ANNUAL REPORT

SUBMITTED TO CSREES

BY

THE COOPERATIVE EXTENSION SERVICE

AND

THE AGRICULTURAL EXPERIMENT STATION

College of Agriculture
University of Wyoming

October 1, 1999 - September 30, 2000

Glen Whipple, Ph.D.
Associate Dean and Director
Cooperative Extension Service

Jamess J. Jacobs, Ph.D.
Associate Dean and Director
Agricultural Experiment Station

Table of Contents

CSREES ANNUAL REPORT
FY2000
Wyoming's Accomplishments & Results

Goal 1: Enhance agricultural systems that are highly competitive in the global economy

Overview:

Wyoming is a rural state where agriculture is a key component of the economy of most of the cities and towns. Livestock and livestock products generated approximately 77 percent of agriculture's cash receipts of $864 million in 1997. The livestock industry of Wyoming is forage based with both private and public lands providing forage for livestock production. It is important to note that these same private and public lands provide forage for game and other animals that are important to another pillar of the state's economy, tourism and recreation.

Due to high elevation (average of 6800') and climate over most of the state, Wyoming's agriculture faces unusual challenges. Improved animal and plant genetics, pest control, soil and water conservation, integrated resource systems, and domestic and international markets are needed to maintain sustainable and profitable agricultural systems. Stakeholder input suggests that all aspects of profitability and sustainability are important issues for research and extension including productivity, markets, and management of land and water resources.

The College of Agriculture conducts research and extension programs to provide knowledge and technology to maintain economically viable and sustainable forage, crop, and animal systems consistent with Wyoming's resource base. Research and extension efforts in the college range from biotechnology to home lawn and gardening with emphasis on animal production efficiency, plant production efficiency, and profitability. More than 1,700 producers attended various workshops regarding agricultural profitability that assisted them in making management decisions. Research results from studies comparing winter grazing of windrowed hay vs. feeding hay showed the cost per ton of windrowed hay was about half that for hay baled, stored, and fed, ($17 vs. $34, respectively). That study also showed that hay quality and animal performance were similar. Since 50-75 percent of ruminant animal production costs are associated with feed, reducing winter feed costs and improving the use of feeds are of paramount importance in the competitiveness of livestock enterprises.

A major focus for the Department of Veterinary Sciences is the study of Emerging Infectious Diseases that are of common concern to both domestic and wild animals. Currently a study is investigating whether chronic wasting disease (CWD) of deer and elk is naturally hazardous to cattle. Studies underway are lifetime projects involving both oral administration of CWD containing material to cattle as well as providing immediate casual contact between affected wildlife and cattle. Information generated will aid wildlife managers, USDA regulators, and ranchers in their animal and disease management decisions. Specifically, the risk of transmission

of CWD to other domestic species of food animals is of tremendous concern to producers, the livestock industry, and public health officials.

Brown Root Rot (BRR) had been reported to cause yield and stand losses in Canada. It was first detected in the U.S. in an alfalfa field in Wyoming in the spring of 1996. As a result, researchers have conducted a survey to determine the extent of BRR in Wyoming, developed a procedure to identify the disease in alfalfa, began efforts to develop a resistant variety, and initiated BRR management strategies. Based on a five county survey, it was estimated that 42 percent of the fields were infested with BRR. The five counties surveyed grow about 55,000 acres of alfalfa and there are approximately 600,000 acres of alfalfa grown in Wyoming. Research has resulted in an experimental BRR resistant alfalfa cultivar for productivity and long-term persistence in Wyoming and the Rocky Mountain West. A half-acre foundation seed field was established in August 1999. Development of a BRR resistant alfalfa cultivar will improve alfalfa persistence and yield in Wyoming. The extent of the disease in Wyoming and other states is not known.

Sugar beets are grown on 58,000 acres and provide Wyoming producers over $42,000,000 annually. Researchers at UW have been involved in studies designed to evaluate the feasibility of reducing herbicide rates on sugar beets. This research led to the development of a micro-rate herbicide program for weed control in sugar beets. The 2000 growing season was the first year the micro-rate program had a federal label for application. The micro-rate herbicide program in sugar beets has resulted in post-emergence herbicide rates being reduced by 66 to 75 percent and application of post-emergence herbicide has been reduced on over 29,000 acres of sugar beets in Wyoming.

The focus of research and extension efforts on production practices and production systems is to enhance both their sustainability and profitability while maintaining the underlying resource base.

Key Theme – Adding Value to New and Old Agricultural Products

a. Statewide initiatives were developed by the University of Wyoming Cooperative Extension Service (UWCES) and the Wyoming Department of Agriculture (WDA) to encourage hay evaluation, improve hay quality, promote hay products, and provide marketing assistance to growers.

b. Impact – A standardized evaluation system was developed for visual appraisal and nutritional analysis of hay. Twenty-four university extension educators in Wyoming were trained to evaluate hay and a regional program to train 28 hay evaluators from Colorado, Montana, Idaho, and Utah was funded by grants from the USDA Marketing Service. Over 200 presentations (1987-2000) on hay production, quality, and marketing were delivered by educators and producers.

Wyoming hay quality improved: three Wyoming hay producers received “Outstanding Western Region Producer” awards from the Alfalfa Council in 1990, 1991, and in 1994 at the National Alfalfa Symposium. Two Wyoming hay producers are “Champion Commercial Hay Producers” (1989, 1993, and 1996) in the Forage Analysis Super Bowl at the World Dairy Exposition. In 1996 a Wyoming hay producer became the only two-time winner of the event.

Several Wyoming hay growers placed first in various hay class competitions at National Hay Shows sponsored by the American Forage and Grassland Council.

The program evolved into an electronic hotline listing for all hay products and related services (http://www.uwyo.edu/ag/ces/ceshome.htm). By late December 1996, over 200 Wyoming hay growers had listed products on the hotline at least once during the previous 15 months. During a 28 month period from March 1998 to July 2000, the web site averaged four visitors per day: individuals from 26 countries and six continents visited the web site during this period. A 1996 survey revealed that cash bonuses of $10 to $35 per ton were typical for superior quality hay.

In July 2000, the Agribusiness Division of the Wyoming Business Council (WBC) combined the Wyoming Hay and Livestock Directories to create the Wyoming Agriculture and Ranching Directory. They have promoted hay products by purchasing booth space for hay grower organizations at the World Dairy Expo and providing transportation to deliver donated hay products to the Expo.

A weed-seed free certification program was developed for hay imported into restricted areas in national parks and forests. The program became statewide in 1988, then expanded as a cooperative regional program to Colorado, Idaho, Montana, and Nebraska in 1991. The certified noxious weed-seed free (CNWSF) hay market offers a premium price for certified hay.

In 2000, Wyoming Seed Certification Service (WSCS) personnel examined 12,815 acres of alfalfa and red clover seed, 5,212 acres of dry beans, 2,735 acres of small grains, 861 acres of grass, and 32 acres of crownvetch and milkvetch. The total acres inspected in 2000 were 21,603. Twelve seed conditioning facilities were inspected and approved to condition certified seed. Information concerning the impacts of weed seed on specific crops was presented at Wyoming Crop Improvement Association meetings, and Wyoming Alfalfa Seed Growers meetings.

A bean-disease plot was established to offer training in disease recognition. During 2000, seven (WSCS) inspectors and two inspectors from the Montana Seed Growers Association received training on disease life cycles, inspection techniques, and other pertinent issues. Instruction was offered in the field and classroom on halo blight, common bacterial blight and bean common mosaic virus. Annual training is needed to provide inspectors with the necessary skills required for bean disease recognition. This level of training is necessary for maintaining a quality crop.

A Cooperative Dry Bean Nursery (CDBN) was established to provide Wyoming bean producers with information on 64 new and experimental dry bean lines. Data was collected on flowering date, days to maturity, yield, and seeds per pound for pinto, pink, myacoba, white kidney, dark red kidney, light red kidney, small red, small white, black, and great northern market classes. Data also is used by the Risk Management office to determine the yield potential and insurance rates for new market classes and varieties. Data also are provided to dry bean contractors, bean producers and CES educators by mail, and at grower meetings such as the Wyoming Crop Improvement Association and the Powell Research and Extension

Center Field Day. This information helps contractors determine contract prices as well as assisting with management decisions that affect the profitability of Wyoming dry bean producers.

Educational efforts increased awareness of planting certified seed as a financially sound method to reduce crop production risks and to improve farm profitability and sustainability. With an average production of 700 pounds per acre and a contract price of $1.15 per pound, the 2000 alfalfa seed crop will have a value to Wyoming seed producers of approximately $10.2 million. Alfalfa seed produced in Wyoming is purchased in the U.S., Europe, and South America.

Wyoming ranks 5th in the U.S. for edible bean producing states, and has the highest average yield per acre of all states. With an average production of 23 cwt per acre and an average price of $20 per cwt, certified dry bean seed production in Wyoming for 1999 was worth $2.8 million. In 1997, the difference between seed price and edible bean price was approximately $500 per acre.

c. Source of Funding – Smith-Lever, Hatch, State

d. Scope of Impact – Multi-state (WY, CO, MT, ID, UT, NE)

Key Theme – Agricultural Competitiveness

d. Value-added opportunities, niche marketing, and outlook information which can be used for market planning are Extension programs on marketing alternatives. Publications were developed which can be used by educators and producers to improve the knowledge of the market environment faced by producers, showing available marketing alternatives, ways to develop marketing plans, and tools available to help producers to do a better job of marketing and managing price risk.

e. Impact - A total of 326 individuals were contacted through Extension programs or individual consultations. Overall evaluation on Agricultural Options program was 8.24 on a 10 point scale, and evaluation on Market Segmentation and Niche Marketing was 7.75 on a 10 point scale. A symposium on Marketing for the Next Millennium was attended by 150 Wyoming ranchers. An art auction and the conference generated $12,000 for scholarships and for the scholarship endowment, three $1,000 college scholarships were awarded to Wyoming students in 2000 who were majoring in agriculture.

f. Source of Funding – Smith-Lever 3 b&c, State

g. Scope of Impact – Multi-state Extension and Research (WY, CO, MT)

Key Theme – Agricultural Profitability

a. Economic profitability is vital to the sustainability of agriculture since no practice or agricultural operation is sustainable unless it is first profitable. In the past, Wyoming

programming has dealt mainly with answers that are short term, quick fixes. As a result, a systems-based approach to address the problems has not been well utilized or promoted. A system that examines all of the resources of the farm and ranch (land, labor, and capital) should provide for a more stable, long lasting, sustainable agriculture in the face of increasing change and numerous demands on agriculture's management. Several major programs were developed and presented to educate individuals in the agricultural sector on ways to make agriculture profitable as well as sustainable.

The single largest cost of beef production is winter feed, a significant portion of which is harvested hay. In a specific project, researchers are studying alternative forage resources and new management techniques of existing forages to reduce winter feeding of hay. In particular, the potential of windrowing forage on irrigated meadows for winter grazing along with the yield and nutrient content of forage species grown under dryland conditions is being evaluated. Results indicate that windrowed and baled hay were similar in forage quality. In a short-term study, bred cows with three weeks access to windrowed forage gained more and increased body condition over cows fed hay from the same meadow.

In sugar beet production, the sugar beet cyst nematode (SBCN) has been a widely occurring and damaging pest problem. Since the SBCN is not uniformly distributed over a field, researchers have initiated a study to evaluate the economics of variable rate application of the most used nematicide for SBSN control. Telone II was banded beneath the seed row at four rates and replicated across the field gradient of high-to-low SBCN.

b. Impact – Research results from studies on the profitability of individual production practices as well as crop and livestock systems ultimately influence the sustainability of the agriculture industry. Results from the winter grazing studies indicate that the quality of windrowed and baled hay is similar and animal performance is also similar. The cost per ton of windrowed forage was about half that for hay baled, stored, and fed ($17.61 vs. $34.69). First year results from the variable rate application of Telone II for SBCN control on a 40 acre field were encouraging. At the currently recommended rate, a uniform application of Telone II would result in a net return of $21/acre, with sugar beets priced at $42/ton. Applying the optimum Telone II rates would increase net returns to $89/acre. In addition, the variable rate would have saved 141 gallons of product on 40 acres.

More than 1,700 producers attended various workshops and clinic regarding agricultural profitability. Evaluations showed that producers increased their knowledge, made correct management decisions, contained their costs, kept current, and evaluated their management options. Two extension bulletins have been published. Five reports concerning applied research were published in the UW Agricultural Experiment Station 2000 Progress Report. Eight issues of the Wyoming Hay Hotline were published. The Hay Hotline web site was updated weekly. Five ranchers are saving $10 to $15 per head per wintering season by testing forages and feeding accordingly. Using the training, a rancher was able to sell an unproductive operation and purchase an operation that is sustainable and profitable.

c. Source of Funding – Hatch, Smith-Lever 3 b&c, State

d. Scope of Impact – State Specific
Multi-state Research (W-177)
(AZ, CA, CO, IA, ID, KS, NE, NM, NV, OK, SD, TX, UT, VA, WA, WY)
Integrated Research and Extension

Key Theme – Animal Health

a. The Department of Veterinary Sciences researchers investigated a variety of animal health-related problems. A major thrust of those efforts has involved investigation of diseases that impact reproduction and immunity in livestock. Examples of diseases that have been investigated include the impact of vaccination for BVD on fetal calf immunity. The incidence of Malignant Catarrhal Fever (MCF) in feedlot bison has also been investigated. New test development is an important aspect of this work. Tests under development include an immunohistochemistry assay for BVD in skin tissue and modern tests for trichomoniasis in cattle. In addition to study of infectious diseases, two major outbreaks of genetic disease were studied. In one instance, a series of calves were born with neurological disease. This unusual outbreak was traced to a single sire. In another instance, Salers-breed cattle were diagnosed as having hemochromatosis, a congenital iron metabolism defect in the liver. Follow-up breeding and genetics studies were conducted in both cases. Environmental poisoning cases were also examined. One project investigated water deprivation in cattle and another is surveying edible fish for mercury and selenium levels.

b. Impact - The impacts of these animal health investigations are both immediate and long-term. The immediate impacts have been to reduce the morbidity and mortality of ongoing disease problems by developing methods to more readily detect disease (e.g., the immunohisto-chemistry test for BVD) and to identify sires that produce genetic defects to hasten their removal from herds. Longer term, a better understanding of these diseases will allow for better test development as well as improved control measures. For example, a rapid test for the *Tritrichomonas fetus* organism will allow for improved screening to help minimize disease and control the spread of this devastating disease. More rapid and accurate testing for trichominasis will help ranchers to minimize early fetal loss in cattle and will facilitate new regulatory control measures for this disease. A better understanding of MCF will help bison producers begin to manage this number one cause of feedlot losses of bison.

c. Source of Funding – Hatch, State

d. Scope of Impact – State Specific, but results have broad implications
Integrated Research and Extension

Key Theme – Animal Production Efficiency

a. Active research programs dedicated to improving animal production primarily related to the areas of nutrition, reproduction, and wool science are being conducted by researchers in animal science at the University of Wyoming. Areas of emphasis in rumininant nutrition include optimal use of dietary protein and lipids to improve performance and quality of cattle and

sheep. Reproductive studies emphasize the identification and development of methods to regulate fertility in domestic animals, particularly cattle and sheep. The scope of the research conducted ranges from fundamental experiments designed to discover underlying mechanisms to applied projects designed to evaluate the practical adoption of new knowledge and technologies. For example, researchers are evaluating protocols designed to enhance feed efficiency, improve out-of-season breeding in ewes and estrous synchronization in cattle, as well as to increase conception rates in cattle and sheep.

The Wyoming Beef Cattle Improvement Association (WBCIA) and their programs associated with the genetic improvement of beef cattle (i.e., Bull Test and Feedlot Test and Carcass Evaluation Program) have been the impetus for several educational efforts directed towards enhancing production efficiency and competitiveness. These include such activities as multi-county Artificial Insemination Schools and associated production and management workshops in addition to the WBCIA educational symposium to discuss issues affecting the state's beef industry; WYO BEEF 2000, Beef Quality Assurance (BQA) workshops and evaluation of marketing alternatives; Beef and Sheep Home Study courses have been developed to further enhance continuing education in production and management of both species. In addition, a South African breed of sheep, the Dorper, has been introduced via applied research projects into crossbreeding programs to determine its effects on lamb production in commercial sheep flocks. Cooperating organizations include the Wyoming Beef Cattle Improvement Association, the WY Beef Council, the Wyoming Stock Growers Association, the Wyoming Wool Growers Association and the University of Nebraska.

With Wyoming consisting of approximately 50 percent public lands, efforts are underway to develop a grazing livestock manual for public land permittees and federal agencies. Cooperating agencies include BLM, USFS and NRCS.

Educational efforts have been directed towards assisting a localized dairy industry in western Wyoming faced with rising costs of production and low milk prices. Nutritional management is being used to help address issues such as air and water quality and waste management which further complicate economic sustainability. This effort is in cooperation with Utah State University.

b. Impact – Because 50-75 percent of ruminant animal production costs are associated with feed, improving use of feed resources are of paramount importance in the competitiveness and sustainability of livestock enterprises. Similarly, the effectiveness in producing annual offspring dictates returns received by cattle and sheep enterprises. With annual receipts from livestock accounting for approximately 80 percent of gross agricultural receipts, a modest increase in feed utilization or reproductive performance would result in an overall increase of millions received by livestock producers in the state.

The WBCIA Bull Test evaluated 245 head of bulls in the 1999-2000 test. One hundred twenty head were sold to 49 producers in 15 Wyoming counties. Assuming these bulls would sire 100 offspring in their lifetime and add an average of 10 pounds per head to their progeny, this is potentially $105,000 worth of additional weaning weight. In addition, $206,400 worth of gross income was realized from the sale of these genetically superior bulls. The Feedlot Test &

Carcass Evaluation program resulted in 300 head of finished cattle returning an additional $22,103 from being sold on a value-based grid rather than from being sold as feeder calves at time of weaning. The 24 participants in the AI classes saved $200 each on the cost of their training. The educational programs such as WYO BEEF 2000 and the BQA workshops could potentially affect producers in all WY counties resulting in a more wholesome, unblemished product being available for beef consumers. Furthermore, 160 producers have completed the Beef Home Study Course over the past 5 years with projected total financial savings of $112,000 resulting from a $14/cow enhancement/savings.

The dairy program facilitated a five percent increase in milk prices paid by a local cheese factory. Dorper-sired lambs were heavier at weaning and produced heavier finished carcasses with an increased value over our more traditional sheep breeds that served as controls.

c. Source of Funding – Hatch, Smith-Lever, State, County, Private

d. Scope of Impact – State Specific
Multi-state Research (W-112)-(AZ, CA, CO, HI, ID, KS, MI, MO, MT, NM, NV, OH, OR, TX, WA, WY)
Integrated Research and Extension
Multi-state Extension (UT)

Key Theme – Biotechnology

a. In the Department of Molecular Biology at the University of Wyoming, projects are underway that are 1) investigating the genetics of an unusual symbiotic N_2-fixing bacteria, *Frankia* that can provide nutrients for plants, 2) characterizing novel protease enzymes from spiders that could be used as very rapid and effective agents for degrading complex materials such as biological waste or pathogens in the environment, cloning and characterizing heat stable enzymes from thermophilic bacteria useful in genetic manipulation, and generating transgenic plants resistant to a broad spectrum of viral pathogens.

b. Impact – Each year, viruses are responsible for tremendous agricultural and human health-related losses. Even where controls exist, the ever-changing nature of viruses has proven problematic. Animals and plants are susceptible to many types of viruses, and current controls and therapies are typically ineffective or effective only against single viruses.

A research team in the Department of Molecular Biology has developed multi-viral resistance in plants and animals. This team found ways to arrest viral development by inhibiting the function of the double-stranded nucleic acid that a virus produces when infecting its host. They have discovered that a certain type of protein attaches to different types of viral double-stranded nucleic acid, obstructing the nucleic acid's function during infection.

Preliminary studies show that when this protein is expressed in plant cells, it can suppress a viral infection. Although they initially chose plants to investigate the feasibility of the approach, once the system is optimized, it should be applicable to animals and humans. The U.S. Patent

Office awarded a patent for this discovery that covers applications for virus control in plants, animals, and humans.

c. Source of Funding – Hatch, State

d. Scope of Impact – State Specific, but has far reaching impacts

Key Theme – Diversified/Alternative Agriculture

b. The Wyoming Seed Law designates the University of Wyoming Seed Certification Service (WSCS) as the seed certification agency for the state. The mission of the WSCS is to assist the seed industry of Wyoming in producing high quality seed crops that will meet the demands of consumers not only in the United States but around the world. Field and seed standards are utilized by field inspectors and WSCS staff to determine the certification eligibility of specific lots of seed. Twelve crops were inspected in 2000, with a total acreage of 21,603 acres. In addition to certification inspections, phytosanitary inspections are made at the request of seed contractors, with reports to the Wyoming Department of Agriculture for determination of phytosanitary certificate eligibility and issue. These seed lots are destined for export. Aside from field inspections, the WSCS staff works to provide crop production information, to assist producers in locating seed sources, and directing seed producers to other sources of information that might make more profitable. The WSCS also works to promote the awareness and use of certified seed.

Seed borne diseases such as bacterial bean blight can seriously impact dry bean production in areas of the United States, making the use of disease free seed important. The dry climate of Wyoming coupled with the use of rill irrigation rather than overhead irrigation make the state a natural place to produce disease free seed. Recognition of bacterial diseases of beans by Wyoming Seed Certification Service field inspectors is a critical component of Wyoming's quality dry bean seed industry, making training of inspectors and other interested parties very important. A disease training nursery is planted outside the bean seed production area using beans inoculated with bacterial bean diseases and a seed born bean virus. The annual training includes a 2 to 3 hour classroom discussion followed by hands-on training in the plots planted with inoculated seed.

c. Impact – Over 130 seed producers sign their crops up for certification every year, with the expectation that the certification fees they pay will provide an economic benefit to them. Certified seed can command a higher price in the market place, and as an added benefit, the seed producer has an additional person checking their field for critical issues. The current differential for Certified class alfalfa seed vs. common (non-certified) alfalfa seed is $.70 per pound. With an average per acre production of 590 lbs. per acre, that is an additional value of $413 per acre if the crop meets certification requirements. The value of certified seed versus common seed varies from year to year and from crop to crop, but certified seed is consistently higher in value.

The potential loss of Wyoming's dry bean seed industry, which brings a significant amount of money to Wyoming through sales of seed to the main commercial dry bean production areas of

the United States and Canada, through the sale of infected seed would be devastating to an area with limited crop production opportunities. Based on average production figures from the *Wyoming Agricultural Statistics 2000*, the value of the 1999 dry bean seed crop is between $4.83 million and $5.32 million. The impact to individual growers can be significant as well. In 1997, seed prices were significantly higher than commercial bean prices, making the difference in value for a seed crop versus a commercial crop on a 60 acre field approximately $30,000. Properly trained inspectors will have the ability to correctly identify suspect plants in the field and collect samples for laboratory analysis for the determination of the presence of the disease. In 2000, WSCS field inspectors as well as field inspectors from the Montana Seed Growers Association participated in the training.

d. Source of Funds – Hatch, Smith-Lever

e. Scope of Impact – State Specific
Multi-state (WY, MT)

Key Theme – Emerging Infectious Diseases

a. A major focus for the Department of Veterinary Sciences is the study of Emerging Infectious Diseases that are of common concern to both domestic and wild animals. This department is currently investigating whether chronic wasting disease (CWD) of deer and elk is naturally hazardous to cattle. Studies underway are lifetime projects involving both oral administration of CWD containing material to cattle as well as providing immediate casual contact between affected wildlife and cattle. Other research in this department involves survey of feral animals to determine whether vesicular stomatitis virus has a feral reservoir. Related research involves survey of pronghorns to determine whether disease exposure to agents of concern has occurred.

b. Impact – The impact and spread of diseases that are common to domestic and wild animals is an area of focus for this research. Information generated in these projects will aid wildlife managers, USDA regulators, and ranchers in their animal and disease management decisions. Specifically, the risk of transmission of CWD to other domestic species of food animals is of tremendous concern to producers, the livestock industry, and public health officials. A better understanding of reservoirs of disease in animals will help researchers and regulators make more informed decisions about wildlife and grazing management.

c. Source of Funding – Hatch, State

d. Scope of Impact – State Specific, but results have broad implications
Integrated Research and Extension

Key Theme – Managing Change in Agriculture

a. Western Integrated Resource Education (WIRE) is an educational program for ranchers and farmers on the integrated management of agricultural operations. The effort was begun in 1992 and currently involves four states—Utah, Idaho, Montana, and Wyoming. During the past

year, the *WIRE Video Library*, a set of short video tapes was published; a three-week visit of five Australian producers and a Department of Primary Industries extension worker was coordinated and facilitated for the four WIRE states; a final, comprehensive Sustainable Agricultural Research and Education (SARE) grant report for the two regional WIRE projects (#SW96-010 and #SW94-034) for all four states—Idaho, Montana, Utah, and Wyoming was drafted and submitted; the report included among other things: statistics on all 76 programs offered across the four states, Saskatchewan, Canada and Queensland, Australia; press releases and news articles on programs offered; and comments offered by some of the just over 1,000 participants following WIRE programs offered in the region.

An online version of the WIRE course was developed and offered (Spring 2000/Fall 2000) under the College system for University of Wyoming credit. A WWW-based version of an Australian management skills assessment tool was developed using PERL scripts (Practical Extraction and Report Language) and tested with Fall 2000 WIRE online students. Enterprise budgets for the Big Horn-Washakie County area of Wyoming were published in hard copy and WWW formats; an update of the bulletin *Custom Rates for Wyoming Farm and Ranch Operations 1998-99* was completed and published in hard copy and WWW formats; A subcommittee of the Western Farm Management Extension Committee (WFMEC) and the Western Extension Marketing Committee (WEMC) joint project on risk management collectively developed the "Virtual Risk Management Library", supported and hosted by the University of Wyoming Department of Agricultural and Applied Economics WWW server and targeted for western producers and agricultural professionals; and the risk management handbook, *Risk and Resilience in Agriculture*, was published on the University of Wyoming Department of Agricultural and Applied Economics WWW server for distribution to western producers and agricultural professionals from Colorado, Montana and Wyoming.

b. Impact – Collectively the four-state regional WIRE teams offered four WIRE programs to 77 producers. The average overall rating given WIRE programs is a score of 3.22 out of a possible 4 points. Participants reported a number of changes in their approach to management after completing the course, e.g., 69 percent stated that they had begun identifying strategic goals for their operation. Over the reporting period WIRE WWW pages provided general information about the WIRE program and received a total of 13,406 visitors. Two WIRE programs were offered by the Wyoming WIRE team, both online courses. A total of 19 individuals participated, including some from across Wyoming and outside the state.

World Wide Web visitors looking for Farm and Ranch Management publications alone totaled over 900 for the period. The University of Wyoming Farm and Ranch Management WWW pages received a total of 3,244 visitors for the reporting period. Visitors looking for information on the Western Farm Management Extension Committee program information pages totaled 7,278 for the reporting period. The Western Farm Management Extension Committee -Western Extension Marketing Committee joint project, the "Virtual Risk Management Library", collectively provided for the posting of 588 articles in 43 categories/sub-categories; visitations to the library totaled 5,363 for the reporting period.

c. Source of Funding – Hatch, Smith-Lever 3 b&c, State, Private

d. Scope of Impact – Multi-state Extension
(AK, HI, WA, OR, CA, ID, NV, AZ, UT, MT, WY, CO, NM)
Integrated

Key Theme – Ornamental/Green Agriculture Horticultural Businesses in Wyoming

a. Training and on-site assistance was provided to green industry businesses within the state. In addition, field visits to horticultural businesses within the state were conducted. A web page was developed specifically for green industry businesses, whether in Wyoming or elsewhere. Cooperators include the Wyoming Groundskeepers and Growers Association, the Wyoming Community Forestry Council, the Green Industries of Colorado, and the Colorado State University Department of Horticulture and Landscape Architecture, and UWCES specialists in the Departments of Plant Sciences, Renewable Resources, Family and Consumer Sciences, and Agricultural and Applied Economics.

Horticulturally speaking, Wyoming is a quite diverse state. Homeowners and commercial enterprises must contend with low precipitation, frigid temperatures, high winds, and generally harsh climatic conditions. From Albany County, where the altitude at Laramie is about 7200 feet, where less that 11 inches of precipitation falls yearly, and where hail is a common summer occurrence; to Teton County, the fastest growing, most expensive county in which to live in Wyoming; to Sheridan County, where subdivisions are being built at a quick pace, horticulture enthusiasts have much to contend with.

It has been estimated that the average household in Wyoming spends upwards of $800 per year on landscaping and gardening. Data from 1987 to 1992 indicates that the amount of money spent in this area has increased by 67 percent. The green industries in Wyoming contribute upwards of $100 million annually to the state's economy.

b. Impact – Field visits were made to 11 green industry businesses in Wyoming (counties of Laramie, Platte, Johnson, Natrona, Park, and Goshen) to better understand and get to know the individuals within each business. Each opportunity was used to educate industry personnel on the services UWCES has to offer and to let them know that their businesses are important. The commercial green industry web page was developed and can be found at <http://august.uwyo.edu/eppl/Horticulture/commercial.htm>. The e-mail only newsletter *Wyo Grow!* was sent out as needed during the year to 77 green industry representatives in Wyoming, Colorado, Montana, Indiana, Illinois, New Mexico, Ohio, and Iowa.

At the annual Wyoming Groundskeepers and Growers Association Conference, over 200 horticulturists were updated on the latest information concerning landscape plant care and appropriate plant materials for Wyoming. At the annual Wyoming Pesticide Applicators Certification Course, 70 new applicators were trained in Turf and Ornamental Insect Management for their licenses. And at the Pesticide Re-certification Course, 200 licensed pesticide applicators were updated on the latest in landscape pest management tools as part of their licensing requirements.

c. Source of Funding – Smith-Lever, State, County

d. Scope of Impact – Multi-state
(WY, CO, MT, IN, IL, NM, OH, IA)

Key Theme – Plant Germplasm

a. Researchers in the Plant Sciences Department conduct variety trials to identify improved varieties under Wyoming conditions and plant breeding studies to develop improved legumes for disease resistance and introduction in existing cropping systems. Specifically, researchers have been studying annual medics (relatives of alfalfa) to integrate into the winter-wheat system. In semi-arid southern Australia, annual medics are grown in rotation with cereal crops in a "ley" farming system. Researchers have identified medic genotypes with sufficient winter hardiness to survive Wyoming winters. Agronomic research is being conducted to develop a new winter-wheat/medic cropping system that will partially replace fallow and integrate livestock into the system.

Brown Root Rot (BRR), a plant disease discovered in Wyoming, threatens productivity and persistence of alfalfa in the state. Researchers have been conducting research to develop plant genetic resistance to BRR. Research has resulted in an experimental BRR resistant alfalfa cultivar for productivity and long-term persistence in Wyoming and the Rocky Mountain West. A half-acre foundation seed field was established in August 1999.

b. Impact – With legumes grown extensively in the northern Great Plains and the west, potential impacts of plant breeding research on legumes are enormous both in terms economics and sustainable crop/livestock systems. For example, the development of a new winter-wheat production system that includes annual medics has the potential to provide soil nitrogen, decrease soil erosion, improve soil quality, integrate livestock, and improve profitability. Development of a BRR resistant alfalfa cultivar will improve alfalfa persistence and yield on over 25,000 acres in Wyoming, but the extent of the disease in Wyoming and other states in not known.

c. Source of Funding – Hatch, State

d. Scope of Impact – State Specific
Integrated Research and Extension
Multi-state Integrated Research and Extension (W-006)
(AK, AS, AZ, CA, CO, GU, HI, ID, Micronesia, MT, NM, NV, Northern Marianas Islands, OR, UT, WA, WY)

Key Theme – Plant Production Efficiency

a. Researchers at the Wyoming Agricultural Experiment Station conduct studies on all major crops, forages, and rangelands. Major research efforts in the plant efficiency area are: 1) biology and control of weeds, 2) plant disease recognition and control, 3) crop production practices, and 4)crop/legume production systems. Specific projects range from basic research to elucidate mechanisms of plants to long-term applied research on cropping systems. For

example, alfalfa, with the largest acreage in Wyoming, is an important crop for the state. Brown Root Rot (BRR) was first detected in the U.S. in an alfalfa field in Wyoming in the spring of 1996. Previously it had been reported to cause yield and stand losses in Canada. Researchers conducted a survey to determine the extent of BRR in Wyoming. Researchers developed a procedure to identify the disease in alfalfa, began efforts to develop a resistant variety, and initiated BRR management strategies. Sugar beets are grown on 58,000 acres and provide Wyoming producers over $42,000,000 annually. Researchers at UW have been involved in studies designed to evaluate the feasibility of reducing herbicide rates on sugar beets. The micro-rate program involves using lower rates of herbicides, in combination, that are applied three or more times during the growing season, at five to seven day intervals. This research led to the development of a micro-rate herbicide program for weed control in sugar beets. The 2000 growing season was the first year the micro-rate program had a federal label for application. Ninety and 45 percent of the sugar beet acres were treated with the micro-rate program in the Big Horn Basin and North Platte Valley respectively, in 2000.

The University of Wyoming Extension Plant Pathology Lab (EPPL) is the University of Wyoming's source of plant pathology information. The EPPL provides information to Wyoming and regional producers on crop production and disease management. It also provides information to homeowners and deals with all plant species. The EPPL also provides a facility for submitting samples for disease diagnosis and receiving disease management recommendations. Educational programs include extension presentations, applied research and demonstration plots.

Annual losses attributed to Rhizoctonia root and crown rot are estimated to exceed two-three percent total sugar loss for 185,000 acres of sugar beet grown in the irrigated High Plains region (CO, MT, NE, and WY). A one percent decrease in sugar content is lost revenue of approximately $78 per acre. Field trials at Torrington demonstrated that properly timed applications of "environmentally safe" azoxystrobin increase yields by an additional 72 percent for sugar beet exposed to moderate to severe disease situations. Results are being utilized by the EPA to develop labels for this new fungicide.

Cercospora affects 80,000 to 100,000 acres of sugar beet in the High Plains. Costs of control are estimated at approximately $26 to $54 per acre. The cost of fungicide in the SE Wyoming District is approximately $320,000 to $664,000. Surveys done by the UW EPPL in cooperation with Western Sugar demonstrated that some production areas have Cercospora populations that are becoming resistant to commonly used fungicides. Therefore, fungicide is being wasted at great economic impact to the grower and the environment.

Field Research and demonstration plots were established at the Torrington Research and Extension Center. These plots included demonstrations on: Management of Potato Late and Early Blight, Seed Treatments to manage Post-emergence Potato Pests, Potato Vine Desiccation and Tuber Quality Effects, Dry Bean Rust Management in Southeastern Wyoming, Bacterial Ring Rot Symptom Development in Selected Potato Cultivars, Management of Foliar and Soil-borne Sugarbeet Diseases, and Early Blight and Late Blight Epidemiology.

b. Impact – The economic and environmental benefits of research being conducted in the plant production efficiency area are enormous and wide spread. For example, based on a five county survey, it was estimated that 42 percent of the fields were infested with BRR. The five counties surveyed grow about 55,000 acres of alfalfa and there are approximately 600,000 acres of alfalfa grown in Wyoming. Research is continuing to determine the extent of BRR impact on alfalfa in the state. The micro-rate herbicide program in sugar beets has resulted in post-emergence herbicide rates being reduced by 66 to 75 percent. With over 50 percent of the sugar beet acres using the micro-rate program, application of post-emergence herbicide has been reduced on over 29,000 acres of sugar beets in Wyoming.

   Field trials demonstrated the most effective fungicide chemistries for Cercospora management under field conditions. Educational programs on IPM approaches for Cercospora management and the proper use of fungicide have been developed for, and delivered to, growers. Increasing the efficacy of a single fungicide spray on 80,000 acres will have an impact of at least $1 million regionally. Field plots at Laramie demonstrated Bacterial Ring Rot Symptom Development in Selected Potato Cultivars, Management of Seed-borne Potato Late Blight, and Transmission of Potato Virus Y by the Cutting Knife. Field plots near Sheridan provided information on bean disease diagnosis for certification personnel. Research Plots Located in Grower-Cooperator Fields were on Early Blight Epidemiology, and Fungicide timing for Early Blight Management. The Extension Plant Pathology Lab processed 322 plant disease samples during 2000. 28 educational presentations were delivered throughout the state, region and US. Outside funding generated for regional plant diseases research and plant pathology extension efforts was $111,700. Selected 1999-2000 publications were in the form of articles in: Popular Press (6), Extension and Agricultural Experiment Station (15), Theses and Book Chapters (5), Refereed Journals (2), Other Reviewed Research Journals (18), and Reports to Granting Agencies (32).

c. Source of Funding – Hatch, State

d. Scope of Impact – State Specific
   Integrated Research and Extension
   Multi-state Integrated Research and Extension (NC-226)
   (IL, IN, KY, MD, MI, MO, NE, NY, OH, OK, PA, SD, VA, WI, WY)

Key Theme – Rangeland/Pasture Management

a. Extension specialists and County based educators have provided education in grazing and other vegetation management practices through a variety of methods including presentations, demonstrations, field tours, print media, and guided collaborative problem solving with land users and land management professionals. Rangelands dominated by native plants and irrigated pastures provide the vast majority of feed resources for animal agriculture, comprising over 70 percent of receipts from agriculture in Wyoming. Training was provided in coping with endangered species, in methods of regulating timing, intensity, and frequency of grazing, achieving effective distribution of grazing use, determining when sufficient grazing had occurred to warrant movement to the next pasture unit, predicting forage yields and planning ways of adjusting for annual fluctuations in yield, management intensive grazing,

unwanted plant management, irrigated pasture grazing including troublesome forages like alfalfa, and plant growth management in irrigated systems.

Research is being conducted to refine grazing systems that foster ecological and economic sustainability on short-grass prairie rangelands. Aspects that are in particular studies include livestock performance, native plant forage production and species composition. Experiments also examine the pros and cons of adopting a late-calving strategy.

b. Impact – Producer recipients of collaborative educational efforts took appropriate actions or in some cases saw potentially adverse actions forestalled in federal grazing allotment management. New grazing strategies were adopted. Grazing decisions such as movement of livestock to other pastures during the grazing season are made based on monitoring of use levels. Permittees took a more active role or took charge in development of allotment management plans. Uncalled for proposals for changes in stocking levels on permits were rescinded. Federal agency managers demonstrated a trust in objective resource management recommendations when they asked for assistance in clarifying issues and remedial grazing management and monitoring actions. Major producer organizations were provided training. Private pesticide applicator licenses for numerous landowners have been renewed for continued judicious application and landowners with coalbed methane production on their property are now more knowledgeable in dealing with drillers and product water discharges.

A research and educational effort with Grand Teton National Park has influenced implementation of extensive land treatments, primarily burning, animal management proposals, and extensive public debate over resource management. A long term demonstration project has shown that the degree of fluctuation in annual forage composition and production is predictable based on April precipitation, knowledge that can be applied in formulating annual grazing management as well as long term adaptive management strategies such as responding to frequently occurring dry years with low forage production.

Grazing system research has influenced many of the producers in the region to make refinements on how they manage their herds and pastures (e.g., criteria for determining stocking rates relative to maintenance of a desirable plant composition). Some ranchers in the area have adopted a late-calving strategy based on the results of this research, which show that the profit associated with this practice is greater than the historical pattern of calving earlier in the season

c. Source of Funding – Smith-Lever, State

d. Scope of Impact – State Specific

Key Theme – Small Farm Vitality

a. Several counties in Wyoming are experiencing rapid growth in small acreage ownership. Extension educators organized educational efforts targeted to owners of small acreages, in cooperation with Conservation District personnel. These programs covered management issues/techniques ranging from managing noxious weeds, feeding livestock, pasture and

forage management, pasture renovation, landscaping, as well as many other issues on small acreages. A newsletter was generated and a resource guide compiled to help in the management of small acreages.

b. Over 85 persons attended a regional workshop where 12 concurrent sessions where offered on rural acreage management issues. Work on the resource guide resulted in the project nearly completed. In addition, 200 persons received the newsletter mailed four times this past year, a pasture demonstration showed a financial savings of 50 percent when compared to traditional tillage, fifteen landowners indicated a strong response to trying the no-till option on their properties, and two individuals purchased no-till drills following the demonstration.

c. Source of Funding – Smith-Lever 3 b&c, State, County

d. Scope of Impact – State Specific

Key Theme – Urban Gardening - General Horticulture

a. Researchers in the Plant Sciences Department are conducting studies to determine the incidence of Cytospora canker on cottonwoods in Wyoming and to determine if new botanically derived fungicides have an effect on growth and development of Cytospora. Research is also being initiated on Castilleja linariifolia (Indian Paintbrush) to determine if it can be produced for commercial uses from seed propagation and cutting propagation techniques.

   County extension offices in Wyoming, whether or not they have a horticulturist on staff, have stated that about half of their calls are horticultural in nature. Each county office, then, spends a considerable amount of time and energy on resolving these horticultural issues. Five county offices have locally funded, trained horticulturists on staff, with only one full time. Question topics range from every plant from turf to trees, and every problem from pests to hail damage.

b. Impact - During 1999-2000, at least 4,400 contacts regarding horticulture were made by UW Cooperative Extension Service field personnel. These do not include the Master Gardener Program. These contacts were made by telephone calls, walk-in customer, horticulture education programs, 4-H gardening projects, tours, and on-site field calls. An additional audience of at least 120,000 was reached via newspaper articles and radio programs plus occasional local television shows.

   One fact sheet was completely revised and published during the year, the *Wyoming 4-H Vegetable Judging Handbook*. Three others were in various stages of publication at the end of the federal fiscal year: *Recommended Trees for Wyoming*, *Iron Deficiency Chlorosis on Woody Plants in Wyoming*, and *Tough Trees for Wyoming*. A horticulture web page was established during the year, but at year's end, was not functional due to changes in web masters. *Short Hort Notes*, which reached 35, is a closed distribution list, sent only to UWCES personnel and a few select others outside the system.

   Three or four research/demonstration projects showed promising results during the year:

Indian paintbrush (*Castilleja*) as a potential horticultural crop for Wyoming, successfully produced Indian paintbrush from seed; test of two new plant growth regulators found to be effective on carrots and edible-pod peas in increasing yield and quality and decreasing time to harvest and new seaweed-based fertilizers tested on carrots and peas that showed negligible results, and demonstration garden plots with over 40 different varieties of perennials and a few annuals each year.

Several specialists collaborated on a series of compressed video horticulture question and answer sessions during the summer. Nine one-hour sessions were hosted with live, interactive feeds to UW horticulturists. Field staff along with several Master Gardeners, a few private citizens (including a 5 year old girl), and specialists were able to talk, discuss current problems, show samples, and relay diagnostic and management information. Sixty-nine percent of those responding to the survey would like to see the session held again next summer. An impressive 94 percent used the information learned during these sessions.

c. Source of Funding – Smith-Lever, State, County

d. Scope of Impact – State Specific
Integrated Research & Extension

Goal 1 Summary:

The College of Agriculture conducts research and provides educational programs on agricultural systems and profitability throughout the state. A few of the college's on-going programs in the Goal 1 area are:

1. Economics of farm/ranch systems with respect to profitability and risk
2. Reproductive performance in domestic ruminants
3. Brown Root Rot resistant alfalfa cultivars
4. New and emerging animal diseases
5. Extended cropping systems with emphasis on incorporating forages

In this program area, researchers have been active in 11 ongoing Hatch projects, 4 multi-state projects, and 8 coordinating committees. Well over 50 percent of the projects are integrated research and extension efforts. The approximate effort related to this program for the AES is 17.8 FTEs with expenditures of $.85 million Hatch and $2.29 million State.

Cooperative Extension Service FTEs	18.65
Goal 1 Allocated Funds	$1,473,350

Goal 1: IMPACTS

ISSUE - Natrona County Master Gardener Training provides introduction to horticulture
The volunteer members of the Natrona County Master Gardener Program provide invaluable assistance to support UW CES in its Urban Horticulture outreach efforts. Casper-area Formal Master Gardener volunteer training was initiated in 1983 in an attempt to more efficiently address the horticultural inquiries of local residents. The hard work and devotion of many long-term Master Gardeners in and around Casper have allowed the Natrona County Master Gardener Program to grow and flourish.

The successful attraction, training, and retention of willing and knowledgeable volunteers requires constant program innovation. The Natrona County Master Gardener Training Program has had consistent success with attracting trainees each year. Despite the abundance of new trainees, however, the program has been forced to cope with extremely low rates of retention and ongoing volunteer participation.

What has been done
As an innovation for the year 2000, the Natrona County program provided an expanded evening training schedule with more than 50 hours of classroom instruction. Program leaders also implemented two distinct training options and corresponding sets of program incentives to encourage volunteer service among new Master Gardener trainees.

Option I, Traditional Master Gardener Training, provides more than 50 hours of horticultural education in exchange for 50 hours of volunteer service over the course of two years, at an initial cost of $250. After the completion of 25 hours of volunteer service, participants receive a $75 tuition refund. After the completion of the remaining 25 hours of service, participants receive an additional $75 refund. The result is an actual training cost of $100.

Option II, Alternative Master Gardener Education, provides more than 50 hours of horticultural education, with no commitment of volunteer service, at a cost of $250. This training option is meant to attract individuals who are unable to contribute their time as volunteers but who are interested in formal horticultural training.

Impact
The financial incentives built into Option I, Traditional Master Gardener Training, are extremely effective in encouraging trainees to become active and to volunteer on an ongoing basis. One of the unforseen benefits of the overall fee structure is that it attracts a pool of trainees who are truly dedicated to participating in the training process and to learning about horticulture. Scholarships are available for the actual cost of training materials.

Option II, Alternative Master Gardener Education, provides a unique opportunity for individuals to increase their horticultural knowledge without making a volunteer commitment. The comprehensive, 16-chapter curriculum for Option II is unique both for Natrona County and for the state of Wyoming. At present, there is no similar educational program that provides a college-level introduction to horticulture to members of the general public.

The following statements, received from participants in this year's Master Gardener Training Program, reflect the positive impacts of both training options in Natrona County:
"I can already make more informed decisions and now know where to find additional information as I need it."
"I've enjoyed the classes tremendously. I've gained a great deal of knowledge, and I'm excited to start gardening."
"This was not just a refresher for me, but a completely new learning experience."
"I'm more informed. I'm confident that I'll be able to properly advise homeowners and to present them with different solutions."
"Offering different training options appealed to many more people. These options provided more opportunities for people to complete and stay involved with the program."
"The cost of this year's training program was appropriate for our area."
"I believe the cost of this year's training program was a great value, especially with the option to offset the initial cost by contributing as a volunteer."
"The cost was appropriate. I liked the program incentives that were available for lowering the overall cost."

David Lentz
Horticulture Program Associate
Natrona County Extension Office
University of Wyoming
307-235-9400
307-265-0419 FAX
dlentz@natrona.net

ISSUE - UW CES teaches gardening as a life skill to young offenders

The Wyoming Honor Conservation Camp (WHCC) is a minimum-security correctional facility located in Weston County. Housed within the WHCC is the Wyoming Boot Camp for young offenders. Although these young men, ages 15 to 25, have broken the law, the legal system believes they have a better chance for rehabilitation by incarceration in a military style boot camp than in the standard penal system. The average term of incarceration in the Boot Camp is 120 days, and the maximum term is 1 year. Boot Camp graduates must possess or obtain a high school diploma or GED and earn sufficient points for attitude and behavior changes. The Wyoming Boot Camp has a 75 percent success rate in preventing second offenses.
The duties and activities of the 47 inmates are highly regimented. They rise at 4 a.m. and are kept busy until lights-out at 9 p.m. An inmate's day includes counseling, physical training, academic classes, and work in the camp garden. Before UW CES became involved with WHCC, most inmates had minimal, if any, exposure to gardening.

What has been done
This past year, the Boot Camp staff requested that UW Weston County CES present a series of classes to inmates on the basic principles of gardening to give them an appreciation for and understanding of what they were doing in the camp garden, as well as to provide valuable life skills for the future. Weston County Chair Bill Taylor agreed to develop a pilot program to deliver

weekly classes on a four to six week trial basis. The class was required of all inmates not involved in other activities and varied from 25 to 50 participants, averaging approximately 35. Taylor developed six 50-minute lessons, which were delivered during consecutive weeks in August and September 2000.
Taylor administered a pre-test at the beginning of the first lesson. The following lessons were subsequently taught:

- Soils
- Plant Science
- Preparation, Planting, and Care
- Pests and Pathology
- Harvesting and Winterizing

Students were asked to complete two homework assignments, including a collection of plant types and a fertilizer problem. At the end of the six weeks, participants took a post-test. During the seventh and last class, they watched a video on square-foot gardening and received their scored pre- and post-tests.

Impact
The improvement in scores from the pre-test to the post-test was the most definitive measure of impact in this project. Of all the students who took the class, only 12 took both tests. The range of change was from an 11 percent decrease in performance to a 300 percent improvement in performance, with a 31 percent improvement average. Camp staff and the caseworker who coordinated the trial period believed the program was a success, and beginning in March 2001, the class will be taught to camp inmates on a regular basis.

Another indication of impact was the enthusiasm for and reception of the class by the inmates. Following the first session, inmates asked astute questions about gardening and requested copies of the overheads. During each class after that, Taylor provided copies of the materials, and usually 30 or more copies were taken. He also received requests for copies of all the final class materials from inmates who were graduating and could not attend the last class. Everyone wanted to complete the course, and enthusiasm remained high throughout the entire trial period.

Bill Taylor
Associate University Extension Educator
Weston County Extension Office
University of Wyoming
307-746-3531
307-746-2870 FAX
weston@uwyo.edu

Goal 2: Enhance a safe and secure food and fiber system

Overview

Researchers at the University of Wyoming seek to improve the quality of life through research and education that fosters a safe and secure food supply, promotes enjoyment of food that is nutritious and affordable, and supports Wyoming residents' health.

Given the public's varied avenues for access to food, reducing the risk of food-borne illness necessitates comprehensive educational intervention from the producer to the consumer – truly a 'farm to table to plate' approach. At all levels, the food safety activities will build on principles of HACCP, (Hazard Analysis and Critical Control Points), the prevention-based food safety system that identifies and monitors food-borne hazards. Agricultural producers, food processors, food-service personnel, and home food preparers are critical points of control for food-borne illness. Research addressing food quality and safety issues directed at these processing, handling and preparation sites is key to enhancing the food supply. Research supported educational programs which expose the expanding base of food-safety knowledge and emergence of new pathogens and more virulent strains of existing ones is necessary at all levels to reduce food- borne illness and increase food quality.

Researchers in Animal Science are conducting food quality studies designed to improve the nutritional value of beef and lamb, extend product shelf life, and control food-borne pathogens. It is anticipated that their results will lead to an enhanced nutritional value, extend shelf life, and reduce food-borne pathogens of meat products. Research involving both Animal Science and Molecular Biology researchers has lead to the development of a more effective antibiotic beneficial in protecting foods stored at low temperatures. Research and extension professionals at the University of Wyoming are also involved in projects focusing on issues of safe and secure food systems.

Key Theme – Food Resource Management

(Based on *Cent$ible Nutrition Program* [*CNP*], University of Wyoming [UW] CES's food and nutrition program for limited resource audiences that combines EFNEP and the Food Stamp Nutrition Education Program [FSNEP]; in FY00, CNP educators in 18 of 23 counties and 1 reservation office worked with 1083 households representing 3,204 people enrolled in a lesson series, and 17,033 persons participated in one-time lessons)

a. Educators helped clients learn to plan meals, compare prices, use grocery lists, and provide food for the entire month.

b. Impact - Households averaged a savings of $40.00 per month on groceries. 84 percent of homemakers showed improved in one or more food resource management practices. On entry surveys, 25 percent of participants demonstrated acceptable practices, in contrast to 58 percent on exit surveys. Sample success story: "I have learned how to feed my family more nutritiously, and I have cut $100 (at least) per month from our grocery bill. Thank you."

c. Source of Funding - Smith-Lever 3-D (EFNEP), USDA Food & Nutrition Service with local and state matching (FSNEP)

d. Scope of Impact: State Specific

Key Theme – Food Quality

a. The American public has become increasingly concerned with food quality and safety issues. Researchers in Animal Science are conducting studies to improve the nutritional value of beef and lamb, extend product shelf life, and control food-borne pathogens. For example, studies involve feeding ruminant livestock vegetable oils to increase conjugated linoleic acid content of the carcass. Dietary antioxidants are being tested as a potential venue to extend retail shelf life of meat from ruminant livestock. Researchers are also conducting studies on the combination of two novel methods, a biopreservative and non-thermal hydrostatic pressurization, to evaluate the level of destruction of pathogens in packaged ready-to-eat meat products. In another study, research is being conducted to compare total lipid fatty acid profiles of bison, beef, chicken, and elk meat. The influence of bison and other meats on growth, serum lipids, and eicosanoid production is being determined through a mouse trial.

b. Impact – Research results that enhance nutritional value, extend shelf life, and reduce food-borne pathogens of meat products will improve consumer acceptability of meat products and have the potential to provide human health benefits.

c. Source of Funding – Hatch, State

d. Scope of Impact – State Specific, but results would have broad implications.

Key Theme – Food Safety

a. A joint project between faculty in Animal Science and Molecular Biology has developed a more effective antibiotic useful in protecting foods stored at low temperature from growth of bacteria that can cause human disease.

(Based primarily on three programs: *Cent$ible Nutrition Program* [*CNP*]; *Wyoming Food Safety Coalition* [*WFSC*], a 70-member partnership that includes 20 trained teams consisting of a UWCES Family and Consumer Sciences educator and a health inspector who together conduct food-safety workshops with local food handlers; and *USDA Food Safety and Quality Multi-State Project: Value and satisfaction with food safety training in the Intermountain West*)

CNP: Educators helped clients learn to thaw and store foods properly and to wash hands frequently and thoroughly.

WFSC: Local teams trained nearly 1292 food handlers via internally developed *Going for the Gold* workshops (Basic, Intermediate, and Advanced) and via *ServSafe* manager certification training developed by the Educational Foundation of the National Restaurant Association.

USDA Food Safety and Quality Multi-State Project: Food-service managers in three states were surveyed regarding the following: their satisfaction with current food-safety training programs, the value they placed on food safety training in general, and whether they could provide higher pay for those trained in food safety.

b. Impact – Pediocin, a peptide produced by a common bacterium, can prevent the growth of other, pathogenic bacteria. UW scientists have cloned the gene for this peptide and used

genetic mutations to increase its effectiveness. They are now investigating the mode of action of the antibiotic to facilitate making other changes to further increase the effectiveness and block acquired resistance in *Listeria*, the target organism.

CNP: 64 percent of homemakers showed improvement in one or more of the food safety practices. On entry surveys, 30 percent of participants demonstrated acceptable practices, in contrast to 56 percent on exit surveys.

WFSC: Based on follow-up surveys from 175 workshop participants (62 percent response rate): 97 percent made at least one change related to cleanliness, for example, 74 percent wash their hands more thoroughly; 78 percent made at least one change related to food preparation, for example, 55 percent thaw food in the refrigerator or under running water; 70 percent made at least one change related to cooking food, for example, 52 percent use a thermometer to check if a food is cooked or reheated enough; 80 percent made at least one change related to cooling food, for example, 54 percent put food into shallow containers or cutting meat into smaller pieces before putting it in the refrigerator; and 75 percent made at least one change related to other miscellaneous areas, for example, 54 percent inspect incoming food more closely.

USDA Food Safety and Quality Multi-State Project: The following results were documented: Approximately 75 percent of respondents had some type of food safety training in place, 67 percent were satisfied with the training received, 72 percent of managers said they would be more likely to hire food-safety trained workers, 50 percent would be willing to pay a higher wage to those trained, and customer satisfaction and image were the most important issues to the surveyed businesses.

c. Source of Funding – Smith-Lever 3(d) EFNEP and USDA Food & Nutrition Service with local and state match (FSNEP), state agencies

d. Scope of Impact – State Specific
Multi-state (2+3+5) (WY, CO, MT)
Integrated

Goal 2 Summary:

he College of Agriculture provides educational programs across the state; two of the on-going programs are *Going for the Gold* and *Food Safety Training.* Research efforts are focused on developing more effective means of protecting foods stored at low temperature as well as improving the nutritional value of beef and lamb. The research effort in this area involves approximately .49 FTEs with an expenditure of $.09 million State.

Cooperative Extension FTEs	4.87
Goal 2 Allocated Funds	$384,730

Goal 2 - IMPACTS

ISSUE - Food Safety

Each year, 6.5 to 33 million people in the United States get food-borne illnesses. The estimated medical costs and productivity losses range from $6 to $34 billion a year. The food industry loses money and reputations--through food poisoning outbreaks, loss of business, and employee illness. Individuals are eating out more than ever before and are confronted with properly--or improperly--handled food. Food safety is a major issue recognized by USDA CSREES.

What has been done

The Platte County Food Safety Coalition has provided over 17 programs in the past year for a total of over 218 students, food service workers, and other clientele. The training was expanded at the junior high to include intermediate food safety training for eighth graders. They bring their parents and friends to try to activities we plan for the local health fairs. Their family and consumer sciences teacher and their counselor have them working on a career portfolio. Their Going for the Gold card will be a part of that portfolio, according to the teacher.

Grade school and pre-school teachers have expressed concerns with children not washing their hands, as needed, to prevent disease in the classroom. The team has provided 4 grade school classes in Platte County to address this issue.

This year, for the first time, ServSafe was taught to 10 high school students working in food service. This was done in cooperation with the School-to-Careers program. Their wages were paid by employers while the School-to-Careers grant paid their registration.

Impact

The Coalition is contacted on a regular basis by teachers to provide basic Going for the Gold food safety training and hand-washing programs. The Coalition also provides regular and seasonal food safety trainings for professional food service workers, fund raisers and other community members.

In 1999-2000, 73% of 90 junior and senior high students were certified in the basic level of the Going for the Gold food safety program.
80% of students passed the National Restaurant Association certification exam. 92% of our total ServeSafe students were certified. During the training, three students answered questions with what they'd learned (almost verbatim) in our junior high food safety training.

Consumer Health Specialist (inspector) reports that she'd seen so many positive changes int he food service establishments in Platte County from those participating in our food safety programs. She has gone from not being willing to eat in some establishments to being willing to eat in any restaurant in Platte County. She attributes this change to the food safety trainings the Platte County Food Safety Coalition provides.

Chris Pasley
Associate University Extension Educator

University of Wyoming
307-322-3667
307-322-4410 FAX
chrisp@uwyo.edu

Goal 3: Enhance a healthy, well-nourished population

Overview

Many Americans appear to have less than positive attitudes about healthy eating that would provide them with the nourishment needed to sustain life and promote their health. Additionally, many individuals have eating and exercise habits that are not in keeping with recommendations for optimal health. A recent survey indicated that Wyoming residents tend to be too sedentary and eat too few fruits and vegetables.

To improve the health of Wyoming residents, research and education programs focus on eating and exercise habits based on recommendations for optimal health. The College of Agriculture conducts research and provides educational programs to adults and youth throughout the state that enables them to make health-promoting choices. Wellness in Wyoming is one new approach to promote people feeling good about whom they are and motivating them to maintain healthy behaviors. In the past year Wyoming researchers have generated substantial extramural funding to support their programs.

University of Wyoming research in the area of human health has focused on cardiovascular stress, neuromuscular disorders and intracellular bacteria pathogens. Researchers are seeking ways that will block the cell to cell transmission of intracellular bacteria pathogens, thus more easily controlling the infections caused by these bacteria.

Human nutrition research has included studies involving omega 3 fatty acids as a non-pharmacological means of controlling asthma. Researchers demonstrated that approximately 50 percent of the asthmatics studied benefited from consuming relatively high levels of omega 3 fatty acids. Further human nutrition research has focused on the bioavailability and metabolism of suitably tagged foods and nutrients. Wyoming's part of this multi-state research project investigated the effect of a number of dietary interventions on oxalate absorption and urinary excretion. Among the results was the finding that consumption of rich sources of calcium and magnesium with high oxalate containing foods exerts an effect against the formation of calcium oxalate kidney stones.

Key Theme – Human Health

a. Projects in the Department of Molecular Biology include 1) studies of mechanisms of hypoxia sensing in cardiovascular stress, 2) genetic and biochemical studies of mitochondrial integrity and function that can affect neuromuscular disorders, and 3) identifying the mechanisms of motility used by intracellular bacterial pathogens of humans such as Rickettsia (Rocky Mountain Spotted Fever) and Chlamydia (urethritis).

(Based primarily on *WIN Wyoming* [*Wellness IN Wyoming*], a state-wide collaboration of more than 70 educators and health-care professionals representing over 55 public and private entities at the community, state, and university levels). Members educate people to respect

body-size diversity and to enjoy the benefits of active living, pleasurable and healthful eating, and positive self-image.

b. Impact – Intracellular bacteria pathogens have developed mechanisms to move between mammalian cells and spread infections. They can take over a normal human cell motility system, actin-based filaments, to move to and infect neighboring cells. If this mode of transmission can be blocked, the infections caused by these bacteria can be more easily controlled.

Inspired WIN the Rockies, a USDA/IFAFS-funded $4.375 million health improvement project starting FY01 in Wyoming, Montana, and Idaho (of the 1000 proposals submitted, 86 were funded, and UW's was the largest single award); selected as one of three Health Programs of Excellence nationwide by CSREES's Diet, Nutrition, and Health Base Program; reached 2,797 adults and youth through the *Size It Up!* presentation; funded two model projects; posted monthly thought bullets, other resources, and member information at < http://uwacadweb.uwyo.edu/winwyoming>; and co-sponsored *Shaping a Healthy Future: A Rocky Mountain Conference on Weight Realities* in Jackson Hole, which resulted in 300 participants hearing nationally and internationally known speakers on food, physical activity and body image, 18 students receiving university credit for a conference-related project, and outstanding evaluations, e.g., "Absolutely one of the best conferences I have attended in my 29-year professional life" and "It has inspired me to do something similar in my state."

c. Source of Funding – Smith-Lever, State, Private

d. Scope of Impact – State Specific
Multi-state
(WY, CO, ID, IL, KS, KY, MA, MO, MT, NE, NM, ND, OR, PA, UT)

Key Theme – Human Nutrition

a. (Based primarily on one program and one research project: *Cent$ible Nutrition Program* and *USDA Multi-State Research Project W-191: Factors influencing the intake of calcium-rich foods by adolescents*)

CNP: Educators helped clients learn to plan meals, make healthy food choices, provide breakfast to their children, read labels, and prepare foods without salt.
USDA Multi-State Research Project W-191: University of Wyoming co-principal investigators (food and nutrition specialist and 4-H youth specialist) on this 11-state project collaborated with county-based UWCES educators to pilot-test part of the survey to be used in the full study and then to pilot-test the complete survey.

The effect of diet on inflammation and inflammatory processes with a primary focus on ovulation and asthma, two of the best characterized inflammatory reactions. Studies this year have demonstrated that there is a greater immune benefit if the person consumes elk or range fed bison or beef. Further, although poultry is touted for its health benefit, in immune reactions, consuming grain fed bison or poultry reduces the immune benefit. The immune response is further compromised by consuming grain fed beef meat. In feeding rats oils enriched in the

shorter omega 3 fatty acids, linolenic acid, or olive oil, ovulation was enhanced to the same extent exhibited with fish oil ingestion when compared to a vegetable oil base**.** Results from ovulation studies and consumption of fish oil, in particular, the long-chain omega 3 fatty acids, imply that by altering the oils in our diets to include olive oil or those with higher levels of omega 3 fatty acids such as canola oil derived from rape seed, an improvement in reproductive success will be seen. These results could have far reaching benefits for those involved in crop husbandry.

A researcher in the Family and Consumer Sciences Department is focusing on human dietary studies to determine the bioavailability and metabolism of suitably tagged key foods and nutrients. This information will then be used to construct physiologic models of the dynamics of nutrient metabolism for an understanding of the preventive properties of proper nutrition. A secondary objective is to determine nutrient bioavailability and/or requirement differences in subpopulations including those based on race, gender, stage of life cycle, and lifestyle. To more efficiently use resources in human studies, initial work in animal models or tissue culture are required.

b. Impact – The asthma research is in agreement with previous work that has demonstrated that approximately 50 percent of asthmatics will achieve a benefit by consuming relatively high levels of the omega 3 fatty acids found in fish and fish oil. Data from the asthma and omega 3 fatty acids research implies that there may be a non-pharmacologic means of controlling asthma if enough fish or fish products can be realistically consumed. Alternatively, that augmentation of the diet with small levels of encapsulated fish oil may ameliorate problems associated with asthma if the competing oils found at high levels in vegetable oils are also controlled. The inclusion of omega 3 fatty acids (also called n-3 polyunsaturated fatty acids or PUFA) in the diet overrides the potential deleterious effect of over consumption of vegetable oils high in n-6 PUFA as encouraged in an effort to reduce the incidence of heart disease. More importantly, this research indicates the relative importance of balance in the diet and how an imbalance can impact diseases such as asthma or a process normally not believed to be influenced by diet, ovulation, or may be involved in immune system regulation.

Ninety two percent of homemakers showed improvement in one or more nutrition practices. On entry surveys, 10 percent of participants demonstrated acceptable practices, in contrast to 39 percent on exit surveys. Dietary intakes improved in terms of protein, calcium, and vitamins A, C and B-6. Intakes of fats, oils, and sweets decreased. Sample success story: One client stated she never ate breakfast. She now eats something after she wakes up and makes sure her little girl eats something within 2 hours of waking.

The 11-state research team has developed and validated a calcium-specific food-frequency questionnaire for Asian, Caucasian, and Hispanic adolescents and has developed and tested a motivator-barrier questionnaire to assess factors that serve to encourage or discourage intake of calcium-rich foods among these same ethnic groups. In doing so, the team is making available two tools for use by researchers and practitioners and is fostering a deeper understanding of and appreciation for diversity.

During the past five years, a series of studies completed at the University of Wyoming have investigated the effect of a number of dietary interventions on oxalate absorption and urinary excretion. Overall conclusions are as follows: 1) Intestinal absorption of dietary oxalate excretion, 2) Oxalate absorption/urinary excretion can be markedly decreased by the concomitant ingestion of either calcium and magnesium with dietary oxalate, and 3) Consumption of rich sources of calcium and magnesium, in conjunction with high oxalate-containing foods exerts a protective effect against the formation of calcium oxalate kidney stones.

c. Source of Funding – Smith-Lever 3(d) (EFNEP), USDA Food & Nutrition Service with local and state matching (FSNEP)

d. Scope of Impact – State Specific,

Multi-state research (NC-167) (W-191)
NC-167 (CA, CO, IA, IN, KS, LA, MI, MN, ND, NE, OR, TN, TX, WI, WY)
W-191 (AZ, CA, CO, HI, ID, IN, NV, NM, UT, WA, WY)
W-143 (CA, CO, IN, MA, MI, NE, NM, OR, WA, WY)
Integrated Research and Extension

Goal 3 Summary:

The College of Agriculture conducts research and provides educational programs to adults and youth throughout the state, enabling them to make health-promoting choices. Wellness in Wyoming (WIN Wyoming) is a new effort and has been expanded to a multi-state project to promote people feeling good about whom they are and motivating them to maintain healthy behaviors. University of Wyoming research in the area of human health has focused on intracellular bacteria pathogens and studies on human nutrition and health. Researchers in this area participate in 2 Hatch projects and 2 Multi-state projects. The research effort in this area includes about 3.2 FTEs with expenditures of approximately $.05 million Hatch and $.40 million State.

Cooperative Extension Service FTEs	25.34
Goal 3 Allocated Funds	$2,001,860

Goal 3 - IMPACTS

ISSUE - Cent$ible Nutrition Program enjoys continued success throughout Wyoming

Cent$ible Nutrition has just completed its third year. The program includes both the Extension Family Nutrition Education Program (EFNEP) and the Food Stamp Nutrition Education Program (FSNEP). The main purpose of both facets of the CNP is to help families and individuals eat better for less.

"I started Cent$ible Nutrition classes five weeks ago. Before the class, I spent an average of $120 per week on groceries. Since learning some nutrition and pricing basics, my grocery spending has really started to decrease. Three weeks ago, I bought 7 days worth of groceries for $80, and this last week I bought 14 days worth of groceries for $56. So far, I have trimmed approximately $110

from my monthly grocery budget."
—Big Horn County Cent$ible Nutrition Program (CNP) participant

What has been done
The following results have been documented in 18 Wyoming counties. The total number of CNP participants in 2000 equaled 1,287. Ninety-one percent (1,167) were new to the program, representing a 41 percent increase over last year. There were 3,781 additional people in these participants' families. Eighty-three percent of the children in these families were under 12 years old. Seven hundred forty-six, or 58 percent, of the families were enrolled in one or more food assistance programs. Eighty-five percent of participants were female, and 91 percent were minority. Seventy-six percent participated in CNP group instruction. Sixty-three percent completed the entire program, with an additional 19 percent continuing to work toward completion.

Impact
In addition to positive program participation numbers, significant impacts on clients' dietary health and food spending also were documented.

Eighty-four percent of CNP participants showed improvement in one or more food resource management practices (26 percent demonstrated acceptable practices at entry, as compared with 53 percent at exit).
- 51 percent more often planned meals in advance
- 40 percent more often compared prices when shopping
- 46 percent less often ran out of food before the end of the month
- 46 percent more often used a grocery list when shopping

Ninety-one percent showed improvement in one or more nutrition practices (12 percent demonstrated acceptable practices at entry, compared with 40 percent at exit).
- 53 percent more often planned meals in advance
- 50 percent more often thought about healthy food choices when deciding what to eat
- 37 percent more often prepared foods without adding salt
- 64 percent more often used the Nutrition Facts on food labels
- 32 percent reported that their children ate breakfast more often

Sixty-four percent of clients showed improvement with food safety practices (63 percent of participants demonstrated acceptable practices at entry, compared with 87 percent at exit).
- 29 percent followed the recommended food safety and storage practices
- 55 percent followed the recommendation to thaw foods in the refrigerator, as opposed to thawing at room temperature

All in all, Cent$ible Nutrition enjoyed continued success throughout Wyoming counties, helping program participants learn the basics of eating better for less.

Linda Melcher
EFNEP/FNEP Coordinator
Department of Family and Consumer Sciences
University of Wyoming
Cooperative Extension Service

307-766-5181
307-766-3379 FAX
lmelcher@uwyo.edu

ISSUE - Weston County Cent$ible Nutrition Program

The goal of the Weston County Cent$ible Nutrition Program is to provide educational lessons through extension nutritional programs that increase, within a limited budget, the likelihood of all recipients making healthy food choices consistent with the most recent dietary advice as reflected in the Dietary Guidelines for Americans and the Food Guide Pyramid. Nutrition is a critical link to health, and having access to reliable nutrition information is especially important to the well-being of low-income families.

What has been done

In Weston County, the Cent$ible Nutrition Educator provides education through a 5-core lesson program or through one-time presentations. Most of the clients are taught in group settings (96%), and approximately 4% are taught on a one-on-one basis. Most of the clients are female (90%). Half of the program families do not have any children in the household, and 36% have 2 or less children at home. Sixty-one homemakers completed the program (87%); nine are continuing the program (13%); none dropped the program. Sixty-six homemakers (94%) completed the program within 0-3 months.

Impact

Clients enrolled in the Cent$ible Nutrition Program are surveyed at entry and exit using USDA's ERS software program. Behavior checklists and 24-hour diet recalls document behavior change. Behavior change is documented in three main areas: Food Resource Management Practices; Nutrition Practices; and Food Safety Practices.

Food Resource Management Practices:

❶Plan meals ❷Compare prices ❸Does not run out of food ❹Uses grocery lists

78% of homemakers showed improvement in one or more practices
56% of homemakers showed improvement in two or more practices
20% of homemakers showed improvement in three or more practices
4% of homemakers showed improvement in all four food resource management practices

Entry surveys report 18% of participants demonstrated acceptable practices of food resource management. Exit surveys report 33% of participants demonstrated acceptable practices of food resource management.

Nutrition Practices:

❶Plans meals ❷Makes healthy food choices ❸Prepares foods without salt ❹Reads nutrition labels ❺Children eat breakfast

84% of homemakers showed improvement in one or more practices
68% of homemakers showed improvement in two or more practices

32% of homemakers showed improvement in three or more practices
8% of homemakers showed improvement in four or more practices
0% of homemakers showed improvement in all five food resource management practices

Entry surveys report 3% of participants demonstrated acceptable nutrition practices. Exit surveys report 11% of participants demonstrated acceptable nutrition practices.

Food Safety Practices:
❶Thawing foods properly ❷Storing foods properly

57% of homemakers showed improvements in one or more of the foods safety practices
14% of homemakers showed improvements in both of the foods safety practices

Entry surveys report 44% of participants demonstrated acceptable food safety practices. Exit surveys report 59% of participants demonstrated acceptable food safety practices.

When all three categories are compared at entry, 2% of participants achieved acceptable scores in all three categories: food resource management; nutrition practices; and food safety practices. Exit surveys show 7% of participants achieved acceptable scores in all three categories listed above.

Other dietary improvements include nutrient intake of protein, iron, calcium, vitamin A, vitamin C, and Vitamin B6.

Vicki Hayman
Assistant University Extension Educator
University of Wyoming
307-746-3531
307-746-2870 FAX
vhayman@uwyo.edu

Goal 4: Enhance greater harmony between agriculture and the environment

Overview

Wyoming's economy is based on its abundant natural resources (minerals, energy, and agricultural products) and is also a tourist destination. Management of natural resources and associated environmental issues permeate nearly every aspect of life in the state. Public demand and expectations often conflict when determining appropriate management strategies for Wyoming's wide-open spaces, wildlife, and public lands. The need for science-based information and expertise in evaluating public policy, and facilitating conflict resolution is ever increasing in Wyoming.

Wyoming's ecosystems, whether agro, range, or forest, have both plant and insect pests. The effective use and value of range, forest, and cropland resources depends on the appropriate management of noxious weeds, insect pests, and diseases. Research and education programs in integrated pest management, bio-control, and other environmentally friendly pest control techniques are important to the state's ecosystems. For example, the Reduced Agent-Area Treatments (RAATs) is a method of integrated pest management for rangeland grasshoppers in which the rate of insecticide is reduced and untreated swaths are alternated with treated swaths. This IPM approach allows predators and parasites to be preserved in untreated swaths and dramatically reduces the amount of insecticide applied and the cost of control.

A large share of the state's income is generated from extraction of mineral and fossil fuels. Coal, trona, and natural gas are examples of large extractive industries in the state. Research and education programs on improving rangeland and reclaiming disturbed sites benefit individuals, communities and the state by enhancing the productivity and stability of reclaimed lands.

The integrity of Wyoming's natural resource base and the state's diverse ecosystems is a central focus of the University of Wyoming's extension and research programs. Natural resource related research and extension programs are designed to foster an understanding of the functioning of Wyoming ecosystems as related to the people and economic viability of our state.

Key Theme – Air Quality

a. Wyoming has a higher than average rate of radon contamination, which needs to be identified and addressed. Over 36 percent of Wyoming homes tested are greater than or equal to EPA's action level of 4.0 PCi/L.

Educators across the state provided displays at health fairs. Educators, health department officials, and teachers were trained. Programs were given and radon test kits distributed. Pesticide applicators were trained in pesticide safety. Columns and radio programs were provided.

Seventy seven Extension educators, 7 health department officials, and 10 University Professors were trained in indoor air quality. Resources were provided for each. In addition, a resource list was created and distributed to all current and previously trained educators. The state coordinator continues to built coalitions with related agencies and groups around the state,

sharing materials and education. 100 “Healthy Homes” bulletins were distributed through a WIC nutritionist. Educational displays were provided for three health fairs, an estimated 1,610 people in three counties. One display was also provided for the Wyoming Extension Showcase on Technology (WEST) featuring the indoor air quality demonstration house. At least 164 people stopped and asked for additional information.

b. Impact - At least 84 consumers have tested their homes for radon, statewide, as a result of Extension efforts. One consumer reported testing for lead whereas another hired a professional to do lead abatement. Steps were taken to reduce/control levels of formaldehyde as a result of Extension connections with the State Department of Environmental Quality. Over 175 pesticide applicators were trained in pesticide safety. One client took steps to reduce moisture and remove mold and mildew in her home. A tobacco use prevention booth was provided with a local coalition at the county “Fun Fest”. Four asked for information on quitting tobacco use. An Indoor Air Quality Month column was adapted and networked to 23 counties, specialists and seven agencies during the month, and also during the rest of the year. Circulation was reported in excess of 21,200 . Seventeen radio programs were provided to in excess of 40,000 people. Three hundred twenty table tents were provided in local restaurants on poison prevention. Seven programs were provided for 259 participants.

c. Source of Funding – USDA/EPA EIAQ, Smith-Lever, State

d. Scope of Impact – Multi-state Extension (WY, MT)

Key Theme – Biodiversity

a. Research is being conducted to determine how precipitation, soil, and land use interact to influence ecosystem structure and function in general, and biodiversity in particular. The primary venue for these analyses is to use a statewide system of 40 year old 10 acre livestock exclosures to analyze how presence or absence of livestock have influenced plant, small mammal, and soil microorganism composition and diversity. These exclosures are useful for assessing the effect of grazing in terms of controlling or catalyzing invasion by non-native weeds.

b. Impact – Results of this ongoing research program are used to educate the public about the role of land use on biodiversity and species composition. These research findings are altering perceptions by the public and land managers about the roles of large herbivores on rangelands (i.e., light to moderate stocking rates of livestock either do not influence or enhance biodiversity and control of invasive weeds).

c. Source of Funding – State

d. Scope of Impact – State Specific
Integrated Research and Extension

Key Theme - Biological Control

a. Leafy spurge has taken over millions of acres of western grazing land in Wyoming, Montana, Idaho, North Dakota, South Dakota, and Alberta. It often forms dense stand that displace native vegetation. Herbicide use is neither cost-effective nor practical on large, well-established infestations. Research being conducted by the Departments of Renewable Resources and Botany is designed to determine the rates at which flea beetles impact leafy spurge. In 1998, 3,000 brown flea beetles and 3,000 black flea beetles were released at each of 77 sites in a 25 square mile area. Another 32 sites served as control sites. By the summer of 2000 the average canopy cover of leafy spurge on the center of the release sites was reduced from 47 percent in 1998 to 12 percent in 2000. The average area over which this impact was observed increased from about 60 square yards in 1999 to over 500 square yards in 2000.

b. Impact – All signs indicate that the biological control program against leafy spurge will be a major success. These results, combined with the ready availability of the two flea beetle species, have stimulated interest among private and public land managers. With considerable effort on the part of county weed and pest personnel, over 6 million flea beetles were collected and moved to other sites in Wyoming. Also in 2000, another 16.5 million flea beetles were collected and moved to sites in Montana, Wyoming, and the Dakotas through a collaborative effort involving private, local, state, university, and federal entities. The long-term benefit-cost ratio has been estimated by some to be as high as $31 for each $1 invested.

c. Source of Funding – Hatch, State

d. Scope of Impact – State Specific
Integrated Research and Extension
Multi-state Integrated Research and Extension (W-185)
(AZ, CA, GU, HI, ID, KS, MT, NM, NY, OR, UT, WA, WY)

Key Theme - Endangered Species

a. The influence of agricultural production and natural resource management on endangered species is increasingly becoming an important consideration in educational programming by the University of Wyoming Cooperative Extension Service.

Examples of specific educational efforts in the area of endangered species includes the development, implementation and evaluation of the following comprehensive programs;
Professional development opportunities for Extension Educators to enhance their awareness of endangered species issues. Public Awareness programs regarding potential impacts of endangered species to Wyoming communities. Development of innovative strategies to mitigate potential negative affects of endangered species on agricultural production.

In addition to the above specific examples, Extension Educators and Specialists with UW-CES continue to integrate endangered species issues into existing educational programming.

b. Impact - The impact of UW-CES sustainable agriculture programs can be best represented by the following examples of behavioral changes of our diverse clientele;

•An enhanced appreciation by our clientele for the potential of endangered species and associated regulatory actions to profoundly influence their livelihood and lifestyle.
•Increased awareness of the Endangered Species Act (ESA) and potential candidate species.
•Reduced "unfounded paranoia" regarding federal agencies, the ESA, and private property rights.

c. Source of Funding - Smith-Lever, State

d. Scope of Impact - State Specific

Key Theme – Drought Prevention

a. Research is being conducted to develop forage production prediction tools that will reduce risk associated with planning for drought. Statistical analysis of annual forage production has shown that there is strong correlation between various aspects of winter or spring precipitation with the amount of forage that will be produced during the summer. For example, in south-central Wyoming, April precipitation was shown to have a strong predictive relationship with annual forage production. Expanded development of these tools for all regions of the state are under active consideration by the Drought Commission empaneled by the Governor of Wyoming.

b. Impact – Ranchers are using the relationships that established the correlation between winter/spring precipitation and summer forage production to guide de-stocking decisions intended to reduce risk/vulnerability of their enterprise to impending drought. The state and federal land management agencies are also considering these analyses with regard to adjustments to grazing allotment stocking rates. Including these relationships as part of the Wyoming Drought Response Guidelines is under active discussion by the Wyoming Drought Commission.

c. Source of Funds – State

d. Scope of Impact – State Specific
Integrated Research and Extension

Key Theme – Hazardous Materials

a. A project in Molecular Biology is underway intended to elucidate the mechanisms used by some bacteria to degrade toxic chemicals. Pentachlorophenol (PCP), a common wood preservative and biocide, is an environmental hazard because of its combined toxicity and persistence in nature. About 23,000 tons of PCP are utilized in the U.S. each year, primarily as a wood preservative. In addition, the wood pulp bleaching process produces chlorinated phenols. Many sites in the U.S. are severely contaminated by this chemical.

b. Impact – Soil bacteria have been identified that combine limited resistance to PCP with the enzymatic capability to dechlorinate and degrade the compound. Unfortunately, they are

recalcitrant to genetic analysis, which limits our ability to 1) manipulate the PCP degradative pathway and 2) to understand the mechanisms that control expression of the key enzymes.

c. Source of Funding – State

d. Scope of Impact – State Specific, but results have broad application

Key Theme – Integrated Pest Management

a. Researchers and Extension educators at University of Wyoming are conducting studies to develop and evaluate integrated pest management systems. The primary focus of this research is to reduce the application of pesticides and enhance biodiversity of the natural resource. For example, the Reduced Agent-Area Treatments (RAATs) is a method of integrated pest management for rangeland grasshoppers in which the rate of insecticide is reduced and untreated swaths are altered with treated swaths. This IPM approach allows predators and parasites to be preserved in untreated swaths and dramatically reduces the amount of insecticide applied and the cost of control.

Eight new demonstration projects were funded in 2000-2001. They include cropping systems and the affects of crop rotation on pest management; the use of competition to manage foxtail barley in range and pastureland; the development of pest management systems to produce commercial tomatoes; the development of video tapes to show how medics can be used as a possible crop rotation for nitrogen fixation; the use of native grasses as competitors for musk thistle management; the spread and management of the disease brown root rot in alfalfa; the development of on-farm testing for Wyoming producers; and the development of grazing systems for control of Russian Knapweed.

In a systems approach to replace perennial weeds on rangelands, numerous studies have been conducted to examine the influence of revegetation with perennial grasses after control for several invasive species. Research on different combinations of herbicides and perennial grasses has shown this systems approach is sustainable, helps in the reduction of herbicides in treating perennial weeds, and provides greater biodiversity. Research during the next three years will focus on remote sensing technology to better predict the spread of weedy species and to identify native species that are competitive with weedy invasions.

b. Impact – Results from the integrated pest management studies being conducted will impact crop production and range management across the west. For example, to apply some figures to the RAATs method of control for rangeland grasshoppers, one county in Wyoming has treated 60,000 acres of rangeland for grasshoppers the last two summers. Savings from the RAATs method versus value of forage loss with no control was $78,000 versus the traditional treatment, the savings with RAATs was $99,600. The percent reduction in insecticide used with RAATs was 62 percent (dimilin) and 99 percent (carbaryl). The RAATs method is being actively adopted in surrounding states with reports of programs in Idaho, Montana, Oregon, South Dakota, and Utah.

Educational books and brochures as well as personal telephone and e-mail messages are continuously in demand. This past year more than 1,000 Weed Management Handbooks were distributed as well as 12,000 copies of the book *Weeds of the West*. The public and private sectors spent more than 20 million dollars in Wyoming to control pests last year. 10.7 million dollars was spent for invasive weed management programs. IPM use is a priority use of these expenditures. People have discovered they get long-term success in controlling pests such as noxious weeds when they replace them with perennial vegetation rather than focusing on only herbicides. Every Weed and Pest District and Federal Land Management Agency is highly focused on the use of systems approaches to control pests.

In another study, applied research trials have shown that the combined use of herbicide followed by perennial grass seeding can be a sustainable approach to controlling Russian knapweed. This practice requires a greater initial investment but economic analysis has shown these costs will be recovered in five to ten years. The control of weeds using combinations of herbicides and grass competition is being used statewide.

c. Source of Funding – Smith- Lever, State

d. Scope of Impact – State Specific
Integrated Research and Extension

Key Theme – Natural Resource Management

a. Research is being conducted with regard to restoration ecology and reclamation to understand how stability and function of degraded lands and plant communities can be re-established. With regard to mine land, research focuses on how to establish sustainable plant compositions that meet Wyoming reclamation objectives (e.g., how to enhance establishment of sagebrush seedlings). This often involves development of techniques to ameliorate the soil (e.g., through soil amendments or phytoremediation) so that the nutrient and water balances and soil microbial communities can be re-established that will support stable plant communities. Research with regard to assessing rangeland health focuses on developing techniques to determine if the rangeland resource is being managed in a sustainable manner.

Monitoring is the process of detecting change and land use effects over time. Approximately eight years ago, at the request of the Wyoming State Grazing Board and the BLM Grazing Permittees Association, UWCES specialists and educators initiated programs concerning the benefits, concepts and methods of monitoring rangeland use to producers and land management agency personnel. In the last year a cooperatively developed monitoring manual for landowners and federal grazing permittees reached the final draft stage with final approval of all state and federal partners. Training was provided in water quality monitoring and management for TMDL's, sustainable agricultural practices, monitoring techniques to grazing permittees, management planning, demonstration research projects were completed, coordinated resource management groups for regional noxious weed control were developed,

b. Impact – Research results have been incorporated into the "best management practices" of the mining industry and state and federal land management agencies with regard to use of

developed techniques to improve re-establishment of native plant species on degraded sites. Rangeland monitoring programs used by ranchers, ranch consultants, and state and federal agencies are based on research techniques that have established rangeland health indices.

UWCES has assisted BLM and USFS specialists and permittees in developing monitoring protocols suitable to permittee capabilities that will be acceptable for making management decisions on the forests. Allotment monitoring locations were reread, new monitoring locations were established, management plans were written, plant response to grazing management systems were determined, plans for noxious weed control were formulated with goals of improving habitat for wildlife and livestock grazing, grazing management on large public land allotments was improved, and 100 percent of permittees on the Bighorn NF have produced annual use monitoring data. Permittees have demonstrated an enhanced understanding of the management goals and have used the monitoring methods to make timely adjustments in stocking levels and pasture moves. Monitoring in conjunction with planning permit decisions, such as development of allotment management plans and permitted stocking levels, has resulted in stocking and grazing programs agreed to by both the permittee and the forest manager, indicating that satisfactory progress is being made toward resource management goals. Permittees monitoring their livestock's impacts on natural resources have maintained or improved the structural and species diversity in deciduous woody plants, ecological and watershed conditions, and stream and fish habitats. Significant behavioral change has occurred in permittees actively monitoring their resource condition and use. They generate the knowledge to be the leader in managing the lands they graze. They respond immediately to needs for management change compared to pre monitoring failures to detect need for change or responses only on the 10 year agency cycle. They have become leaders in initiation of monitoring on private or other agency managed lands. They can provide support for or respond to critics of administration of federal grazing permits. Monitoring provides the knowledge of resource response needed to make timely decisions to preserve or enhance the value of resource condition and of the grazing permit to the ranch.

c. Source of Funding – Hatch, Smith-Lever, State

d. Scope of Impact – State Specific
Multi-state Research (W-170)
(AR, CA, CO, FL, GU, HI, IA, IN, KS, OK, MI, OR, PA, TX, WA, WY)
Integrated Research and Extension

Key Theme – Pesticide Application

a. Federal and state laws require that individuals using restricted pesticides become certified applicators. Private applicators must be re-certified every five years, and commercial applicators must earn re-certification every three years. The University of Wyoming Cooperative Extension Service provides training for both initial certification and re-certification of private and commercial applicators. New training materials are needed annually. UWCES cooperates with the Wyoming Department of Agriculture in the certification program.

The response to applicator training schools continues to be very good. Of the various ways to become certified, many people elect to attend training schools, which indicates they are receiving training in the safe and proper use of pesticides. Private applicator training takes place at the county level, with each county holding one to two training sessions per year. County educators provide training for private applicators. Commercial applicator training takes place at the state level. An initial certification school, consisting of 24 hours of training and a 12 hour re-certification school were each held in 2000. Federal, state, and university personnel provide the training for commercial applicators.

b. Impact - In 2000, approximately 600 private applicators received training to become certified and 500 received training to become re-certified. Also in 2000, 67 commercial applicators received training to become certified and 190 received training to become re-certified. Approximately 6,600 applicators in the state have a private applicators license and 1,600 have a commercial applicators license. All have adopted practices such as reading and understanding the pesticide label, wearing and using the proper safety clothing and equipment, applying pesticides only when needed, and using integrated pest management strategies. Due to the private and commercial pesticide applicator training programs, pesticide complaints to the Wyoming Department of Agriculture are minimal. Those that are reported are usually due to pesticide misuse.

The UW Cooperative Extension Service offers pesticide training materials on the Internet. (http://www.uwyo.edu/ag/psisci/ferrell/webpage/index.htm)Web site access has increased from approximately 25 times per week to 50. Twenty-three Pesticide Education Program Fact Sheets (MP-93.1 through MP93.14) and others that deal with various pesticide topics are available in both the private and commercial pesticide applicator training programs.

c. Source of Funding – Smith-Lever 3(d)

d. Scope of Impact – State Specific

Key Theme – Recycling

a. “Recycling is just too much of a bother. Besides, there’s no place to take my stuff!” seems to be the mind set of many people living in rural Wyoming. Issues related to concerns over the environment and energy conservation continue to receive increased public attention and recycling is one of the “hot” issues. Educating adults and youth about environmental issues, natural resource management and energy conservation is essential to achieve a well-informed public about how they impact our local landfills, roadways, etc. is a challenge. Through specific recycling collection days and events, Extension offices worked closely with other entities such as Conservation Districts, Conservation Service, Wyoming Game and Fish, Emergency Management, BLM, County Public Health officials and local landfill operations to instill healthy recycling habits among their residents.

b. Impact – Since its inception seven years ago, the Niobrara Recycling Project has collected approximately 68,500 cubic feet of refuse that otherwise would have been destined for the landfill. In one year, approximately 8,500 cubic feet of refuse was collected. Currently over

300 households and businesses in Niobrara County participate in the recycling project collection days. In Washakie County, recycling bins are now placed around the county and, on a regular basis, the contents are taken to the landfill for recycling. Also, the local landfill is now taking certain recyclable items on a year-round basis. Local residents in both counties continue to be educated on the importance of recycling. Participation and support by local businesses, residents and government agencies has greatly increased.

c. Source of Funding – Smith-Lever, State

d. Scope of Impact – State Specific

Key Theme – Riparian Management

a. Research focuses on developing an understanding of the ecological and hydrologic structure and function of riparian communities. This insight is then used to develop technical guidance for setting riparian management objectives and developing sustainable management strategies.

b. Impact – This research is used by state and federal land management agencies throughout Wyoming in particular, and the west in general, to guide assessment and management of riparian systems. The primary use of this research has been to address grazing issues associated with riparian management. More recently this research is being used to foster sustainable streambank stabilization using native plant species as previously ephemeral streams are converted to constantly flowing streams due to discharge of product water from coal bed methane development.

c. Source of Funding – Smith-Lever, State

d. Scope of Impact – State Specific
Integrated Research and Extension

Key Theme – Soil Quality

a. Extension soil fertility specialists developed and presented Extension programs all across the state of Wyoming to educate the public about the importance of soil quality to the soil-plant ecosystem, and to promote the wise use of fertilizer materials and soil amendments in crop production and home gardening. An important component of the overall program is the offering of accurate soil and plant testing services and unbiased fertilizer recommendations. It was emphasized in training programs that soil testing and plant analysis are important tools that can be used to achieve good crop production while optimizing economic returns and environmental protection. Current research, including work conducted in Wyoming, was included in education efforts so that participants could have access to up-to-date information.

b. Impact – A total of about 14 meetings (attendance of more than 300) were held targeting crop producers and homeowners. Presentations were also delivered to Wyoming Certified Crop Advisors (30 participants) and to county Extension Educators (20 participants) to provide them with soil quality and soil fertility information that will help them to better serve their clientele.

A number of telephone and face-to-face requests for information were also addressed. Some of these calls were in regard to the use of soil amendments of questionable value and effectiveness. In cases where suggestions were adopted by clientele, significant savings in either reduced input costs or increased production were likely realized. This included recommendations that were offered to home owners and land owners regarding the use of proper fertilizer materials at proper rates.

c. Source of Funds – Hatch, Smith-Lever, State

d. Scope of Impact – Integrated Research and Extension, State Specific

Key Theme – Sustainable Agriculture

a. The focus of research being conducted on sustainability is to increase agricultural producers' understanding and adoption of agricultural practices and production systems that sustain and protect ecosystem integrity and biodiversity. Research efforts have focused on production practices and systems that reduce inputs, improve ecosystem diversity, and maintain profitability. In particular, extensive research has been conducted on the integration of nematode-resistant crops into sugar beet rotations. The sugar beet cyst nematode (SBCN) *Heterodera schachtii*, is a widely occurring pest problem faced by Wyoming sugar beet producers. To address this problem, UW researchers have explored the effectiveness of "trap crops" in the form of special varieties of radish and mustard for controlling nematodes. Studies have shown that trap crops grown in rotation prior to sugar beets can reduce SBCN populations by up to 75 percent, while maintaining or improving sugar beet yields. Economic analysis also indicated the sugar beet/barley rotations with the trop crop was more profitable. Researchers have also conducted extensive studies to evaluate more diversified dryland crop rotations. The traditional wheat-fallow systems have created difficult winter annual grass problems and resulted in soil erosion potential. Applied research results of extended crop rotations including crops other than wheat (i.e., corn, millet, sunflower) have reduced fallow acres, reduced soil erosion potential, decreased weed problems, and increased farm income.

Sustainable agriculture continues to be an important consideration in educational programming by the University of Wyoming Cooperative Extension Service. Specific educational efforts in the area of sustainable agriculture includes the development, implementation and evaluation of the following comprehensive programs; Managing rangeland ecosystems for sustainable production and the enhancement of biodiversity; Innovative natural resource management strategies to balance forage production and wildlife habitat; Sustaining "multiple-use" through conflict resolution; Sustainable beef production through reduced winter feed costs; Western Integrated Resource Education (W.I.R.E.); Efficient and responsible use of chemical fertilizers and soil amendments; Professional development program for natural resource managers on promoting sustainable management strategies.

Outcomes from activities like the above examples include educational programs, applied research programs and Extension publications. Additionally, UW-CES activities in sustainable agriculture generate peer-reviewed publications and produce extramural funding to enhance support for our sustainable agriculture activities.

b. Impact – Results of research projects on sustainable agriculture demonstrate impacts that maintain or improve ecosystem diversity while increasing profitability. In particular, research results from the integration of trap crops within a rotation of sugar beets and barley show a decrease in the use of pesticides and a reduction in production costs. A whole farm economic analysis in the Big Horn Basin showed that by substituting trap crops in the rotation in lieu of pesticides could increase the rate of return from 3.9 to 5.8 percent. Applying this information to sugar beet nematode infested fields in Washakie County, it is estimated profits could be increased $1 million annually by substituting trap crops for pesticides in that one county. In addition, there is the benefit from reducing pesticide application by 84,000 gallons.

   Behavioral changes of the diverse clientele include:

   •Increased implementation of innovative management strategies which provide for sustainable production, while maintaining ecological and economic sustainability.
   •Enhanced consideration for beef production systems which better synchronize cow production requirements with "natural" forage production.
   •Adoption of integrated management strategies for invasive weed species, which promote the efficient and responsible use of chemicals.
   •Sustainable (economic) and responsible use of chemical fertilizers and soil amendments.
   •An enhanced appreciation by our clientele for the concept of sustainability in agricultural production.

c. Source of Funding – Smith-Lever, Hatch, State

d. Scope of Impact – State Specific
   Integrated Research and Extension
   Multi-state Integrated Research and Extension (W-186)
   (AR, CA, HI, ID, MI, NC, NE, NM, OR, WA, WY)

Key Theme – Water Quality

a. The focus of our programs in water quality is to provide information and technical guidance to our clientele regarding the management of aquatic and terrestrial ecosystems to maintain water quality. Also, programs provide a pro-active strategy to address regulatory actions associated with the Clean Water Act and similar legislation. Examples of specific educational efforts in the area of water quality include the development, implementation and evaluation of the following comprehensive educational programs include; Watershed 101, a multi-day program which provides participants with the necessary technical background to address water quality issues in local communities; Potential water quality issues associated with methane gas production; Monitoring water quality, a workshop for landowners and resource managers; Riparian zone management and monitoring; AFO/CAFO: The influence and mitigation of regulation in Wyoming; Sustainable Waste Management Strategies for Wyoming agricultural producers.

Outcomes from activities like the above examples include educational programs, applied research programs and Extension publications. Additionally, UW-CES activities in water quality

generate peer-reviewed publications and produce extramural funding to enhance support for our water quality activities.

Research concentrates on evaluation of how vegetation, soils, and management use affects the Total Maximum Daily Load non-point source contributions of sediment and chemical constituents from agronomic crop, range, and forest lands. A special area of focus is assessment of water quality associated with coal bed methane development and how aspects of this product water would influence sodium adsorption ratio considerations associated with disposal of the water. Research also concentrates on developing cost effective technologies to better manage pollutants such as selenium, fluoride, nitrate, arsenic, boron, acid mine drainage, and waste petroleum products contaminating soil and groundwater.

b. Behavioral changes of the diverse clientele include: Increased implementation of innovative agricultural and natural resource management strategies which provide for sustainable production, while maintaining water quality; Implementation of water quality and riparian zone monitoring strategies by conservation districts, private landowners, federal natural resource managers; Adoption of integrated management strategies for waste and water management, which minimize the influence of agricultural production practices on water quality; Sustainable (economic) and responsible use of chemical fertilizers and soil amendments; An enhanced appreciation by our clientele for the importance of terrestrial and aquatic plant communities to maintain water quality; Adoption of best management practices for grazing management in riparian plant communities.

The research associated with coal bed methane water quality is influencing the development considerations associated with this industry. In particular, the Wyoming Department of Environmental Quality and various industry consultants are relying on this research to guide the evolution of standards dealing with sodium adsorption ratio concerns. Municipalities, industry, and state government are using insights developed from research to guide evolution of TMDL management standards in Wyoming. Municipalities and industry are using the research to develop options for removing selenium, nitrate, arsenic, and petroleum products from groundwater. Several soil and water conservation districts within the state are using reconnaissance monitoring protocols this research has developed for large rivers and lakes to develop TMDL standards for their localities.

c. Source of Funding – Smith-Lever, Hatch, State

d. Scope of Impact – State Specific
Multi-state Research (W-128, W-184, W-188)
(AZ, CA, CO, DE, FL, GU, HI, IA, ID, IL, IN, KS, MN, MT, ND, NM, NV, TX, UT, VA, WA, WY)
Integrated Research and Extension

Goal 4 Summary:

The integrity of Wyoming's natural resource base and the diverse ecosystem is the focus of the College's extension and research programs. A few of the college's on-going efforts in the Goal 4 area are:

1. Integrated Pest Management
2. Biological Control
3. Reclamation of Disturbed Lands
4. Rangeland and Riparian Management

The focus of research being conducted this broad area is to increase understanding and adoption of systems that reduce inputs, improve ecosystem diversity, and maintain profitability. There are over 30 research projects in this area; researchers are involved in 6 multi-state projects and participate in 6 multi-state coordinating committees. Overall research effort is approximately 14.1 FTEs with associated expenditures of $.34 million Hatch and $1.43 million State.

Cooperative Extension Service FTEs	12.86
Goal 4 Allocated Funds	$1,015,940

Goal 4 - IMPACTS

ISSUE - UWCES: Working to change lives

Nearly 10 years ago, Niels Hansen, owner of the PH Ranch, asked Doug Reynolds, UW CES Lincoln County chair and former Carbon County educator, for help documenting his resource stewardship. Hansen's objective was to increase cattle numbers on Bureau of Land Management (BLM) lands.

What has been done

Hansen and Reynolds worked together to develop a draft management plan with resource and range improvement objectives and submitted it to the BLM. Reynolds designed a range monitoring plan to test progress toward the objectives. Subsequently, the monitoring plan was implemented collaboratively by the BLM, UW CES, and ranch personnel during the following three years. Ranch personnel were trained in plant identification and data collection, so they were able to turn in information at the appropriate times.

The BLM wrote the necessary Environmental Assessments (EAs) and participated in annual management plan updates. Range improvements that were paid for by Hansen, the permittee, included 4 prescribed burns, 3 new fences, 14 water developments, and the change to a heavy stocking rate for short periods of time in each pasture. The National Resource Conservation Service (NRCS) designed the water developments and fencing.

Impact

The BLM field office manager in Rawlins asked Reynolds and the ranch managers to be part of a team to establish the criteria for an increase in Animal Units per Month (AUM). When these requirements were fully met by the ranch in 2000, AUMs were permanently increased by 25 percent, which amounted to an increased land capacity that could now support an additional 500

steers. Using a 10-year average of prices received for an 850-pound steer, the gross income amounts to more than $36,000 a year or about $361,000 over a 10-year period. The criteria developed by the team are now used statewide by the BLM.

In June 2000, the Society for Range Management and the Soil Conservation Society held their annual summer tour on the Fillmore Allotment section of the ranch, the area that had been developed. They said this decision to permanently increase the AUMS was a rare case in the history of BLM management.

Upon receiving the Wyoming State Stewardship Award from the BLM, Hansen remarked that the award belongs to Reynolds as much as to him. In a letter to Mr. and Mrs. Niels Hansen and Ms. Anna Helm, Alan R. Pierson, state BLM director, stated, "Through your own initiative and with help from the Cooperative Extension Service county agent, the monitoring program you established has helped to provide the Bureau of Land Management the necessary information to evaluate and confirm your achievements in healthy rangeland management."

Niels Hansen is fond of saying that a cowboy should "never hang up the lass rope until the critter is roped and tied down." When considering the impacts of this project it is clear that, in keeping with this creed, Hansen took advantage of all the resources he could. This line of thought is akin to President Woodrow Wilson's adage that it doesn't matter how smart you are, how many degrees you obtain, who you know, or what your position in life happens to be; success depends only on persistence. Niels Hansen and President Wilson may be getting at the same idea, an idea that is exemplary to others in Lincoln County and throughout the state of Wyoming: use every resource person available, considering them friends as well as advisers. County CES educators are good examples of people who serve as both friends and advisers to their clients in the counties of the Cowboy State.

Doug Reynolds
Senior University Extension Educator
Lincoln County Extension Office
University of Wyoming
307-886-3132
307-886-9432 FAX
jhubbard@uwces.wyoming.com

ISSUE - Recycling Coalition in Washakie County

During a 1998 Washakie County Extension Advisory Board meeting, it was suggested that the Family and Consumer Science Extension Educator initiate a recycling coalition in Washakie County since the local recycling business was quitting. It took nearly a year to put together a cohesive working coalition, resulting in a county wide collection day in May 1999. Federal, state, county and city entities joined forces with local businesses and concerned citizens to hold Reduce/Reuse/Recycle Day…or as the group calls themselves, R^3 ® cubed.

What has been done

Paints were recycled to non-profit organizations for their use. Used motor oil was used in waste oil heaters. Pesticides were recycled or disposed of properly by Weed & Pest; refrigerated units were decommissioned for free (usual cost is $25-30/unit) and units disposed of by Solid Waste Board. Batteries were recycled through a regular recycling center.

Impact

Exit surveys taken in 1999 showed that 50 to 51 respondents (one didn't reply) would use the service again. In 2000, sixty respondents out of sixty-six (no one said they wouldn't use the service) said they would come again next year. Out of the people utilizing the 2000 R^3 Day, 26 had participated in 1999 and 48 were first time users.

Recycling bins are now available in the Ten Sleep area and the Ten Sleep Sagestompers 4-H Club has volunteered to bring their contents to the Solid Waste site on a regular basis.

R^3 Collection Day has improved the looks of Washakie County by having less trash disposed of in the badlands. The National Guard spent a large portion of two days combing the areas and disposing their findings at the Solid Waste site. Potentially hazardous waste materials are no longer on shelves where they could be harmful to inquiring people and 138+ refrigerators and other cooling units are no longer a potential hazard to people playing hide-and-seek.

Phyllis Lewis
Assistant University Extension Educator
Washakie County Extension Office
University of Wyoming
(307)347-3431
(307)347-9251 FAX
Pblewis@uwyo.edu

Goal 5: Enhance economic opportunity and quality of life for Americans

Overview

Money/personal finances and investment, family and child development, and economic issues were identified among the highest priorities for the State of Wyoming residents when asked to identify the most pressing issues facing families in the next 3-5 years.

The economies of Wyoming communities have been at a critical juncture. Per capita income growth statewide from 1994 to 1996 was less than 60 percent of the national average, and Wyoming experienced an 8 percent growth rate in jobs, while neighboring states enjoyed a 13 percent growth rate. Wyoming communities need to diversify their economies to provide for economic growth and development.

University of Wyoming researchers are working with Wyoming communities, assisting them with identifying impacts of change, developing community network resources, and identifying growth opportunities for existing businesses. Preliminary results from research concerning USFS policy changes indicate that one national forest brings in $75.7 million to a three county area. The *Wyoming Community Network* functions not only as a clearinghouse for Wyoming communities but also provides a match-up service for specific resources. A new multi-state project interfaces retailers, small manufactures, and home-based businesses; helping these businesses identify economic development and growth opportunities in their rural locations.

Several communities across Wyoming identified children, youth, and family issues as priorities for programming and research. Many communities also identified needs for public awareness and collaboration on youth issues. Through building community partnerships between young people, adult volunteer leaders, and other adults, youth organizations help develop leadership and citizenship skills, gain positive attitudes and habits about work, become stewards of the environment, and engage in entrepreneurial opportunities.

Children, youth and families at risk have been major foci of child and family studies researchers at the University of Wyoming. Researchers have been participating in multi-state projects involving welfare reform and at-risk youth resilience to violence. In-depth research on child health and safety provided the basis for curriculum development and training for child care providers statewide. In the past year approximately 300 individuals received the benefits of this research-based training.

Key Theme – Aging

a. Aging of the nation's population increased interest in financial and physical health for mid-life and older adults. In addition to including information on these issues on monthly radio, television, and newsletter media and networking with networks with health, housing, and senior services organizations, workshops were offered to enhance self-care and care for aging parents in several areas: money management, long-term care, and retirement planning, safety and nutrition, inheritance, grandparenting, and women's financial/work issues. Programs on these topics enhance awareness of civic and community groups, professionals and volunteers

such as Natrona Senior Network or Glenrock and Douglas Senior Centers working with mid-life and older adults, and adult audiences themselves.

b. Impact - Participants in a three-session workshop on long-term care insurance indicated significant knowledge gains in several areas, with subsequent requests for additional information. Ninety-three percent of participants in the "Who Gets Grandma's Yellow Pie Plate" program intended to discuss inheritance issues with their families. A Senior Social featuring 23 educational booths and inter-generational activities served over 100 older adults. The Natrona Senior Network Education Committee remained active in planning learning opportunities for older adults. An Extension educator continues to sustain and contribute to Cheyenne Housing Authority's Family Self-Sufficiency Project for women reentering the workforce. Twenty-five participants in Laramie County "Focus on Aging" programs and 10 in grandparenting programs reported gains in awareness and knowledge about aging issues. Nutrition programs for mid-life and older adults increased knowledge for 152 participants. Several workshops reaching 137 older adults increased their knowledge of dehydration and skills for increasing fluid intake to improve health in later years.

c. Source of Funds – Smith-Lever 3b

d. Scope of Impact – State Specific

Key Theme – Child Care/Dependent Care

a. Programs to improve dependent care for children, elders, and handicapped family members and training for caregivers were undertaken in several rural areas. Training workshops on understanding sensory losses, supporting the caregiver, and accessing Internet resources were offered to families with dependent elderly. Workshop series on child care topics including working with children with disabilities, preventing child abuse, food safety, positive discipline, child first aid and CPR, business management, safety, age-appropriate activities, and stress management. After-school classes on babysitting skills were offered to help youth to better understand and work with children. After-school workshops in collaboration with Lincoln County Child Development Centers and Public Health taught safety and health and offered activities to school-age children. A week-long summer arts camp co-sponsored with Uinta County Lifelong Learning Center provided 7-12 year-olds hands-on experiences in creating practical activities and skills in communication, teamwork, and time management.

b. Impact – Participants in five Extension-sponsored eldercare workshops reported increased understanding of elder needs, importance and methods of respite care, and availability of Internet resources for care-giving families. Programming for families with dependent elders spawned a small town support group with 15 members who meet twice monthly to share ideas, problems, and successes and learn new care-giving strategies. Thirty-five rural childcare providers receiving satellite or direct instruction indicated increased knowledge in program areas (food safety, positive discipline, etc.). Ninety percent planned to improve at least one area of their day care center as a result of training. Local trainings enabled almost 90 percent of participants to gain the 8 hours of training needed for state re-certification. Thirty two 11-14 year-olds who participated in the 6 hour babysitting clinics gained in knowledge and skills and

several formed babysitting clubs to market and continue to increase their skills. Eighty-five school-age youth participating in safety and craft workshops demonstrated knowledge and skill gains and indicated interest in continued activities in the coming school year. All the 44 youth attending the summer arts camp reported increased knowledge and teamwork skills. Participants showed high approval (70-100 percent) for all activities and 86 percent indicated interest in attending a similar camp in 2001.

c. Source of Funds – Smith-Lever 3b

d. Scope of Impact – State Specific

Key Theme – Children, Youth, and Families at Risk

a. "Community Connections for Competent Youth" builds capacities of youth, adults, and communities to meet the challenges of the 21st century. UWCES, through the CYFAR project and in collaboration with schools, community and state agencies, provides training, materials, web resources on youth development and workforce preparations skills (science, tutoring, life and job skills, community service, career exploration) and recreation activities to youth, adult professionals and volunteers. Through CYFAR, community educators offer after-school programs for children and youth at three grant-funded community sites: Platte, Crook and Campbell counties; one grant-funded technical site: Sheridan; one YAR site: Wind River Reservation. State and local Extension educators collaborate with content experts at the university, promote public awareness of youth assets, and continue the development of public policy through membership on juvenile justice, community health, and early childhood boards. CYFAR has helped sponsor the largest youth assets conference in the state—Healthy Communities/Healthy Youth; supported a major speaker at Wyoming Extension Showcase on Technology; and supported "Second Gathering" a youth assets carnival for Park County.

   Faculty in the area of child and family studies combined research with on-campus academic programs in order to address the needs of Wyoming families. Educational programs have been designed to strengthen individuals and families so as to prevent the development of children, youth and family based social problems. Faculty used their research to develop training programs delivered throughout the state. One example of this effort is the "Healthy Child Care Wyoming" project. After extensive research and field testing with children, a curriculum was developed and delivered to child care providers and public health nurses throughout the state. Along with the curriculum several newsletter items and brochures have also been developed.

b. Impact - Students in Platte and Crook County participated in a variety of experiential learning activities (field trips, interactive learning, labs) and showed increased interest in science. Students in all sites identified teamwork, communication and positive self-regard as benefits of participation. Platte County youth held an open house to demonstrate GIS and GPS technology; nine Campbell County youth mentors planned and implemented a youth assets summer camp; Park County youth led the planning and implementation of the community-wide assets carnival. CYFAR/YAR participants in four sites presented results of their involvement at statewide conferences and governor-sponsored events. Students in two sites received tutoring and study skills assistance. In the Platte County project, only 35 percent

of students receiving assistance were still failing one or more classes at the end of the school year.

There were six "Infant and Toddler" regional trainings held throughout the state with approximately 200 individuals receiving training. Statewide training was also provided to 40 public school nurses. Curriculum materials were distributed to 850 child care providers, 20 Head Start programs, and 30 public health nurses. The curriculum has also been adopted by the child care health consultant trainers in the State of Virginia. An infant/toddler care giver credential for the state was also developed under this program and will be required for infant/toddler care providers starting July 1, 2001.

c. Source of Funding – Smith-Lever, Hatch, State

d. Scope of Impact – State Specific
Integrated Research and Extension
Multi-state Integrated Research and Extension (W-193, NC-223)
(AZ, CA, CO, ID, IN, KY, LA, MA, MI, MN, MO, NE, NH, NV, OH, OR, UT, WY)

Key Theme - Communications Skills

a. Extension Specialists in Wyoming are branching out and embracing new technologies in several different ways. These include reaching out to the public directly through the Internet, informational programs (workshops) that give people the hands on skills to use the technology, newsletters in electronic format that can reach people in their homes with timely information and initiatives in existing programs that allow people to enhance their experience and learning through the use of more advance communications.

The Wyoming Economic Atlas, http://Agecon.uwyo.edu/default.htm, is an example of a program reaching out to both public and extension personnel. This educational resource site provides economic information about Wyoming counties and sectors of the Wyoming economy. Extension personnel are building an online resource of published material to help educators in the field learn more about their local economies and allow public access so individuals and local and state government agencies have access to the same data allowing a more free-flowing dissemination of information.

The above is a more centralized approach even though information is available on a county specific basis. In Sublette County, Extension personnel have gone directly to their constituency by putting county programs and information on a locally run website. The public now can access information, such as document drafts and meeting minutes electronically, plus communication via e-mail enables enhanced communication within targeted groups of people.

Extension personnel in Fremont and Washakie Counties have a more grassroots flavor in their presentations on basic technology awareness. These presentations were given at agricultural awareness (Ag Days) programs. The presentations specifically targeted producers who could

benefit from introduction to resources available on the World Wide Web including e-commerce, government regulatory sites and forms plus more advanced market information.

More traditional methods of communication are being replaced by newer methods at less cost. The "4-H Animal Science News" newsletter was started in March 2000. Postage costs became a concern at an early date so the newsletter was shifted to an e-mail subscription. The number of subscribers has since doubled during the year.

4-H personnel in the state office are working to integrate technology training into the 4-H program. This program incorporates many different aspects of information technology into an already existing program helping to enhance awareness of new tools and to help garner interest in the program itself.

Finally, Extension personnel in Uinta County have joined in the movement to help get Wyoming on an equal footing with more populous states by serving on a committee to help set up a wide area network in the county for county government services with an eye toward future public access.

b. Impact – As with other productivity gains, the measurement of the ability to communicate better and have better decision-making tools is hard to measure in and of itself. The Wyoming Economic Atlas received over 2000 hits in the year 2000. Additionally, several extension field personnel have reported using information off the Atlas site in preparation for presentations in their counties. The impacts of other programs are harder to measure since the tools are not yet available statewide. Survey results from programs presented indicate that the audience was well served and that there is a great desire for an increase in these types of programs. The true measurement of the success of these programs comes not only with the feed back from survey forms but if there is increased communication and increased use of the new communication resources.

c. Source of Funds – Smith-Lever 3 b&c

d. Scope of Impact – State Specific, International

Key Theme – Community Development

a. Extension specialists and University Extension educators developed a broad-based set of programs that encompassed and disseminated information for residents across the entire State as well as specific programs that focused on particular counties. Community development efforts included information, local economic conditions, and analysis disseminated through presentations and the University web site. State specialists were part of a statewide collaborative team to enhance community development efforts around the state. Assessment programs and leadership development programs were conducted in Converse, Teton, Park, and Laramie counties. A statewide economic development program "Communities in Economic Transition" was developed. Family level education programs looked at Wyoming Homestead Families, Hispanic families in Teton County, and financial management education. Park and Albany counties conducted Rowell Poverty Simulation exercises.

To be successful and responsive to future opportunities for economic and community development, Wyoming communities must have a well-developed vision for the future. They must also have strategies, tools, and infrastructure to target and facilitate this development. Most Wyoming communities, because they are small, do not have the staff and expertise to identify and capitalize on the resources and assistance that might be available.

The Wyoming Community Network (WCN) represents a partnership among the Wyoming Business Council (WBC), Centers for Excellence in Rural America (CERA), Wyoming Rural Development Council (WRDC), and the University of Wyoming (UW). The WCN will provide communities with information on resources available to assist in fulfilling community development goals. It will not only perform this valuable clearinghouse function, but will also provide a match-up service for specific resources (expertise, funding, technical assistance) with the communities needing these resources to accomplish their goals.

b. Impact – An easy accessible website for disseminating local economic information with over 500 hits this year. Over 1,500 people across the State attended educational programs and presentations conducted by University Extension Educators, with more indirect general public education dissemination efforts.

   Facilitation of a community assessment program developed by the WRDC in six communities, development of a community grants program for planning grants for community development with a $10,000 limit per community, and assistance in Worland, WY on an agricultural field burning controversy.

c. Source of Funding – Hatch, State, Smith-Lever, County, Private

d. Scope of Impact – State Specific
   Integrated Research and Extension
   Multi-state Integrated Research and Extension (W-194)
   (AL, CO, MT, NY, OR, WA, WY)

Key Theme – Family Resource Management

a. The family resource management specialist and educators are developing a comprehensive campaign of existing and new financial education programs to increase the financial awareness of basic financial skills. Directed at individuals and households at different income levels and stages of life, the goal of the financial literacy campaign is to improve consumer awareness, savings, spending habits, and decision-making. Programming includes Money 2000 and Beyond ™, Power © Debt Reduction Program, Financial Calculators, Student Financial Information Program, Saving Money for College, Women's Financial Information Program, Budgeting for a Baby, Be Money Wise, and Who Get's Grandma's Yellow Pie Plate.

b. Impact – More than 254 individuals attended basic financial skills (single topic) workshops. One hundred twenty eight people completed in-depth financial management courses that entailed four to seven sessions in length. Ninety-two percent of the course participants

increased their knowledge and 89 percent had a different outlook on financial management as a result of the course. Eighty four percent reported that they had improved their financial situation as a direct result of the course. Thirty-nine high school students learned how to use financial calculators to determine interest and future payments and 27 youth learned what it would cost to raise a child; they all agreed that it would be best to plan for a child. The broader impact was that 100 percent of respondents to program evaluations indicated financial educational programs raised their awareness of issues relating to financial management and planned to change at least one thing they currently did to improve their financial management practices.

c. Sources of Funding – Smith-Lever, State, County

d. Scope of Impact – State Specific

Key Theme – Farm Safety

a. Extension specialists developed a program on skin cancer prevention strategies, which was presented at agriculture-related meetings, including pesticide applicator trainings. A component of the program was trading sun-reflective hats for attendees baseball caps and providing sun-reflective hats to individuals scoring in the very high category on a sun susceptibility questionnaire developed by the American Academy of Dermatology.

b. Impact – Three hundred sixty-five people were reached through the program. Seventy- two hats were distributed. As a result of a selected evaluation of sixty-six participants of the presentations, 92.2 percent reported they had learned new information. This new information included identifying melanoma, how to perform self-exams, the importance of protecting children, and prevention techniques such as sun screen, sun glasses, proper clothing, better diet, and broad rimmed hats.

   Seventy-two percent of those surveyed said they would do something different as a result of attending the presentation. These actions will include using more sun screen on their children, carrying sun screen when outdoors, wearing different styled hats, wearing long sleeved darker colored shirts and being attentive to reflective surfaces.

c. Source of Funds – Smith-Lever 3(d), State, County

d. Scope of Impact – State Specific

Key Theme – Youth Farm Safety

a. An Extension educator developed a check-out system and training program to encourage helmet use among young equestrian riders through the 4-H program. Three Extension educators cooperated to conduct farm safety day camps in three counties and in neighboring states. Topics presented included a safety partner challenge game, food safety, “Watch-It

Visits the Barnyard", livestock safety zones, safety outdoors, basic first aid, bicycle safety, safety around machinery, home safety and Halloween safety.

Another Extension educator created an educational display, coordinated farm safety puppet shows at day care locations, coordinated a gun safety program through the cooperation of the Safe Kids coalition, placed a car seat for check-out with a Spanish-speaking employee at a local car dealership and coordinated National Farm Safety Week promotions in the county. Farm Safety Week promotions included table tents at restaurants, a city marque highlight, and public service announcements on local radio. One extension educator created a Mock Disaster Contest and provided a Spanish-speaking interpreter and Spanish-translated brochures for participants.

b. Impact - Twelve youth in this county now use an equestrian helmet as a result of the check-out option and training program. Verbal feedback from 4-H horse leaders indicated strong support for the program and a reduced stigma against helmet use among 4-H horse members. One 4-H club replicated the program at the club level, resulting in 8-10 helmets in use through their efforts. Seven farm safety day camps reached 200 youth. Five day care puppet shows reached 94 youth (including 6 Hispanic). Seventy five percent of participants changed their answer from a wrong answer to a correct answer from the pre-test to the post-test. 80 percent could correctly distinguish friendly and unfriendly behavior signs of animals. 100 percent recognized the importance of wearing helmets, staying away from downed power lines and the proper place to ride in a pickup truck, on snowmobiles, on a tractor and on a riding lawn mower. Youth who indicated they would wear a bike helmet if they had one were provided one and properly fitted. 45 percent identified all farm safety signs correctly and 80 percent connected them to their proper location on the farm. 100 percent of participants expressed they had increased knowledge upon completion of the presentation. 100 percent of the day care providers said they would recommend this program to other providers and also requested the program be repeated next fall during National Farm Safety Week.

Four thousand two hundred fifty contacts were made through farm safety displays and demonstrations at county fairs. When verbally asked, 50 percent of the viewers could identify whether a task was age appropriate for their child; 100 percent requested similar displays at the next annual county fair and 85 percent could declare something new they had learned from the display. Five thousand were reached by the farm safety week promotions. Two hundred trigger locks were distributed.

At the Child Restraint Check Point, one infant car seat was placed. One hundred percent of individuals completing the installation class showed an increase of knowledge and applied this at the check point. Ninety six percent of the individuals who brought their car seats to be checked for proper installation learned why theirs was incorrectly installed and how to correct the problem. Forty one percent of the child restraints which were checked were confiscated for being unsafe.

Six mock accidents were staged. During the contest, 12 water bottles were awarded as prizes, with 85-90 participants. Eleven hundred questionnaire/promotion pieces were distributed through local grocery stores and truck stops. An audience of 150 were drawn by the staged

mock accidents. Thirty five agencies collaborated across the projects. 23 new materials, posters, questionnaires, etc. were developed.

c. Source of Funds – Smith-Lever 3(d), State, County

d. Scope of Impact – State Specific
Multi-state (WY and UT)

Key Theme – Fire Safety

a. An extension educator collaborated with a rural fire trainer, a county fire warden, and a county rural fire district to identify and implement minimum requirements of training for rural fire district volunteer firefighters.

b. Impact - Twenty-one volunteers participated in two work days for maintenance of equipment. Forty-five volunteer firefighters were trained in "Standards of Survival" and passed the course with a score of 70 percent or better. Volunteers responded to over 90 fires this season. An increase in use of fire protective equipment was documented from the last two fire seasons. No serious fire related injuries were sustained to fire volunteers this season.

c. Source of Funds – Smith-Lever 3(d), State, County

d. Scope of Impact – State Specific

Key Theme – Impact of Change on Rural Communities

a. Current forest plans represent changes in resource management policies. These changes, in turn, will impact those rural communities in and around the forest systems. It is important for the improved long-term benefits of the forest that various management options and their impacts on the surrounding communities be identified.

b. Impact – Preliminary estimates indicate that the economic activity associated with the Medicine Bow National Forest brings $75.7 million into the three-county economy (Albany County, WY; Carbon County, WY; and Jackson County, CO). This economic activity generates a total of $119.2 million in total economic impact in the three-county region. This economic activity supports a total of 1,656 jobs in the region and generates $21.9 million in labor earnings.

c. Source of Funding – Hatch, State

d. Scope of Impact – State Specific
Multi-state Research (W-133)
(CA, CA-D, CO, CT, GA, IA, MA, ME, MI, MN, MT, ND, NH, NM, NV, NY, OH, OR, PA, SC, TN, UT, WA, WV, WY)
Integrated Research and Extension
Multi-state Integrated Research and Extension (W-192)

(CO, ID, NM, NV, OR, UT, WA, WY)

Key Theme – Home-based Business Education

a. Two Extension programs have concentrated on educating two sectors of Wyoming's rural home-based businesses. While the programs are distinctly different, both deliver programs in enterprise development to limited-resource households that are dependent on irregular and uncertain incomes and are seeking knowledge to establish and maintain economically viable home-business enterprises.

Women's Ag Symposium, now in its seventh year, is an annual one-day county event that provides women in farm (ranch) household with relevant, up-to-date information pertinent to running an agricultural home-based business. The program is organized and primarily funded by county volunteers who are committed to addressing the unique role of women in the agriculture industry.

Wind River Indian Reservation Entrepreneurial Training is a new program that provides home-based entrepreneurship training and development support for the under-served Native American people on the Reservation. Poverty is a major factor impacting the quality of life on the Reservation where 58 percent of all Indian families live below poverty standards. Because the Reservation does not have major manufacturing or processing industries and retail and service businesses are minimal, new business development in the form of home-based sole proprietorships is crucial for an economically viable future. The program is a twelve-week start-up business course followed by business counseling for assistance in marketing, obtaining start-up funding, and other start-up needs.

b. Impact – *Women's Ag Symposium:* Volunteers were able to get a major donation from a new bank. The volunteers' commitment and involvement have increased community interest resulting in a projected commitment of private cash and in-kind donations of $8,200 for the next annual symposium. The educational sessions have resulted in changed behavior. A six-month follow-up survey distributed to participants who have attended one or more of the symposiums during the last three years revealed that 85 percent of the survey respondents had changed their behavior as a result of what they had learned. Changes ranged from how they manage finances to how they handle livestock.

Wind River Indian Reservation Entrepreneurial Training: It is too early to report impact based on profit measures. So far, two Native Americans have written start-up business plans. One of two has started a retail home-based business. Five Native Americans have requested follow-up business counseling to determine feasibility of their business ideas. There are plans to work with the University of Wyoming to develop an internship program with business student interns who can provide information and guidance to future new home-business owners to insure their success.

c. Source of Funding – Smith-Lever, State, EIRP/USDA, Private, Tribal Council, County

d. Scope of Impact for both programs – State Specific

Key Theme – Rural and Community Leadership Development

a. Extension educators in two Wyoming counties developed comprehensive programs to cultivate and develop community leaders. A series of seven to eight educational sessions were held on styles of leadership, collaboration, communication, conflict management, planning, managing change, political process and developing civic trust. Classes ranged from three to seven hour sessions conducted by professionals from the community, state and region. Participants completed a one day leadership assessment, to identify strengths and weaknesses in four dimensions of leadership; communication, planning and organizing, decision making and overall leadership. Participants in one county learned civic trust though Community Based Experiences each month. Graduates of the programs have the opportunity to join the steering committee to plan and develop future leadership programs.

b. Impact – Thirty two individuals graduated from leadership development programs. Overall evaluation results rated the course a 4.5 on a 5 point scale. The most significant results of the Assessment Day were identification of individual leadership strengths and weaknesses, and affirmations of what a person believed about themselves. Community Based Experiences resulted in participants learning the diversity and depth of the county. Behavior changes noted were improved motivation, ability to analyze situations and forward thinking attitudes.

c. Source of Funding – Smith-Lever, State

d. Scope of Impact – State Specific

Key Theme – 4-H Leadership Development

a. The State Youth Specialist, Extension Educators and 4-H Program Associates presented training to volunteer leaders in Wyoming. Methods for training included subject matter project training, risk management though two hour workshops and home study courses, district and state meetings and printed materials. Additionally both state and county level job descriptions for volunteers were developed to define leader roles and improve leader effectiveness. Counties utilized training to recruit new and diverse volunteers to fill 4-H committee assignments and increase participation of new leaders. Volunteer recognition on state and county level was completed through certificates, plaques, leader appreciation in newsletters and 'leader of the month'.
Wyoming State 4-H Leaders Council made final preparations for Western Regional 4-H Leaders Forum (WILF) held in Sheridan, Wyoming March 2001. State Specialists assisted volunteer leaders in planning, establishing committees, promoting, and securing funding for the forum. Extension educators and county volunteers solicited proposals for educational programs at WILF.

4-H Volunteer leaders are required to complete a screening process conducted by the Department of Family Services. A new component was added to include potential criminal background check. The year 2000 was the first for implementation of the five year re- screening process for current leaders. State specialists provided training for extension personnel working with youth

on the screening process. Extension Educators and 4-H Program Associates conducted certification training through workshops and home study courses. Thirteen 4-H educators participated in training on the screening process.

b. Impact – Over 600 volunteers leaders, approximately 25 percent of the total 4-H volunteer leaders enrolled in Wyoming received formal training. Volunteer participation increased in counties where training was conducted. Over 100 leaders took on significant leadership roles including planning and conducting contests and event, assuming leadership roles at the county and state level and in one county agreeing to host the National Wildlife Habitat Contest.

Goshen County Extension staff planned and conducted seven leader training/certification sessions for more than 125 leaders, who indicated an increased awareness working with folks with disabilities.

Fund raising and donor support has provided $38,665 for Western Regional Leaders Forum. This includes travel scholarships for three previous years for leaders to travel to WILF and promote the Wyoming Conference. A computer web page and list serve were developed. A total of 118 applications for Workshops were reviewed for the WILF. Sub-committees were established which will allow for leaders to demonstrate their leadership abilities through middle management roles.

Statewide 609 new leaders successfully completed the screening process. 100 percent of participants indicated gaining new knowledge and 80 percent reported they better understand the structure of 4-H. State specialists in youth development have shared information on Wyoming screening process with 32 states. Thirteen 4-H agents participated in training on the screening process.

c. Source of Funding – Smith-Lever, State, County

d. Scope of Impact – State Specific
Multi-state Extension
(MT, ID, NV, NM, AZ, WA, OR, CA, UT, WY, HI, AK, and Guam)

Key Theme – Promoting Business Programs

a. The second Wyoming Extension Showcase on Technology (WEST), a trade show of technology suppliers, researchers, and distributors, was held at the Casper Events Center on February 18-19, 2000 in Casper, WY. Booth spaces were filled with exhibitors of current and near-developing technology and best management practices. Educational presentations were also held during the show. Exhibitors and others were invited to provide educational programs concerning various aspects of technology and best-management practices. One of the unique aspects of the show was its facilitation and sponsorship by the state Cooperative Extension Service and was not limited to one particular trade or organization.

Other programs included several N's Level courses on business plans and entrepreneurship offered to small business owners, Native American audiences, and University of Wyoming students.

b. Impact – The Wyoming Extension Showcase on Technology involved some 30-40 Wyoming Extension personnel, from planning and chairing various aspects of the show to assisting exhibitors. Substantial support was received from the University of Wyoming Information Technology Division, Conferences and Institutes, Small Business Development Center (SBDC), Mid-America Manufacturing and Technology Center (MAMTC), the Research Office, and University administration. A partnership was also established with the Wyoming Business Council, which donated $25,000 and encouraged staff participation in the planning process. A sponsorship and recognition program was developed bringing over $85,000 of cash and in-kind support. Aggregate show income from the sponsorship program, exhibitor fees, and in-kind donations totaled just over $100,000. Total costs for producing the show amounted to approximately $92,000.

   The two day show housed 80 booths and was held in conjunction with the regional Department of Energy Science Bowl competition. Four keynote addresses, broadcast onto the show floor from the meeting area, were given on the subjects of technology. The event was covered by all major media outlets in the state. The show was jointly endorsed by the Governor of Wyoming, the CEO of the Wyoming Business Council, and the president of the University. Approximately 2,600 people attended the event. A survey question asking "Would you attend another Extension Showcase on Technology if the show were similarly formatted?" 338 responded yes, 58 responded no, and 52 were unsure.

For the year, two separate N's Level courses were offered. Enrollees totaled 35 for the 14-week classes, including eight Native Americans. As a result, 22 hours of business counseling was provided to Native American residents outside of the N's Level courses, $20,000 in new loan activity was initiated on the Wind River Indian Reservation, and an additional $85,000 in economic activity was developed on the Reservation through a new agricultural business. In addition, four business were assisted with research and marketing information, a Western-region SARE grant was funded to provide better information on agricultural enterprise diversification, and two Small Business Innovation Research (SBIR) USDA grants were submitted to assist Wyoming business owners.

c. Source of Funding – Smith-Lever 3 b&c, State, County, Private

d. Scope of Impact – State Specific

Key Theme – Workforce Preparation - Youth and Adult

a. Wyoming's economy is weak, due in part to stagnation in the natural resource/mining industry, low wages in tourism and agriculture sectors, and lack of technology-based industries in the state, with few prospects for increasing per capita income, gross state product and valuation resulting in more revenues. Intentional efforts in economic development will be necessary to

raise economic growth indicators to regional standards and build globally-competitive businesses.

Small-scale, value-added services and industries are expanding in the state, despite significant obstacles (i.e., geographic isolation, harsh climate, limited natural resources such as water, limited political/economic support/assistance, inadequate infrastructure, limited human capital/expertise). Expansion of high-quality, specialized small businesses is the most viable and sustainable path to economic revitalization in the state.

Young adults, especially those with higher education, skills and initiative, are leaving the state, in spite of self-expressed preferences to remain in Wyoming to build the state's economy and enjoy its environment and lifestyle.

b. Impact – A Wyoming Youth Entrepreneurship Conference executive planning committee was established and developed an agenda for the conference. Presenters were identified and contacted. A working collaboration with the Wyoming School to Careers program will be established during the fall of 2000.

A Youth Entrepreneurship Coalition includes: the UW College of Business, Western Entrepreneur Network, U.S. West Foundation, Wyoming Business Council, Small Business Association, School to Work program at the state and local levels, Moyer Foundation, Powell Economic Development Association, Wyoming commission for National and Community Service, UW Cooperative Extension Service and the Wyoming State Fair.

Thirty youth from Sweetwater and Uinta counties have had their projects financially backed by the Wyoming State 4-H Foundation. Sweetwater County 4-H members built and manage a youth livestock barn for their projects. The Uinta County 4-H members wrote a grant to support their individual entrepreneurship projects which the Wyoming State 4-H Foundation matched dollars with the granting agency.

c. Source of Funds – Smith-Lever 3 b&c, State, County

d. Scope of Impact – State Specific

Key Theme – Youth Development/4-H

a. Positive youth development is a process of growing up and developing one’s capacities in positive ways. (Walker & Dunham, 1994). This development typically takes place in the context of family, peer group, school and community. 4-H becomes part of the total contextual environment for positive youth development. The length of time keeping youth actively involved in 4-H makes a difference in terms of asset and skill development. Life skills were defined as communications, problem solving, striving for excellence, leadership and interpersonal relationship building. Hands-on projects were ranked as the most important component of a positive club experience along with having fun.

The University of Wyoming Cooperative Extension Service uses a variety of experiential educational activities to attract and keep Wyoming youth in the Wyoming 4-H programs.

Educational programs and activities include cultural exchange programs, 4-H project meetings, camps, clinics, workshops, judging programs, junior leader programs, teaching others, demonstrations, public speaking, and day camps and overnight camps.

b. Impact – Albany County Junior Leaders increased awareness of cultural differences and similarities in a cultural exchange program. Fifty-five Fremont County 4-H members increased their skills and knowledge in clothing construction, beading, sports nutrition, yeast bread making, decorative creations, visual arts and the use of the Internet. In addition they increase their self-confidence, self-esteem and personal growth.

Forty-four Uinta County 4-H members and leaders attended a clinic on ultra sound and 116 members and leaders attended a livestock skill-a-thinned with a 52 percent increase in knowledge and skills gained.

A total of 1,251 4-H members attended a variety of state and county level educational programs on livestock, horse, poultry, rabbits and/or animal products. One-hundred Lincoln County 4-H members gained in general livestock knowledge and increased oral communication skills through the judging process. The State 4-H Office conducted FCS programs for 103 contestants in the 4-H Fashion Revue, 3000 FCS exhibits at State Fair, 150 4-H members at county fairs and Sports Nutrition program for 1,300 school and soccer camp participants.

Thirteen 4-H clubs or junior leader groups involving 86 Wyoming 4-H members planned a variety of tobacco prevention education activities. The majority of these activities involved working in 14 local elementary and junior high schools which contacted 3,363 students. Through Healthy Communities/Healthy Youth, Albany County Extension Office surveyed 596 youth. This survey helped in the creation of a productive city youth council, the development of a new teen center and other supervised youth dances and recreational activities.

Twelve Niobrara County 4-H Junior Leaders taught three different sessions to 175 youth and teachers at the Wyoming Cattle Women's Ag Exposition. Verbal and communications skills, as well as self-confidence was significantly increased for 30 Washakie County 4-H members involved in the judging program. Thirty-five Sublette County 4-H members increased their knowledge and skills and oral communications skills through demonstration activities. Forty-four 4-H youth attended a week long day camp in which youth participated in interactive and team building games. The youth reported an increase in team work, and communication skills as well as developing increased interaction among group members. Twelve Unita County 4-H members participating in a Catch-A-Calf program reported an increase in knowledgeable about the basics of caring for their animal and learning about the particular species of livestock. Fremont County Junior Leaders reported they gained in knowledge on how to deal with different age groups and developed increased communication skills with different age level groups.

Fremont County's 4-H program conducted a 3-day camp for 140 4-H members and 22 leaders, in which members and leaders learned new leadership skills, increased self confidence and self-esteem and learned how to work in groups. Fifteen Niobrara County Junior 4-H Leaders planned and conducted a variety of county 4-H events and activities. As a Junior 4-H Leader,

members improved their skills in leadership, public speaking, self-confidence, commitment and responsibility, entrepreneurial skills and how to work as a group.

In Park County 310 K-1 graders along with 69 teachers and parents experienced the hands-on learning, sights, sounds, smells and the feeling of animals during a sheep farm tour. Natrona County developed a K-3 program that attracted 68 new 4-H members. This program fills a void in the community, in terms of providing an education-based program for younger children with an opportunity to expand their interests through non-gender-based environment.

Twenty, tenth graders participated in a four session, Park County 4-H anger management session. Twenty-five girls form the Wyoming Girls School participated in the Sheridan County 4-H Horse Program. They reported an enhancement in their life skill's development by graining responsibility, increasing their self esteem, learning the importance of completing a project and being a leader among their peers.

c. Source of Funds – Smith-Lever 3 b&c, State, County

d. Scope of Impact – State Specific

Key Theme – Youth-at-Risk

a. Extending the benefits of Extension youth development to non-traditional youth involves three types of activities: direct services to at-risk youth, training for youth workers, and sustaining networks of youth-serving professionals and volunteers to enhance advocacy and education in youth development. Projects targeted to local needs included 6-week gardening skills workshops at Weston County Honor Conservation Camp, CYFAR after-school tutoring, science and life skills and community service in Crook and Platte counties, and locally-funded activities in youth entrepreneurship and asset-building in Campbell and Park counties and Wind River Indian Reservation. Training activities include statewide distribution of information and curricula on children, youth, and families topics and training for professionals on risk and resiliency, program evaluation, and mentoring skills. Extension professionals provided active leadership in county, state, and national Extension coalitions addressing youth-at-risk issues.

b. Impact - More than 300 at-risk youth in six counties participated in learning activities during incarceration or after-school hours—times often associated with negative experiences and outcomes. Over three-fourths demonstrated increased skills in learning activities (gardening, hands-on science, computer skills, entrepreneurship, teamwork and conflict resolution). The caring staff and environment identified by over 60 percent of participants resulted in increases in self-esteem and confidence. Training activities with 7 county Extension staff, 35 community educators, and 300 youth and adult participants in a co-sponsored Healthy Communities/Healthy Youth conference increased skills in asset-building, mentoring, program evaluation, and training community educators in youth development. Educational newsletters, posters, and information sheets on asset-building, workforce preparation, and family strengths were distributed through conferences, newsletters, and a web site to several hundred educators and parents statewide. Healthy Communities/Healthy Youth coalitions

were sustained in ten counties and at the state level, promoting public awareness, youth activities and leader training, through contributions of Extension professionals.

c. Source of Funding - Smith-Lever 3b&3c, State, County

d. Scope of Impact - State Specific

Civil Rights-Diversity

Key Theme - Multi cultural and Diversity Issues

a. The Extension Civil Rights coordinating committee developed a comprehensive training program to assure that all Extension Employees are committee to serving all employees and clients as equals and targeting underserved audiences when identified or needed. A review was scheduled each year by the review team to assess the progress of the counties.

b. Impact - All 27 County Extension officer have now gone through a comprehensive training and Civil Rights - Diversity program assessment review. In addition, 2 trainings were held on campus to train administrators, secretaries and Extension Specialist. Needed Changes and recommendations have been made following each onsite county training review. County Extension chairs were given the charge to make the needed changes and recommendations and all have completed their work. Several counties have also developed their own Civil Rights Plan of Work to serve as guide for their own County Extension Program.

c. Source of Federal Funds - Smith-Lever

d. Scope of Impact - State Specific

Goal 5 Summary:

The economies of Wyoming communities, personal finances, and family and child development were identified as high priorities by Wyoming residents. University of Wyoming researchers are working with Wyoming communities, assisting them with identifying impacts of change, developing community network resources, and identifying growth opportunities for existing businesses. Children, youth, and families at-risk have been major foci of child and family studies researchers and educators at the University of Wyoming. In this program area, the research effort includes about 2.9 FTEs and expenditures include $.12 million Hatch and $.29 million State.

Cooperative Extension Service FTEs	41.06
Goal 5 Allocated Funds	$3,243,740

Goal 5 - IMPACTS

ISSUE - UW CES supports Native American small business ventures

The first Wyoming Indian Needs Determination Survey (WINDS) was completed in 1987 with the purpose of identifying the strengths and needs of the people in Wind River Country. In 1998, the University of Wyoming Department of Sociology, in cooperation with the American Indian Studies Program, conducted a follow-up survey, which was sent to 7,680 people. This number represents 76.6 percent of all Indian homes and 56 percent of all non-Indian homes on the Wind River Indian Reservation. Median family income results from the survey are as follows:

Northern Arapaho	$10,700
Eastern Shoshone	$12,075
Non-Indian	$19,000

Poverty is a major factor impacting quality of life on the Wind River Indian Reservation. The study indicated that 58 percent of all Indian families are living below poverty standards compared to 27 percent of families in the non-Indian population. Unemployment was 54 percent in the Indian population compared to 19 percent in the non-Indian group surveyed.

There are no major manufacturing or processing industries on the reservation, and the retail and service infrastructures necessary to support industrial development are minimal. Therefore, the future of the economy on the Wind River Indian Reservation rests in the hands of those capable of operating small businesses, which are defined as having no more than 10 employees. Most likely, any new business development will follow the current trend and be a micro-enterprise—a home-based, sole proprietorship.

The UW Extension Indian Reservation Program (EIRP) provides more economic development resources to the Arapahoe and Shoshone tribes than any other agency or institution on the reservation.

What has been done

This past year, UW Wind River CES partnered with the Wyoming Small Business Development Centers and private businesses to provide entrepreneurship trainings, certified business counselor trainings, and small business development workshops to support several Indian-owned businesses.

- Twenty-two people from the Wind River Indian Reservation and Fremont County enrolled in the Nx Level Training, including eight Native American students.
- Two of the Native American students enrolled completed the class.
- One student who completed the class started a retail business.
- Five Native Americans have requested certified business counselor services from the EIRP Project Director.
- Two of the people who requested services have started retail businesses.
- One of the start-up businesses is a timber business.

Impact

Because the start-up businesses are new, it is difficult to report impact based on profit measures, but all of the start-up businesses project annual profits in excess of $20,000 after three years. The recent start-up businesses have generated approximately $30,000 in new loan activity in agricultural production, retail, and tourism. Plans are in place to secure business interns from the University of Wyoming to work with the new businesses in an effort to ensure future success.

Milt Green
Assistant University Extension Educator
Wind River Reservation
University of Wyoming
307-332-2681
307-332-2683 FAX
mgreen@uwyo.edu

ISSUE - Girls School residents develop life skills through 4-H Horsemanship Program

The Wyoming Girls School is a residential facility located in Sheridan, Wyoming. All of the 12- to 18-year-old students have been court ordered to attend the school as a result of inappropriate behaviors and/or addictions. In addition to providing counseling and treatment programs, the Wyoming Girls School is an accredited, full-time academic institution. The students earn course credits while attending the Wyoming Girls School, enabling them to stay on track for high school graduation.

The year-round calendar is based on four quarters and summer school. The girls are taught core academic subjects and offered many extracurricular activities, including a Horsemanship Program, which allows staff to use horses for therapy and physical education. The Horsemanship Program has been in use at the Wyoming Girls School for years, but prior to January 2000, the program had not been an established 4-H project.

What has been done

In January 2000, staff members from the Wyoming Girls School and UW Sheridan County CES combined the 4-H Horse Project with the existing Horsemanship Program in an attempt to encourage the girls to develop a bond with their selected horses and to foster life skills, including responsibility and self-esteem. Staff members believed that through participation in the project, girls would gain positive life experiences, be viewed as respectable and capable individuals (at public events such as county and state fair), and learn to accept the natural consequences of their actions.

Twenty-five girls from the Wyoming Girls School (approximately 25 percent of the student body) enrolled in 4-H for the year 2000. Thirteen girls enrolled in the Horse Project, and their horses were housed at the school. The girls were responsible for feeding and caring for their horses on a daily basis. During the school day, the girls rode their horses in horsemanship class. They also worked with their horses to prepare for the Level 1 Option B 4-H Safety Test and studied for the Level 1 Written Test. The girls were required to maintain their grades and behavioral status to work with their horses and participate in the class.

Impact

All of the girls took the written test and passed successfully. The average test score was 83.5 percent. The girls also passed their Option B Practical Tests, with an 83 percent average score on the practical portion of the test. After passing Level 1, the girls worked with their horses to prepare for the Sheridan County Fair competition. Seven girls showed their horses at fair, and

they received several awards, including Champion Miniature Horse, Reserve Champion Miniature Horse, Champion Quarter Horse Mare, and Champion Quarter Horse Gelding. Three of the girls then traveled to Douglas to show their horses at the Wyoming State Fair. To show support for their peers, a busload of fellow students met the competitors in Douglas to watch the Horse Show. This effort was a large commitment from the Wyoming Girls School.

The 4-H Horsemanship Program was a positive and rewarding experience. The girls who participated in the program gained a sense of responsibility, increased their self-esteem, learned the importance of completing a project, and enhanced their leadership capabilities in peer groups. Several of the girls who exhibited horses at the Sheridan County and Wyoming State Fairs were released from the Wyoming Girls School approximately one month earlier than scheduled. The staff at the school attributes the early releases in part to the girls' 4-H experiences.

Because of the success of this year's program, 4-H projects at the Wyoming Girls School will continue. CES staff members would like to see more students from the Wyoming Girls School included in 4-H, so they plan to have greater 4-H involvement with the school in the near future. Grant funding will be sought because additional resources are necessary to expand the program.
When the girls spend less time in the correctional facility, taxpayers save money. And by providing a positive experience that can be continued in home communities, UW CES helps to ensure long-term success for the girls.

Scott Hininger
Associate University Extension Educator
Sheridan County Extension Office
University of Wyoming
307-674-2980
307-674-2909 FAX
extoff1@fiberpipe.net

Kristi L. Cater
4-H Program Associate
Crook County Extension Office
University of Wyoming
307-283-1192
307-283-1192 FAX (call first)
kcater@uwces.wyoming.com

ISSUE - KEYS Mentor program helps youth, teens, and adults in Campbell County

Mentoring is a proven way to help prevent substance abuse, school truancy, and violent behaviors in at-risk youth. Recognizing the need for a mentor program in Gillette, the UW Campbell County CES and the Gillette Abuse Refuge Foundation began work in November 1999 to develop a social mentoring program for youth ages 8 to 12 years. The two organizations, assisted by the Employment Resource Center, Campbell County School District, and several other local agencies, founded the Keeping Every Youth Successful, or KEYS, Mentor Program in July 2000.

What has been done
The KEYS Program's unique approach is a good fit for Campbell County in a number of different ways:

- Both teenagers (15 years and older) and adults are recruited as mentors. Adults are asked to formally mentor the younger children in the program and also to act as informal mentors for the teens involved. Mentors make a one-year commitment to the KEYS program.
- Because Gillette is a very transient community, each youth is matched with two or three mentors. This strategy decreases the possibility of the youth feeling rejected or left out if one of the mentors moves away from the area.
- Mentors commit to bimonthly mentor meetings and trainings, as well as monthly get-togethers with youth. The program has offered a summer overnight camp, game nights, and the fall barn bash. Upcoming events include a penny carnival, a "gift of giving" party, and the winter overnight retreat.
- Mentors are asked to maintain contact with the youth via e-mail, phone, or standard mail; they are not asked to spend independent time alone with youth. This policy reduces the need for extensive background checks and cuts down on the number of volunteer hours required of mentors.
- The KEYS mentor program closely follows the Healthy Communities Healthy Youth philosophy, which emphasizes a set of developmental assets that are essential to youth success. The program will focus on two of these assets (teamwork and positive identity) for the first year.

The KEYS Program is funded by Children, Youth, and Families at Risk (CYFAR), Planned Approach to Community Health (PATCH), and K-N Energy grants, and through local donations. Volunteers In Service to America (VISTA) funds the program coordinator's salary.

Impact

Currently, the KEYS mentor program has 9 active mentors and 16 youth participants. Program leaders hope to have 20 mentors and 30 youth participants by September 2001.

KEYS youth receive back-to-school care packages in the fall. Both youth and teens attend an ice cream social with the program coordinator; this provides a relaxed atmosphere in which to discuss school progress or to request tutoring from a mentor. Both youth participants and mentors receive a monthly newsletter throughout the year that highlights upcoming events, encourages family participation, and discusses the developmental assets.

Youth participants and their parents have given positive feedback about the program. One parent mentioned how her son always feels valued and cared about when he comes home from KEYS events. She said, "He is so proud to be a part of the mentor program."

Teen mentors report feeling "important and needed." One mentor said, "I can't believe these little kids think I'm so cool. I never thought of myself as a role model before I started in the program. Now I feel like I'm somebody."

Darlene Christensen
Assistant University Extension Educator
Campbell County Extension Office
University of Wyoming
307-682-7281
307-686-8530 FAX
dchristensen@ccg.co.campbell.wy.us

ISSUE - Ultrasound technology enhances 4-H animal science projects

Ultrasound technology enables livestock producers to collect carcass information on live animals, so they can select and retain animals that fit the goals of the operation. Because it is becoming more accessible, ultrasound can help 4-H members choose animals that may be more efficient and produce a better end product.

What has been done

This past year, UW CES educators in Uinta County worked with the Uinta County Fair Board, the Junior Livestock Sale Committee, and University of Idaho extension educators to hold a number of programs that teach 4-H members with market sheep, swine, and beef projects how ultrasound results reinforce traditional animal science information.

An informational workshop was held during November (1999) to introduce members, leaders, and other stake holders to ultrasound technology. The following June, UW Uinta County CES offered a Livestock Skill-a-Thon where participants performed ultrasound on their animals and learned how to interpret the data. They also had an opportunity to rotate through a series of mini-workshops that focused on proper injection sites, body parts identification, nutrition, and showmanship.

In July, UW Uinta County CES hosted a hands-on Ag Play Day, which taught 4-H members how to clip and show their animals and prepare them for the show ring. During the Uinta County Fair, all market animals and Catch-a-Calf heifers were ultrasounded, and their carcass information was collected. If the animals met the criteria set by a committee of stakeholders, 4-H members were awarded Gold Certificate Standard Awards. As a follow-up, members were supplied the ultrasound data for their animals and given an informational handout.

Impact

Forty-four people attended the first instructional ultrasound workshop, and most people had several questions for the educators. “Participants were very interested in learning what carcass data could be obtained from each animal through ultrasound,” said Idaho Extension Educator Scott Nash. “They also wanted to know where their animals should be in terms of this data.”

As a result of this workshop, the Uinta County Fair Board and the Junior Livestock Sale Committee agreed to
provide travel funds for ultrasound technicians to come from Idaho to the 2000 Uinta County Fair and scan all market animals. Ultrasound will be repeated on all market animals at the 2001 Uinta County Fair to monitor whether or not the previous year’s information was used when members selected their 2001 project animals. After county fair, participants will be given a questionnaire to gauge how helpful they perceive the ultrasound data to be.

One-hundred sixteen members, leaders, and parents attended the Livestock Skill-a-Thon and Ag Play Day. Both events were evaluated using results from pre- and post-tests. The average score of participants on the pre-test was 33 percent, and the average score on the post-test was

85 percent, which indicates a knowledge increase of 52 percent. Ninety-one percent of the attendees requested that similar programs be offered in the future.

"These opportunities have been great training tools for the kids," said A.J. Barker, 4-H volunteer.

"Ultrasound allows us to link traditional 4-H animal science projects with new technology," said Diana Richins, 4-H Council member. "Now we are able to reward the youth who have raised the best product, not the prettiest."

Dawn Sanchez
Assistant University Extension Educator
Uinta County Extension Office
University of Wyoming
307-783-0570
307-783-0580 FAX
dasanchez@uintacounty.com

ISSUE - Teton County success story: The Hispanic/Latino Family Resource Center

As early as 1994, Teton County CES personnel began to notice an increasing need for Spanish translation when working with clients. That same year, the Planned Approach to Community Health (PATCH) Program identified the issue of language difference in its Teton County health assessment. Discussions between CES and members of the community in the years that followed increased CES agents' awareness that the community needed to do more to address the needs of both Spanish-speaking and bilingual Hispanic residents.

In an effort to address multicultural concerns, local organizations responded in variety of ways. The Cultural Council of Jackson Hole began to offer celebrations of Mexican culture and art, and the local library increased its Spanish-language holdings. Alongside these positive efforts, however, were growing concerns from other segments of the community. Public health nurses were reporting an alarming number of pregnant single women arriving in the county alone and expressing concern that these young women were being exploited while en route to the United States. Law enforcement, too, reported concerns related to the influx of Hispanic immigrants.

What has been done

In the fall of 1999, the UW Teton County CES Office began to meet with agencies and local citizens about what might be done to improve the situation of the area's Hispanic population. These meetings resulted in an increased focus on issues related to this population. The local UW CES Office began preliminary efforts to facilitate the successful integration of newly arrived Hispanics into the community and to mitigate law enforcement and employment concerns.

The Hispanic/Latino Family Resource Center (HFRC) opened its doors in September 2000. Community Partners include the Town of Jackson, Teton County Sheriff's Department,

Cooperative Extension Service, Chamber of Commerce, Cultural Council of Jackson Hole, Teton County Public Health Service, Teton Literacy Program, Teton County School District, Teton County Crisis Pregnancy Center, and Teton County Library. The purpose of the HFRC is to provide a safe environment where Hispanic immigrants can access local resources and services and to assist these new residents in developing the skills needed to be successful in the community.

The UW Teton County CES Office submitted a $5,000 grant to the Jackson Hole Community Foundation and assisted with an application to the Catholic Extension Society of Chicago for a grant of $10,000. The HFRC was successful in obtaining additional funding from within the community to provide for the first year's operation.

One of HFRC's first projects involved the Immigration and Naturalization Service (INS) and was completed with the assistance of U.S. Senator Mike Enzi's office. The INS regional office manager visited Jackson to discuss visa and work permit issues with local employers. During the visit, the manager learned that some Hispanic immigrants were paying $2,000 or more for a work permit and the accompanying paperwork. When these immigrants arrived in the United States, however, the work they were offered was often not what they had been guaranteed. The Hispanic/Latino Family Resource Center has made tremendous strides toward rectifying this situation. The Immigration and Naturalization Service reports that the HFRC is "really trying to work with" Hispanic immigrants in Teton County and that the INS "wants to be a part of this effort."

The new director of the Hispanic/Latino Family Resource Center was hired in August, and he has established weekly educational seminars. These sessions have helped an estimated 300 individuals per seminar. Local law enforcement personnel, insurance agents, and bankers have been featured at the seminars and have presented their ideas about how recent immigrants might learn to work and live in a new community. Other seminar topics have included obtaining a drivers license, meeting insurance requirements, understanding income tax regulations, avoiding family violence, and becoming aware of seasonal employment bonuses.

Impact

The HFRC director has met with local agencies that work with Hispanic people and also has made a concerted effort to attract members of the Hispanic community to the HFRC Board of Directors. Working together, the director of the HFRC, the Center's Board of Directors (which includes a local UW CES educator), local agencies, and community members have ascertained that affordable housing, day care, legal issues, and work permits are the most critical issues for recent Hispanic immigrants in Teton County.

On-line resources to assist local businesses and agencies that work with Hispanic-Americans also are available. The Latino Resource Web page is posted on the UW Teton County CES site, located at uwyo.edu/CES/County_Info/Teton/Default.htm.

Mary Martin
Senior University Extension Educator
Teton County Extension Office

University of Wyoming
307-733-3087
307-733-0749 FAX
mmmartin@uwyo.edu

ISSUE - Wyoming Economic Atlas: Providing site-specific information to Wyoming counties

The economies of Wyoming communities are at a critical juncture. Between the years 1994 and 1996, state wide per capita income growth was less than 60 percent of the national average. Wyoming has experienced an 8 percent growth rate in jobs, while neighboring states have enjoyed a 13 percent growth rate. Communities need to diversify their economies to provide for their economic futures. However, each community must decide whether and how it wants to seek economic growth and development.

As the name specifies, community economic development starts with communities. It is local residents who have the best ideas and the vested interest needed to make economic development work. In order to make sound decisions about their communities, though, local residents in Wyoming also need access to basic economic information.

Often Wyoming's vast geographic distances make it difficult for communities to obtain accurate and current information. The Wyoming Economic Atlas Web site, located at Agecon.uwyo.edu/EconDev, provides information in a form readily available to most communities throughout Wyoming.

More than just a data source, the Wyoming Economic Atlas is an informational and educational resource. It is designed to help the public learn about a community through informative features and themes. The central feature is the "hub page", a wagon wheel with buttons leading to different areas of the site.

The following information can be accessed from the Wyoming Economic Atlas hub page:

- *Counties in Profile*. An interactive map guides visitors to any of Wyoming's 23 counties, where they will find both graphs and accompanying text that interpret changes in the local economy over a 29-year period (1969 to 1997).
- *Trends in Wyoming Agriculture*. This is a series of five publications detailing the changes in Wyoming agriculture over time. The reports include:
- *The Changing Demographics of Wyoming Agricultural Operators (1959-1997)*
- *Agricultural Income (1969-1997)*
- *Size of Operation (1935-1997)*
- *Agricultural Employment (1969-1997)*
- *Community Economic Development.* This feature gives on-line viewers a primer on what community economic development is and shows how UW CES and the University of Wyoming Department of Agricultural and Applied Economics have been able to assist Wyoming communities in their economic development efforts. Some primary community economic development concepts are defined, and a basic "toolbox" is presented.

- *Payment in Lieu of Taxes (PILT).* Visitors will find a complete set of PILT facts sheets on Wyoming's 23 counties for the past three years. Future plans are to enhance this section and to track PILT payment trends over time. Local officials can access this feature to understand the complex process used to calculate and distribute these monies.

- *Publications*. The designers of the Wyoming Economic Atlas are in the process of building an on-line library of publications by the Department of Agricultural and Applied Economics. Topics will include community economic development, agriculture, tourism, mining, telecommunications, and resource economics.

Impacts Achieved

The Wyoming Economic Atlas Web site has served both UW CES clients and other population groups in a variety of ways:

- The World Wide Web is about dissemination of information, and Web traffic at the Atlas is growing steadily. There were 481 hits during the month of January 2001. This was a significant increase from early 2000. Since its inception, there have been an estimated 2,000 hits on the Wyoming Economic Atlas home page. Wyoming residents, as well as people from other states and countries, have accessed the page and increased thier awareness of the economic forces that shape the Cowboy state.

- Several UW CES agents have utilized the site in their extension programming.
- An article written by Gene Gade and published in the January 4, 2001 issue of the *Moorcroft Leader* makes extensive use of the *Trends in Wyoming Agriculture* publications found on the site.
- Milt Green used the site to obtain basic economic and agricultural income data on Fremont County for a presentation at Farm and Ranch Days.
- UW In-Depth Training 2001 features a presentation based on the Web site that shows how trends in agriculture are contributing to stress in farm and ranch families.
- Designers presented the Jackson Hole Chamber of Commerce with information on using the Atlas to learn more about PILT as it relates to the economic structure of Teton County.
- Several faculty throughout the region, as well as UW College of Agriculture administration, have accessed the Wyoming Economic Atlas Web site to obtain information on bison budgets.

Tom Foulke
Information Specialist
University of Wyoming
Cooperative Extension Service
307-766-6205
Roger Coupal
Community Development Specialist
University of Wyoming

Cooperative Extension Service
307-766-5246
David Taylor
Community Development Specialist
University of Wyoming
Cooperative Extension Service
307-766-5682

ISSUE - Stay Smart - Stay Alive: Skin cancer prevention in Wyoming

Skin cancer is the most common and rapidly increasing cancer in the country. More than 1 million people were diagnosed with skin cancer in 1998. Between 1992 and 1996, Wyoming had the second highest melanoma death rate in the country due, in part, to the state's altitude, sunny weather, and wind. By the nature of their occupation, Wyoming agriculturists are at greater risk than the general public for developing skin cancer.

What has been done
The educational program, Stay Smart - Stay Alive, was developed to address growing concerns regarding skin cancer. The program focused on the types and causes of skin cancer, factors that lead to high risk, melanoma in Wyoming, and prevention techniques. USDA Farm Safety and Pesticide Applicator Training funded this effort.

Impact
Stay Smart - Stay Alive increase participant knowledge of skin cancer and awareness of skin cancer prevention techniques. The program enabled participants to describe prevention techniques they plan to use in the future.

Presented in agriculture-related meetings and pesticide applicator trainings, Stay Smart - Stay Alive reached 365 people in 2000. Seventy two sun-reflective hats were distributed in a trade for participants' baseball caps. In the future, hats will be provided only to those who score in the "very high" category on a sun susceptibility questionnaire develop by the American Academy of Dermatology and completed at the training.

Sixty six participants were evaluated following five of the presentations. The previous knowledge of skin cancer was greater than expected. On a scale of 1 to 5, 1 low and 5 high, participants had a mean knowledge level of 3.36.

When asked if they learned new information from the presentation, 92.2 percent of participants said they had. Most participants said they benefited most from information regarding how to perform self-exams and identify melanoma, the importance of protecting children, the significance fo a healthy diet, and prevention techniques such as wearing sunscreen, sunglasses, proper clothing, and wide-brimmed hats.

When asked if they would do anything differently as a result of attending the presentation, 71.9 percent of the participants said yes. Some of the prevention techniques individuals planned to implement in their own lives included using more sunscreen on their children, carrying

sunscreen with them outdoors, and wearing different style hats and long-sleeve shirts in darker colors. Participants also noted they will be more careful when near reflective surfaces that can project ultra-violet radiation.

Additional anecdotal impacts included 10 people who stated they would see a dermatologist because of an atypical mole. Several people said the sun susceptibility assessment told them they were at high to very high risk of skin cancer, and that they were unaware of this before the training. One participant traded his ball cap for the sun protective hat and reported that he planned to give it to his daughter who was working as a lifeguard. Another participant requested hats for his entire family.

This presentation will continue as requested, with special emphasis on commercial and private applicator training.

Randy Weigel
Human Development Specialist
Dept. of Family & Consumer Sciences
University of Wyoming
307-766-4186
307-766-3379 FAX
weig@uwyo.edu

ISSUE - 4-H K-3 Program introduces new members to abundant opportunities available through traditional 4-H

Enrollment in 4-H had stagnated, and Natrona County needed a program to attract the attention of a more diverse group of participants. Family heritage and word-of-mouth memberships were not reaching new families and urban residents.
The UW Natrona County CES Office started the K-3 Program in order to recruit younger children to 4-H. To that end, 4-H K-3 literature was distributed at elementary schools throughout the county, and current 4-H members provided information and answered questions at local events. Natrona County 4-H also attended the Central Wyoming Fair and the annual state Game and Fish Exposition in an effort to enroll new members.

Impacts Achieved
During the 2000 4-H year, Natrona County gained 30 new members through the K-3 Program. Seven of those new members joined the regular 4-H Program upon graduation from K-3. Only eight newmembers are related to current 4-H members, which shows a new interest outside of the "4-H family." CES hopes that these new members will gain both a lifelong interest in 4-H and a sustained commitment to family and community.

The 2001 4-H year brought the return of 20 members, with an additional 8 joining through their siblings. Natrona County 4-H also was able to attract 40 new youth, for a total second-year enrollment of 68 members. The K-3 Program has attracted new children from diverse populations who might not have otherwise had the opportunity to learn and grow with 4-H.

By providing an education-based program for younger children, K-3 fills a void in the community. The program gives children an opportunity to continue with the organization and to expand their interests. Unlike most popular sports, it also provides a non-gender-based environment in which young people can grow through their teens and gain the skills and attributes needed to mentor younger children as they come in to the 4-H Program.

Jeri Vines
University Extension Educator
Natrona County Extension Office
University of Wyoming
307-235-9400
307-265-0419 FAX
jkeckler@natrona.net

B. Stakeholder Input

Since the University of Wyoming Cooperative Extension Service is currently implementing the strategic plan that has been partially approved, stakeholder input was gained in a different format than suggested in the Plan of Work 1999 - 2004. Town meetings were held within each county to address the plan and five suggested initiatives. Both oral and written comments were accepted. Changes were made to the strategic plan after input was gained from those town meetings in every county. As the strategic plan states, initiative teams will determine the needs assessment formats and gather the information. With the induction of the five initiatives, the stakeholder input process suggested in Wyoming's Plan of Work 1999-2004 will begin with in 2001. Local Extension advisory committees continue to function and support the program delivery assessment.

This past year, the Wyoming Agricultural Experiment Station established a sixteen member review team to evaluate the two existing Research and Extension (R&E) Centers in southeast Wyoming. The charge to the review team was to think in broad and nontraditional ways in arriving at recommendations as to how the R&E Centers in southeast Wyoming might be organized to capture efficiencies and improve effectiveness. More specifically, the committee was asked to address research needs and priorities, organizational structure, and facility needs. Based on the committee's recommendations, there have been some organizational changes at the existing centers and a facilities planning committee has been organized to look at the focus and structure of a new R&E Center in southeast Wyoming.

Each of the College's four R&E Centers has an advisory committee that meets annually. At these meetings each member is asked to present their concerns and to identify research and education needs. The research and educational needs are summarized in the minutes and, as appropriate, distributed to department heads and individual faculty. The members of one advisory committee are in the process of establishing an endowment for the center as a result of discussions at their annual meeting.

C. Program Review Process

With the UW CES strategic planning process, the merit review process was not conducted with Utah as planned. The results have shown more focus needed and some of the objectives may be changed from those listed in the Plan of Work. Initiative teams are currently working on the goals, objectives, strategies, outputs, and outcomes. In writing the UW CES strategic plan, the Program of Work was used as a reference.

D. Evaluation of the Success of Multi and Joint Activities

(1) As mentioned in the Stakeholder input section, the University of Wyoming Cooperative Extension Service and two of the Agricultural Research Stations went through a strategic planning process. Because of these two reviews, changes are currently in process that will affect the 5-Year Plan of Work. Extension is waiting for a final decision pertaining to the direction the organization will be headed in the next five years. Research will be closing two stations and building one in a new location that will accomplish the necessary research for the region.

With the identification of five initiatives, there will be more focus for the limited number of Extension personnel. Those initiatives redefined by the stakeholders are Profitable and Sustainable Agriculture, 4-H / Youth Development, Nutrition and Food Safety, Rangeland Resources, and Enhancing Wyoming Communities and Households. Because of the stakeholder input, the 4-H / youth development became a separate initiative. There is less emphasis on economic development and more on community development.

The programs identified in the University of Wyoming College of Agriculture's 5-Year Plan of Work address the critical issues of strategic importance for the state and region. These issues were identified through extensive input from research and teaching faculty, CES personnel, and college stakeholders during the college's strategic planning process. The five program goals listed in the 5-Year Plan of Work are consistent with those at the national level. Over 50 percent of the research projects identified in this report reflect an integrated effort between research and extension. Researchers at the University of Wyoming's College of Agriculture are involved in approximately 18 multi-state projects. These 18 projects cover all but one of the identified program goals (goal 2). The College's researchers have also been successful with research involving multi-institutions. WIN the Rockies is an example of successful multi-institution research efforts by combining efforts with Montana and Idaho. There is also on-going multi-institution research programming through the Research & Extension Centers. In additions, researchers have been successful in integrating research programs with various federal and state agencies and organizations. These linkages, as well as campus wide multi-disciplinary research programs, are encouraged through the Agricultural Experiment Station's university wide competitive grants program.

(2) When developing the individuals' plans of work, they either included a separate plan to address diversity or included diversity issues within each plan. UW Extension and Research professionals were committed to reaching the total population of Wyoming including the under-served and under-represented Native American and Hispanic population. Such activities included hiring a Spanish speaking interpreter for a farm safety program, preparing nutrition materials in Spanish, developing a business course for youth on the Reservation, developing a gardening course for the honor farm incarcerated, and involving some Girls' School residents in the 4-H horse program.

There are a limited number of on-going multi-state/multi-institution research projects involving University of Wyoming researchers that address the needs of under-served and under-represented populations, NC-223 and WIN the Rockies. However, researchers may need to seek ways to better address the needs of these population groups in their future efforts.

(3) The programs described the expected outcomes and impacts. Each of the educators and specialists wrote impact statements, some of which are used for the Impact Reporting to CSREES and others for county commissioners, state and national legislators, university administration, and clientele.

The College's 5-Year Plan of Work spells out the expected outcomes and impacts for each of

the five goals. Information concerning the outcomes and impacts is presented in an evaluative manner so that expectations have been made clear. Within each goal outcomes concerning work with external agencies including multi-state and multi-institutions are also addressed and encouraged.

(4) By focusing on specific outputs and outcomes as identified within the plan, there was more consistency in reporting the program effectiveness. Through the college's strategic planning efforts there appears to be a more concerted effort to streamline research programs to address one of the identified goals. Research and extension personnel are seeking ways through the Plan of Work to work more closely together in order to address the needs of the state and region. As these efforts continue the college can anticipate an improved effectiveness in its research and extension programs.

E. Multistate Extension Activities

Cross-discipline activities, multi-state, and joint research have been common place in the past, so these requirements are not new to Wyoming. However, the multi-state activities have not been auditable. Joint research can be audited through the projects that were at one time called regional projects. In the supplemental report to the Plan of Work 1999 - 2004, Wyoming suggested that 25 percent of its Hatch funds would be devoted to the integrated activities; but Extension listed zero (0 percent) of its Smith-Lever funds on integrated activities. The contradiction comes from the fact that the Hatch funds can be audited, whereas the Smith-Lever funds could not be audited. Because of that concern, Wyoming added an auditable tracking of the Smith-Lever funds that are both multi-state and integrated with Hatch.

Appendix C
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____ University of Wyoming _____
State_____ Wyoming _____

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

Actual Expenditures

Title of Planned Program/Activity	**FY 2000**	**FY 2001**	**FY 2002**	**FY 2003**	**FY 2004**
Goal 1: Enhance agricultural systems that are highly competitive in the global economy					
Goal 3: Enhance a healthy, well- nourished population					
Goal 4: Enhance greater harmony between agriculture and the environment	**22,894**				
Goal 5: Enhance economic opportunity and quality of life for Americans					
Total	**22,894**				

Director **Date**

Form CSREES-REPT (2/00)

F. Integrated Research and Extension Activities

The strategic plan for the College of Agriculture calls for collaboration in all three functions, instruction, research, and outreach. To encourage multi-disciplinary and collaborative research efforts, the Wyoming Agricultural Experiment Station established a competitive grants program that emphasizes research across disciplines and colleges.

Multi-disciplinary and integrated research efforts are quite common in the College of Agriculture. Over half of the research projects are integrated and the majority of those are multi-disciplinary. This is particularly true of the research efforts dealing with Goal 1 on competitiveness and profitability of agriculture.

Research efforts in areas under Goals 3 and 5 have been enhanced through projects on human nutrition and health, and youth and families at-risk, respectively. This has been most apparent with the increase in projects in the Department of Family and Consumer Sciences.

Appendix C
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____ University of Wyoming _____
State_____ Wyoming _____

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

Actual Expenditures

Title of Planned Program/Activity	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004
Goal 1: Enhance agricultural systems that are highly competitive in the global economy	340,396				
Goal 3: Enhance a healthy, well- nourished population	16,490				
Goal 4: Enhance greater harmony between agriculture and the environment	108,374				
Goal 5: Enhance economic opportunity and quality of life for Americans	58,466				
Total	**523,726**				

_____ _____
Director **Date**

Form CSREES-REPT (2/00)