. Cattlemen from Idaho,

Nevada, Wyoming, and Utah attended this dinner seminar. Cattle Producers attending this seminar learned the Pharo philosophy of cattle production. Producers using his suggestions could optimize production by matching cattle which their range/forage conditions.

Intermountain Jr. Livestock Judges Training: There is a great difference between champion Jr. Livestock market animals and the real market. Jr. Livestock Shows have become more of a beauty pageant than a quality production program. In order to narrow this differential and strengthen the educational component of 4-H and FFA Jr. Livestock programs, agents in Utah, Idaho, and Wyoming collaborated to offer a three-day Intermountain Jr. Livestock Judges Training at USU. Traditional live animal eye appraisal was used, but live animal ultra-sound technology and actual carcass evaluations and comparisons were added to strengthen the visual with the actual state of the animals. The objective was to train Jr. Livestock Judges to select animals that conform to the real market and produce a quality product for the consumer. It is estimated that Utah Jr. Livestock Shows impact the meat market by nearly $800,000 annually. Skilled Jr. Livestock Judges can greatly impact the quality of Jr. Livestock animals entering the meat market, helping to ensure a consistent and quality product for the consumer. Due to the multistate character of this training, there can be an assurance of higher quality meat in the intermountain west.

Lamb Dock Research and Rule establishment: Extreme tail dock in market lambs is a very serious fad that has spread through Jr. Livestock Shows in the U.S. Utah, in collaboration with 9 states: Idaho, Wyoming, Ohio, Texas, Washington, Arizona, West Virginia and Maryland, have researched docking at the distal end of the caudal fold as recommended by the American Veterinary Medical Association and other national animal science associations. A De-Tail measuring device was developed to give consistent measuring results. The research indicates that if lambs are consistently docked at the distal end of the caudal fold, 99% of all lamb docks will measure .7ths to 1.4 inches, reducing rectal prolapse to less than 1%. The scientific and agricultural impact of this docking practice could generate a savings of $500-$650 for every 100 lambs sold. Educational presentations were given at the Utah Jr. Livestock Assoc., Utah Leadermete, Western Region 4-H Leaders Forum in Alaska and the NIAA (National Institute of Animal Agriculture) professional meetings. The Utah Jr. Livestock Assoc. adopted it as a state rule. To date, Utah and West Virginia are the only two states adopting this rule, but other states are showing increased interest.

UT/AZ Range and Livestock Workshop: Extension staff helped plan, coordinate and facilitate the 26th Annual Utah/Arizona Range Livestock Workshop and Tour held in Kanab and St. George. A segment entitled "Irradiation of Beef: Why We Need It." was well received by nearly all who attended and it was a good collaborative effort with Arizona State. Over 240 people (including 3 male and 3 female American Indians, 1 male Hispanic and 21 females) attended the workshops and tour. The Kanab location had the highest attendance ever with 91 people attending. Workshop participants included a good mix of ranchers and government agency personnel (58% ranchers and 24% agency personnel). A vast majority of the participants expressed satisfied and positive feedback about the Conference.

Kentucky Cattlemen Tour: USU Extension and an agent in Kentucky developed a tour of the

area for a group of cattlemen from Kentucky. The twenty-one participants spent several days in southern Utah and Arizona. Topics included large alfalfa hay operations and techniques, cattle grazing in the arid west, and utilizing mountainous terrain n the cattle industry. Producers were able to share with one another techniques and applications that could be adopted in their various geographical locales.

- Community Development and Business

Nationwide NASA/NACCA "On-Target": USU Extension planned, marketed, and produced the 4th Annual NASA/USDA/NACAA "On-Target" GIS/GPS/RS Training. Over 20 key Extension and USDA professionals, beyond the four regional NACAA "Fellows," paid their expenses to attend this prestigious training, held in SLC, UT.

KSL Radio Greenhouse Show: The KSL Radio Greenhouse Show is the most popular, longest running garden program in the nation. It has cumulative listeners of more than 600,000 each week and combined yearly total of more than 31,200,000 listener impacts. It received much national recognition for quality and community service. This year marked a new era in the history of the radio show. It is now broadcast on three new stations, one in St. George and two in Idaho. This significantly increases the signal in an already very widely broadcast show. It provides current USU Extension information in counties and areas that do not have good radio signals. The KSL web page is another significant addition to the program. Each hour the subjects change on the show and the information discussed is published on the web page. This divides the program into three programs covering different subjects.

Ranch Business Plans: USU Extension was contacted by three different ranches from Utah, Montana and Texas requesting information on developing a whole-ranch plan which would enable them to obtain loans. They were provided with information developed through the Western Integrated Resource Education (WIRE) program, which taught how to maximize ranch resources to obtain the strategic goals set by the ranch management. One of the ranches is in the final stages of planning and is working closely with their lender to finish their business plan. The other two ranches have just begun the process and are working on the initial phases of strategic planning and resource inventories.

UT/AZ Ranch Economic Workshop: USU Extension coordinated a UT/AZ Ranch Economic Workshop. Over 20 participants attended including three Native Americans. The workshop presenters were cooperators from the University of Arizona Cooperative Extension. The course included discussions on Restocking Evaluations, Ranch Finance, and the Right Risk Management Game.

Collaborative Learning Workshop--Caribou National Forest: On January 9-10, 2004, over 40 “stakeholders,” including motorized recreationists, non-motorized recreationists, and natural resource managers from federal and state agencies, gathered in Soda Springs, Idaho, to participate in a Collaborative Learning Workshop regarding recreational travel management planning on the Soda Springs and Montpelier Districts of the Caribou National Forest. The workshop was sponsored by the Theodore Roosevelt Conservation Partnership, facilitated by

Utah State University's Department of Environment and Society and Institute for Outdoor Recreation and Tourism, and hosted by Monsanto Corporation. A Proceedings Report has been published and is available on the IORT website at www.cnr.usu.edu/iort. This Professional Report was made available to the approximately 40 participants in the workshop, and will be used as an informational document for Travel Management Planning in the Caribou National Forest.

- Family and Consumer Science/Miscellaneous

WIN Rockies: WIN Rockies (Wellness IN the Rockies) is a four-year long project targeting behavior change in fitness and nutrition. It involved the University of Idaho, Montana State University, the University of Wyoming, their extension services, their WWAMI Medical Education Programs, the Area Health Education Centers in Wyoming and Montana, and other state organizations and community groups. The program advocates fitness, acceptance of body size, and good health attitudes, rather than diet or restriction. Impact on improving attitudes and behaviors related to food, physical activity, and body image will be assessed in depth at the end of the course in 2005.

F. BRIEF SUMMARIES INTEGRATED UTAH AGRICULTURAL EXPERIMENT STATION

Inventory and Management of Invasive Noxious Weeds
Investigators: Dewey, S. A.
Performing Department: Plants, Soils & Biometeorology -- 1624
Start Date: 07/01/2002 Termination Date: 06/30/2007
Reporting period: 01/01/2004 to 12/31/2004
Progress Report: The wildfire model developed by USU to improve and standardize wildland invasive weed management strategy was presented to public land management personnel at regional and national meetings. Early detection and rapid response to new infestations of exotic weeds is a key element of the model. Utah's many State and National Parks are high-probability points of exotic weed introduction by visitors from around the world. Infestations of invasive weeds could spread from Parks to private agricultural lands throughout the region if not detected and eliminated quickly. Searching and mapping methods were refined and field tested as USU crews surveyed for invasive weeds on more than 40,000 acres of wildlands in portions of Dinosaur, Zion, Arches, Canyonlands, Black Canyon, Cedar Breaks, Bryce, and Capitol Reef National Parks during 2004. Members of NPS EPMT crews were also trained in USU's mapping methods. Weed mapping quality assurance protocols were developed, including the use of plastic replicas of flowering leafy spurge, spotted knapweed, and yellow starthistle plants to test field detection efficiency. Herbicide performance field studies were conducted on squarrose knapweed, leafy spurge, Canada thistle, Russian knapweed, Dalmatian toadflax, downy brome, medusahead on pasture and rangeland sites in Utah; and effective treatments were identified for each species. Herbicide active ingredients included in the tests were picloram, imazapic, dicamba, clopyralid, triclopyr, sulfometuron, chlorsulfuron, metsulfuron, and glyphosate.
Impact: The USU wildfire/weed management model has been incorporated into the core of weed management plans of the Forest Service, Bureau of Land Management, and the National

Park Service, thus influencing land management policy and practices on a national scale. The model has been adopted by all sixteen National Park Service Exotic Plant Management Teams, and was practiced during their 2004 national field training exercise held at Arches National Park. Previously unreported infestations of one or more weed species were discovered in each of the National Parks surveyed by USU crews in 2004, allowing land managers to initiate appropriate eradication measures in a timely manner. Results of herbicide studies conducted under local conditions will provide weed managers with valuable guidance when designing control programs for specific invasive species problems.

Project Number: UTA00103
Multi-State Project: NRSP-4
High Value Specialty Crop Pest Management
Investigators: Deer, H. M., Roe, A. H.
Performing Department: Animal Dairy & Vet Science -- 0302
Start Date: 10/01/2004 Termination Date: 09/30/2009
Reporting period: 01/01/2004 to 12/31/2004
Progress Report: New minor use requests under this project include: peach/novaluron/codling moth and pear psylla, caneberry/novaluron/raspberry crown borer, caneberry/etoxazole/two spotted spider mite, onion (dry bulb)/acetamiprid/onion thrips, onion/acibenzolar/xanthamonas leaf blight, bacterial soft rot, and iris yellows virus, cantaloupe/rimsulfuron/annual broadleaf weeds, safflower/sulfentrazone/annual broadleaf weeds and annual grass suppression. More than 35 minor food crops and a large variety of nursery and landscape crops are grown in Utah. The total value of Utah minor crops is $98 million. This program is a government and land grant university sponsored program to develop the data necessary for submitting minor crop pest control options to the EPA for approval. Through the years this program has expanded to include ornamentals and also, biopesticides including microbials like bacteria and viruses, and biochemicals like pheromones and growth regulators. This program works with farmers, agricultural scientists, commodity organizations, and extension personnel to provide pest management solutions to growers of minor crops. By law, any use of a pesticide must be stated on the label or allowed for by regulation. Each label use instruction must be registered by the EPA. The registration requires proof that the pesticide use poses no undue hazard when applied as instructed. Registration data costs for most pesticide uses are paid by the pesticide manufacturers who expect to sell enough product to return a profit. Many uses for pesticides, however, are on such a small scale that their registration costs are greater than any possible return to the manufacturer. Even these small or minor uses require registration to protect the applicator from a possible fine or crop residue problem. This program has helped in securing clearances for registration of certain pesticide uses on these Utah crops: alfalfa, apple, apricot, asparagus, bean (dry), broccoli, brussels sprouts, cabbage, canola, cantaloupe, carrot, cauliflower, cherry (sweet), cherry (tart), clover, field corn, honey and beeswax, honeydew melons, lettuce, onion (dry), pasture grass, peach, pear, sweet corn, tomato and watermelon.
Impact: Potential economic losses of $11,900,000 are estimated without this program. It is important to secure minor use registrations for agricultural producers for legal reasons and also to increase grower productivity and profitability. These additional registrations help maintain a high quality and varied supply of foods, feed, and fiber and help to manage cases of pest resistance

Project Number: UTA00344
Water Use and Growth of Selected Vegetables With Emphasis on Onion
Investigators: Drost, D.
Performing Department: Plants, Soils & Biometeorology -- 1624
Start Date: 07/01/2001 Termination Date: 06/30/2006
Reporting period: 01/01/2004 to 12/31/2004
Progress Report: Irrigation timing significantly impacts onion growth and yield. Our objectives were to evaluate the delivery and timing of water applications to onions and find ways to improve water use efficiency. The specific objectives are 1. To evaluate the water requirements for drip irrigated intensively managed onions; 2. to identify differences in water efficiency in cultivars of onions; 3. to determine the mechanism of improved water use efficiency; 4. to develop sound water management practices for Utah onion growers. Three plant populations (175,000; 200,000; and 225,000 plants per acre) and two irrigation frequencies (every day or every 7th day) were used to assess plant growth and productivity. These frequencies mimic the differences between drip irrigation and currently used furrow system used by much of the onion industry in the western US. Irrigation application amounts were based on monitoring available soil water, soil water depletion, estimates of daily evapotranspiration, published crop coefficients (Kc), and local precipitation. Information collected is used to estimate seasonal water use for the crop. We are also studying the impacts of how irrigation applied every 2nd or 4th day impacts the performance of early and late and high and low yielding onion cultivars. Onions were seeded on 22 March 2004 and stand counts were assessed 30 days later. Irrigation treatments were initiated in early May and continued till early September. Plant establishment was fair in 2004 and plant stands were approximately 80% of the planted populations. As plant population increased from 175,000 to 225,000, the percentage of large bulbs (jumbo and colossal) decreased and small bulb size increased regardless of irrigation frequency. While all populations received the same amount of water, the interval between irrigation events was very different and was a contributing factor to differences in plant growth. While there was no detectible difference in leaf number or root biomass between the irrigation treatments, bulb to bulb variability increased as the irrigation interval increased from 1 to 7 days. In 2004, there was no difference in yield between the four cultivars evaluated. Seasonal temperatures were considered normal in 2004 with average ET values estimated to be 23.7 inches.
Impact: In general, larger grade onions are worth $2-3 per cwt more than smaller bulb sizes. In 2003, Utah grew onions on 2000 acres with a value of $7.8 million and growers reported that 15-20% of the crop was graded as mediums and culls. Improved water management and crop cultural practices could increase the proportion of the crop in the larger size classes thus improving marketability and farm profits at nominal additional cost to the grower.

Project Number: UTA00359
Turfgrass Management in the Intermountain West: Conservation of Water and Nutrients
Investigators: Kopp, K. L.
Performing Department: Plants, Soils & Biometeorology – 1624
Start Date: 01/01/2001 Termination Date: 06/30/2006
Reporting period: 01/01/2004 to 12/31/2004
Progress Report: During the growing season of 2004, fertilization and clipping treatments were

applied to field plots of Kentucky bluegrass. Nitrogen fertilization treatments ranged from 0 kg N/ha to 388 kg N/ha and clippings were either returned or removed. Clipping samples were analyzed for moisture content as well as total nitrogen and carbon contents. Visual turfgrass quality data were also collected at the site to describe turfgrass color and density. Soil moisture data was collected at 10 cm depth increments to 100 cm. Anion exchange membranes were deployed in the plots and collected and analyzed weekly for adsorbed nitrate. Total nitrogen and carbon contents and anion exchange membrane data are still being analyzed at the time of this reporting. In the greenhouse, turfgrass lysimeters were established with several varieties of tall fescue in preparation for a water use study comparing cultivar groups. The lysimeters were watered with a fertilizer solution and maintained at optimum quality in preparation for data collection. A dry down experiment was initiated with the lysimeters in September of 2004. Over a four-week period, clippings were collected every fourth day. The clippings were weighed to obtain fresh weights and their color was quantified using a color meter. The lysimeters were weighed to obtain evapotranspiration rates and greenhouse conditions were closely monitored. The experiment was terminated when too few clippings were growing over a four-day period to collect. Water and fertilization resumed at this point. The experiment will be repeated in the spring of 2005. A study utilizing an eddy covariance system also continued over the growing season of 2004. Problems with the irrigation system at the site were addressed and the experiment is continuing. A dry down experiment is anticipated on this project during the 2005 growing season. A replicated field project was installed to compare water use and quality of three different landscapes. The design of each of the three landscapes was identical, but the plant material differed. With regard to turfgrass, Kentucky bluegrass, tall fescue, and buffalograss are being compared in the landscapes. The landscapes, which measure 20 x 30 feet, are also lined and plumbed to collect leachate. Hydrology of the landscapes and water quality of leachate will also be examined in related studies.
Impact: Landscape irrigation, and particularly turfgrass irrigation, accounts for as much as two-thirds of the water use in the typical Utah home. The results of this work are being conveyed directly to federal and state agencies as well as water purveyors. In 2004, these findings helped to generate a 13% decrease in statewide water use.

Project Number: UTA00489
Multi-State Project: NC-1119
Management Systems to Improve the Economic and Environmental Sustainability of Dairy Enterprises (Rev. NC-119)
Investigators: Young, A. J.
Performing Department: Animal Dairy & Vet Science -- 0302
Start Date: 08/14/2003 Termination Date: 09/30/2008
Reporting period: 01/01/2004 to 12/31/2004
Progress Report: Monthly research files containing data for all cows that completed lactations for that month have been obtained from DHI-Provo for a 12-month period of time. These records contain data from herds that process their cows through DHI-Provo from Utah, Idaho, Montana, California, Arizona and Nevada. This past year I have been working on extracting the records for cows that died or were sold. The records are then prepared for inclusion into a database. Due to the large volume of records, I am still in the extraction and database phase of this project and should finish by mid-summer.

Impact: Death losses on dairies have been increasing and are currently approximately 11% of the cows that leave the herd. If these numbers could be halved, Utah dairy producers could save almost $9 million because they would not have to buy replacement heifers to maintain herd size. In addition, excessive death loss may indicate other problems on a dairy and results in no money for the sale of cull animals.

Multi Activities - Utah Agricultural Experiment Station

Each of the following projects (divided by goal areas) are contributing to the resolution of problems or issues related to the goal areas.

Goal 1 An Agricultural Production System that is Highly Competitive in the Global Economy by Project Number - Multistate

UTA00085: Multi-State Project: W-1177 - Enhancing the Competitiveness of U.S. Meats
UTA00099: Multi-State Project: NRSP-8 - National Animal Genome Research Program
UTA00123: Multi-State Project: W-1171 - Germ Cell and Embryo Development and Manipulation for the Improvement of Livestock
UTA00236: Multi-State Project: NC-131 - Molecular Mechanisms Regulating Skeletal Muscle Growth and Differentiation
UTA00292: Multi-State Project: NC-140 - Rootstock and Interstem Effects on Pome-and Stone-Fruit Trees
UTA00329: Multi-State Project: W-1188 - Characterizing Mass and Energy Transport at Different Scales
UTA00332: Multi-State Project: NE-132 - Environmental and Economic Impacts of Nutrient Management on Dairy Forage Systems
UTA00351: Multi-State Project: NE-183 - Multidisciplinary Evaluation of New Apple Cultivars

UTA00417: Multi-State Project: NC-1009 - Metabolic Relationships in Supply of Nutrients for Lactating Cows
UTA00423: Multi-State Project: W-1181 - Modifying Milk Fat Composition for Improved Nutritional and Market Value
UTA00432: Multi-State Project: S-1007 - The science and Engineering for a Biobased Industry and Economy
UTA00489: Multi-State Project: NC-1119 - Management Systems to Improve the Economic and Environmental Sustainability of Dairy Enterprises (Rev. NC-119)
UTA00491: Multi-State Project: NC-228 - Avian Respiratory Diseases: Pathogenesis, Surveillance, Diagnosis and Control
UTA00701: Multi-State Project: W-1187 - Interactions Among Bark Beetles, Pathogens, and Conifers in North American Forests
UTA00762: Multi-State Project: W-6 - Plant Genetic Resource Conservation and Utilization

Goal 2 A Safe and Secure Food and Fiber System by Project Number - Multistate

UTA00085: Multi-State Project: W-1177 - Enhancing the Competitiveness of U.S. Meats
UTA00476: Multi-State Project: W-1122 - Beneficial and Adverse Effects of Natural, Bioactive

Dietary Chemicals on Human Health and Food Safety

GPRA Goal 3 A Healthy, Well Nourished Population by Project Number - Multistate

No listings.

Goal 4 Greater Harmony Between Agriculture and the Environment by Project Number - Multistate

UTA00007: Multi-State Project: W-192 - Rural Communities and Public Lands in the West: Impacts and Alternatives
UTA00020: Multi-State Project: W-1190 - Interfacing Technological, Economic, and Institutional Principles for Managing Inter-Sector Mobilization of Water
UTA00103: Multi-State Project: NRSP-4 - High Value Specialty Crop Pest Management
UTA00322: Multi-State Project: NRSP-3 - The National Atmospheric Deposition Program (NADP)
UTA00329: Multi-State Project: W-1188 - Characterizing Mass and Energy Transport at Different Scales
UTA00332: Multi-State Project: NE-132 - Environmental and Economic Impacts of Nutrient Management on Dairy Forage Systems
UTA00390: Multi-State Project: W-45 - Mechanisms and Mitigation of Agrochemical Impacts on Human and Environmental Health
UTA00524: Multi-State Project: W-1185 - Biological Control in Pest Management Systems of Plants

Goal 5 Enhanced Economic Opportunity and Quality of Life for Americans by Project Number - Multistate

UTA00052: Multi-State Project: W-1133 - Benefits and Costs of Natural Resources Policies Affecting Public and Private Lands
UTA00074: Multi-State Project: NE-1011 - Rural Communities, Rural Labor Markets and Public Policy

UTA00835: Multi-State Project: W-1001 - Population Change in Rural Communities
UTA00869: Multi-State Project: W-167 - Family and Work Identities During Times of Transition
UTA00985: Multi-State Project: NE-167 - Family Business Viability in Economically Vulnerable Communities

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

Institution **Utah State University**
State Utah

Multistate Extension Activities	***FY 2004***
Planned Program/Activity	
Agronomy/Crops	**$ 41,122**
Livestock	57,940
Youth and 4-H	0
Economic Development Planning	60,639
Business Retention and Expansion	20,213
Total	$ 179,914

Fund Audit Salary Tracking:
Ron Bowman
Allen Young
DeeVon Bailey
Howard Deer

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

Institution **Utah State University**
State Utah

Integrated Activities (Smith-Lever Act Funds)	**FY 2004**
Title of Planned Program/Activity	
Inventory and Management of Invasive Noxious Weeds (Dewey,S.) #291	**$ 69,379**
High Value Specialty Crop Pest Management (Deer, H.) #103	**6,985**
Water Use and Growth of Selected Vegetables With Emphasis on Onion (Drost, D.) #344	**45,617**
Turf grass Management in the Intermountain West: Conservation of Water and Nutrients (Kopp, K.) #359	**39,967**
Sustainable Cropping Systems Utilizing Low-Cost Precision Agriculture Techniques (Newhall, R.) #431	**10,767**
Management Systems to Improve the Economic And Environmental Sustainability of Dairy Enterprises (Young, A.) #489	**15,708**
Total	**$188,423**

U.S. DEPARTMENT OF AGRICULTURE
COOPERATIVE STATE RESEARCH, EDUCATION, AND EXTENSION SERVICE
ESTABLISHMENT OF TARGET PERCENTAGES
FOR MULTISTATE EXTENSION ACTIVITIES AND INTEGRATED ACTIVITIES

Institution **UTAH STATE UNIVERSITY**
State **UTAH**

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

Options for Determining Target Percentages (Circle one)

A. **25 percent (Submission of Form CSREES-BASE is waived).**

B. Target Percentage of _____ (two times the Preliminary Baseline Percentage of _____).

C. (Option only available if higher than option B and less than 25 percent.)

Target Percentage of _____ for FY 2000 and therafter.

D. (Option only available if higher than option B and less than 25 percent.)

Target Percentage for FY 2000 and thereafter phase-in:

FY 2000 _____
FY 2001 _____
FY 2002 _____
FY 2003 _____
FY 2004 _____

_____ _____
Director Date

Form CSREES-TARG (2/00)

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 UTAH STATE UNIVERSITY
State UTAH

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

Title of Planned Program/Activity	Actual Expenditures FY 2004
1. A Highly Competitive Agricultural System	$ 107,074
2a. Plant and Animal Health and Safety: Identification	$ 0
2b. Plant and Animal Heath and Safety: Control	$ 35,272
2c. Plant and Animal Health and Safety: Safety Assurance	$ 58,032
3. Agricultural Production Enhancement	$ 281,154
4a. Intensive Pasture Management and Use	$ 4,889
4b. Natural Resource Management	$ 89,031
5a. Human Health	$ 56,197
5b. Family-Community Relationships	$ 86,849
Total	$ 713,609

_____ _____
Director Date
Form CSREES-REPT (2/00)

Continuation (Detail) of Form CSREES-REPT for 2004
Summary Listing of Projects by Goal Area

Goal 1: An Agricultural Production System that is Highly Competitive in the Global Economy.

Goal Area #1	Project	Hatch	Multi-State	Total Hatch	Non-Fed	Other Fed
	9	6,596	0	6,596	17,552	0
	12	23,513	0	23,513	33,740	0
	16	0	0	0	24,609	0
	21	34,126	0	34,126	33,985	0
	35	4,565	0	4,565	3,939	0
	91	0	0	0	80,114	0
	244	0	0	0	105,098	0
	286	0	0	0	316,657	0
	326	0	0	0	141,957	5,796
	369	0	0	0	141,879	87,569
	373	0	0	0	37,491	0
	788	0	0	0	66,246	0
	811	0	0	0	332	0
	885	0	0	0	598,384	0
Total Goal Area #1		**68,800**	**0**	**68,800**	**1,601,983**	**93,365**
MultiState	**Project**	**Hatch**	**Multi-State**	**Total Hatch**	**Non-Fed**	**Other Fed**
	123	0	87,022	87,022	333,481	0
	329	0	0	0	0	0
	471	0	20,052	20,052	65,925	0
Total Goal 1, Multistate		**0**	**107,074**	**107,074**	**399,406**	**0**
Total Goal 1		**68,800**	**107,074**	**175,874**	**2,001,389**	**93,365**

Goal 2. Plant and Animal Health and Safety

Goal Area #2a	Project	Hatch	Multi-State	Total Hatch	Non-Fed	Other Fed
	29	0	0	0	3,385	84,565
	468	0	0	0	1,148	0
	485	0	0	0	293,716	4,188
	486	0	0	0	7,285	6,473
	491	0	0	0	0	0
	537	0	0	0	114,544	7,629
	578	39,239	0	39,239	52,198	0
	607	32,997	0	32,997	96,554	0
Total Goal 2a		**72,236**	**0**	**72,236**	**568,830**	**102,855**
Goal Area #2b	**Project**	**Hatch**	**Multi-State**	**Total Hatch**	**Non-Fed**	**Other Fed**
	27	21,178	0	21,178	35,913	0
	239	0	0	0	57,921	0
	400	0	0	0	417,867	0
	415	0	0	0	321,338	0
	466	0	0	0	23,136	0
	478	0	0	0	0	20,004
	484	0	0	0	0	7,981
	487	0	0	0	0	43,610
	618	0	0	0	73,367	0
	622	0	0	0	79,443	0

	624	42,133	0	42,133	66,789	0
	626	0	0	0	21,648	0
	634	0	0	0	42,723	0
	743	0	0	0	238,799	0
Total Goal 2b		**63,311**	**0**	**63,311**	**1,378,944**	**71,595**
Goal Area #2b Multistate	**Project**	**Hatch**	**Multi-State**	**Total Hatch**	**Non-Fed**	**Other Fed**
	103	0	35,272	35,272	95,962	0
	701	0	0	0	0	0
Total Goal #2b Multistate		**0**	**35,272**	**35,272**	**95,962**	**0**
Goal Area #2c	**Project**	**Hatch**	**Multi-State**	**Total Hatch**	**Non-Fed**	**Other Fed**
	126	16,671	0	16,671	54,869	0
Total Goal 2c		**16,671**	**0**	**16,671**	**54,869**	**0**
Goal Area #2c Multistate	**Project**	**Hatch**	**Multi-State**	**Total Hatch**	**Non-Fed**	**Other Fed**
	476	0	58,032	58,032	217,281	0
Total Goal 2c Multistate		**0**	**58,032**	**58,032**	**217,281**	**0**
Total Goal 2a,b,c		**221,018**	**93,304**	**245,522**	**2,315,886**	**174,450**

Goal 3. Agricultural Production Enhancement.

Goal Area #3	Project	Hatch	Multi-State	Total Hatch	Non-Fed	Other Fed
	17	0	0	0	29,060	0
	28	0	0	0	27,251	0
	164	5,084	0	5,084	15,927	0
	170	0	0	0	819	0
	222	0	0	0	103,655	0
	223	0	0	0		0
	231	0	0	0	462,984	0
	234	45,795	0	45,795	163,331	446,340
	241	34,728	0	34,728	56,835	0
	246	0	0	0	4,498	58,501
	247	0	0	0	0	0
	250	23,190	0	23,190	105,449	0
	285	0	0	0	0	0
	295	0	0	0	137,371	0
	328	84,520	0	84,520	227,419	0
	337	60,550	0	60,550	177,291	0
	344	0	0	0	71,092	0
	356	0	0	0	0	742,899
	357	0	0	0	3,620	41,494
	358	0	0	0	58,920	0
	363	0	0	0	285,896	0
	365	0	0	0	1,826	0
	366	26,225	0	26,225	232,270	0
	367	0	0	0	5,748	0
	371	5,979	0	5,979	31,701	0
	436	0	0	0	0	23,759
	441	0	0	0	0	34,949
	452	0	0	0	0	102,979
	457	0	0	0	158,906	1,904
	461	0	0	0	151,308	0
	472	0	0	0	4,287	0
	478	0	0	0	0	20,004
	479	56,931	0	56,931	346,164	0

	483	31,611	0	31,611	191,489	0
	492	0	0	0	212,276	0
	493	0	0	0	225,382	0
	527	90,880	0	90,880	1,396,247	71,792
	533	61,444	0	61,444	94,108	0
	578	0	0	0	52,198	0
	628	51,284	0	51,284	150,847	6,302
	630	0	0	0	97,796	0
	637	0	0	0	0	641
	735	64,115	0	64,115	193,285	0
	784	0	0	0	38,341	0
	786	0	0	0	94,089	0
	926	0	0	0	59,699	0
	929	0	0	0	26,547	0
Total Goal 3		**642,336**	**0**	**642,336**	**5,695,932**	**1,551,564**
Goal Area #3, Multistate	**Project**	**Hatch**	**Multi-State**	**Total Hatch**	**Non-Fed**	**Other Fed**
	85	0	17,851	17,851	14,529	0
	99	0	40,151	40,151	217,825	0
	236	0	10,271	10,271	48,455	0
	292	0	69,710	69,710	131,855	0
	351	0	21,518	21,518	31,472	0
	417	0	28,861	28,861	86,078	0
	423	0	33,269	33,269	156,273	0
	432	0	5,776	5,776	6,215	0
	489	0	19,667	19,667	53,505	0
	524	0	33,272	33,272	52,703	0
	762	0	808	808	0	0
Total Goal 3 Multistate		**0**	**281,154**	**281,154**	**798,910**	**0**
Total Goal 3		**642,336**	**281,154**	**923,490**	**6,494,842**	**1,551,564**

Goal 4. Agriculture and Natural Resources

Goal Area #4a	**Project**	**Hatch**	**Multi-State**	**Total Hatch**	**Non-Fed**	**Other Fed**
	33	0	0	0	185,377	215,693
	36	0	0	0	0	0
	179	0	0	0	251,031	0
	331	10,448	0	10,448	131,200	0
	418	0	0	0	76,416	0
	797	0	0	0	63,563	0
Total Goal 4a		**10,448**	**0**	**0**	**63,563**	**0**
Goal Area 4a, Multistate	**Project**	**Hatch**	**Multi-State**	**Total Hatch**	**Non-Fed**	**Other Fed**
	332	0	4,889	4,889	4,884	0
Total Goal 4a		**0**	**4,889**	**4,889**	**4,884**	**0**
Goal Area #4b	**Project**	**Hatch**	**Multi-State**	**Total Hatch**	**Non-Fed**	**Other Fed**
	10	0	0	0	34,910	0
	13	0	0	0	42,530	0
	14	0	0	0	27,886	0
	15	0	0	0	61,636	0
	18	0	0	0	89,065	0
	173	0	0	0	614,778	0
	278	0	0	0	120,622	0
	291	0	0	0	58,872	0

	293	25,973	0	25,973	125,931	0
	294	0	0	0	0	634,006
	323	17,759	0	17,759	83,678	0
	324	0	0	0	58,883	0
	330	0	0	0	177,503	0
	335	0	0	0	0	757,307
	345	0	0	0	229,497	0
	359	0	0	0	94,009	0
	360	0	0	0	0	176,862
	361	0	0	0	109,480	0
	364	0	0	0	0	1,453,292
	368	0	0	0	49,520	0
	370	0	0	0	0	128,734
	372	0	0	0	0	26,140
	374	0	0	0	0	0
	431	0	0	0	34,324	0
	442	0	0	0	141,721	0
	555	0	0	0	0	59,595
	556	0	0	0	0	33,678
	561	0	0	0	0	101,162
	627	0	0	0	33,533	0
	663	0	0	0	0	8,151
	703	0	0	0	27,633	38,291
	705	0	0	0	0	714
	709	0	0	0	38,441	0
	710	0	0	0	17,528	23,267
	713	0	0	0	16,092	15,734
	727	0	0	0	8,690	8,927
	729	0	0	0	11,881	11,425
	786	0	0	0	94,089	0
	787	0	0	0	88,505	0
	861	21,931	0	21,931	36,079	0
	905	0	0	0	66,968	0
	910	0	0	0	20,745	0
	917	15,729	0	15,729	32,710	0
	919	37,278	0	37,278	117,611	0
	922	0	0	0	45,516	0
	923	0	0	0	300,680	0
	924	0	0	0	0	955,222
	925	0	0	0	94,788	0
	927	0	0	0	42,952	0
	928	5,388	0	5,388	6,961	0
	930	0	0	0	0	0
	942	0	0	0	30,410	0
	943	0	0	0	37,136	0
	945	0	0	0	5,382	0
	960	0	0	0	0	0
Total Goal 4b		**124,058**	**0**	**124,058**	**3,329,175**	**4,432,507**
Goal Area 4, Multistate	**Project**	**Hatch**	**Multi-State**	**Total Hatch**	**Non-Fed**	**Other Fed**
	7	0	26,970	26,970	31,793	298,508
	20	0	22,936	22,936	16,801	0
	52	0	34,236	34,236	31,196	0
	651	0	0	0	0	0
Total Goal 4b Multistate		**0**	**84,142**	**84,142**	**79,790**	**298,508**

Total Goal 4a,b		**134,506**	**89,031**	**213,089**	**3,477,412**	**4,731,015**

Goal 5: Empower People and Communities

Goal Area #5a	**Project**	**Hatch**	**Multi-State**	**Total Hatch**	**Non-Fed**	**Other Fed**
	209	0	0	0	116,505	0
	228	0	0	0	0	187,205
	237	0	0	0	103,548	17,729
	240	0	0	0	0	36,702
	258	0	0	0	74,784	0
	638	0	0	0	112,364	0
Total Goal 5a		**0**	**0**	**0**	**407,201**	**241,636**
Goal Area 5a, Multistate	**Project**	**Hatch**	**Multi-State**	**Total Hatch**	**Non-Fed**	**Other Fed**
	390	0	56,197	0	53,089	0
Total Goal 5a, Multistate		**0**	**56,197**	**0**	**53,089**	**0**
Goal Area #5b	**Project**	**Hatch**	**Multi-State**	**Total Hatch**	**Non-Fed**	**Other Fed**
	376	0	0	0	0	0
	421	0	0	0	10,534	0
	579	0	0	0	40,020	0
	662	0	0	0	11,367	0
	726	0	0	0	25,379	25,006
	730	0	0	0	12,857	12,628
	840	0	0	0	39,288	0
	841	0	0	0	45,508	0
	848	0	0	0	0	37,393
	944	0	0	0	58,874	0
	957	0	0	0	54,387	55,954
	974	0	0	0	0	376,349
	975	0	0	0	25,206	0
	976	0	0	0	7,788	0
	977	0	0	0	14,782	0
	978	0	0	0	11,724	0
	979	0	0	0	0	0
Total Goal 5b		**0**	**0**	**0**	**357,714**	**507,330**
Goal Area #5b, Multistate	**Project**	**Hatch**	**Multi-State**	**Total Hatch**	**Non-Fed**	**Other Fed**
	74	0	21,080	21,080	14,521	0
	835	0	37,747	37,747	30,042	0
	839	0	0	0	69,137	0
	843	0	0	0	12,508	0
	844	0	0	0	27,423	0
	869	0	25,526	25,526	19,294	0
	985	0	2,496	2,496	1,679	0
Total Goal 5b Multistate		**0**	**86,849**	**86,849**	**174,604**	**0**
Total Goal 5a,b		**0**	**143,046**	**86,849**	**939,519**	**748,966**
Grand Total		**997,860**	**713,609**	**1,644,824**	**15,282,137**	**7,299,360**