

**UNIVERSITY OF NEVADA
COOPERATIVE EXTENSION (UNCE)
&
NEVADA AGRICULTURAL EXPERIMENT STATION (NAES)**

**Annual Report
of
Accomplishments & Results**

Submitted April 1, 2006

TABLE OF CONTENTS

PROGRAMS

| | |
|--|---------------|
| Overview and Introduction: | Pg. 3 |
| Goal 1: An Agricultural System That Is Highly Competitive In The Global Economy | Pg. 3 |
| Goal 2: Safe And Secure Food And Fiber System | Pg. 12 |
| Goal 3: Healthy, Well Nourished Population | Pg. 14 |
| Goal 4: Greater Harmony Between Agriculture And The Environment | Pg. 20 |
| Goal 5: Economic Development and Quality of Life for People and Communities | Pg. 33 |

| | |
|----------------------------------|---------------|
| STAKEHOLDER INPUT PROCESS | Pg. 44 |
|----------------------------------|---------------|

| | |
|--|---------------|
| PEER AND PROGRAM REVIEW PROCESS | Pg. 44 |
|--|---------------|

| | |
|--|---------------|
| EVALUATION OF THE SUCCESS OF MULTI AND JOINT ACTIVITIES | Pg. 44 |
|--|---------------|

| | |
|--|---------------|
| MULTISTATE EXTENSION ACTIVITIES | Pg. 45 |
|--|---------------|

| | |
|---|---------------|
| INTEGRATED RESEARCH AND EXTENSION ACTIVITIES | Pg. 45 |
|---|---------------|

| | |
|--|---------------|
| APPENDIX “A” – Univ. of Nevada Cooperative Extension Integrated & Multistate Programs | Pg. 46 |
|--|---------------|

| | |
|--|---------------|
| APPENDIX “B” – Nevada Agricultural Experiment Station Integrated Programs | Pg. 49 |
|--|---------------|

PROGRAMS

Overview and Introduction:

Reports are only provided on select program impacts which reflect unique benefits to a diversity of clientele and stakeholders in Nevada. No attempt was made to include all programs or all program impacts since they are too extensive. All programs are based on local or statewide formal and informal needs assessments.

It should be noted that just about all Cooperative Extension programs have some type of applied “research” component. Cooperative Extension faculty are expected to research needs, program impacts, and may use applied research projects to learn new information as well as a teaching tools. All Cooperative Extension faculty must have at least these minimum research components in their programs, and research is a major consideration in annual evaluations for both field faculty and campus based faculty (many of whom also have joint Nevada Agricultural Experiment Station appointments as well). Finally, a number of Cooperative Extension faculty also participate on NAES research projects related to their program areas..

The research programs of the NAES are integral to the College of Agriculture, Biotechnology and Natural Resources and are associated with the College of Human and Community Sciences, and the School of Medicine. The mission of NAES is to build and support research capacity to advance understanding of biological, environmental, natural resource and social systems to enhance agriculture, community and economic vitality in compliance with State and Federal Legislation. Research is conducted in the laboratories of the Max C. Fleischmann College of Agriculture, Knudsen Resource Center, Howard Medical Sciences, Bureau of Mines building, and the Sarah Fleischmann College of Human and Community Sciences. Six field laboratory sites are also utilized for research, including: Main Station Field Laboratory, which houses the large animal surgical facility and laboratory and the meats laboratory; Valley Road Field Laboratory, which houses the College of Agriculture Equestrian Center; Newlands Research and Extension Center; Gund Ranch Rangeland Research Center; Rafter 7 Ranch Sheep Research Station; and the Jay Dow Sr. Wetlands Research Laboratory.

GOAL 1: AN AGRICULTURAL SYSTEM THAT IS HIGHLY COMPETITIVE IN THE GLOBAL ECONOMY

Overview: Our Plan of Work (POW) goals are to increase the overall quality and health of Nevada livestock through research and outreach, to understand the quality of plants through basic research and to evaluate and promote improved marketing of Nevada products.

University of Nevada Cooperative Extension (UNCE) education programs have focused on diversified/alternative crops, risk management and animal production efficiency. UNCE campus and field faculty are also part of many NAES research projects in these subjects, and have made extensive use of research findings. As noted in some of the key themes, the dissemination of research information via UNCE educational programs has had an impact on producer’s practices and profits.

NAES research programs have focused on developing alternative crops for Nevada, determining genetic and nutrition factors to enhance the quality of beef products, improving beef cattle reproduction rates to increase profitability, rangeland rehabilitation, improving the economic return in sheep production by emphasizing both wool and meat production and finding niche markets for specialty meat products.

Federal and State Funding by Plan of Work Goals

| | <u>Goal</u> | <u>Federal \$</u> | <u>State \$</u> | <u>County</u> | <u>Total \$</u> | <u>FTE</u> |
|--|-------------|-------------------|-----------------|---------------|-----------------|------------|
| Nevada Agricultural Experiment Station | I | 335,454 | 2,584,262 | | 2,919,716 | 47.20 |
| University of Nevada Cooperative Extension | I | 252,798 | 1,226,859 | 1,588,418 | 3,178,075 | 21.38 |

Theme: Invasive Species (Weeds)

Issue:

Weeds are one of the most serious threats to Nevada rangelands and lawns. Noxious weeds have already invaded thousands of acres of Nevada's lands and waterways and threaten water quality, wildlife habitat, recreational activities and the economic stability of ranchers, farmers and other land managers.

What Has Been Done:

Hundreds of Weed Warriors, Woad Warriors, and other volunteers have been trained by University of Nevada Cooperative Extension (UNCE) personnel in how to spot, control and eradicate noxious weeds. There are numerous activities every spring in which weed volunteers pull and/or spray hundreds of acres of noxious weeds. These volunteers:

- Educate their neighbors and other local residents about the threat of noxious weeds by making presentations, staffing booths, writing media articles and giving tours.
- Identify weeds and map infestations. They develop databases and monitor the infested areas.
- Control and eradicate weeds by conducting weed pulls and applying herbicides to large infestations.

There are more than 30 Nevada coordinated weed associations and other groups, according to the Nevada Department of Agriculture's Weed Coordinator. UNCE plays an active role in many of these groups, serving as catalysts, educators and grant consultants. The goal is to achieve long-term sustainability of the weed control efforts.

Impacts:

The Tahoe Weed Group mapped and treated a total of 282.9 acres in the Tahoe Basin, making significant progress in controlling invasive weed species and measuring a 20 percent decrease in total weed infestations from 2004 to 2005.

The Truckee Meadows Weed Group hired 4 seasonal staff to complete 12 weeks of weed mapping and control in 2005. Seasonal staff surveyed 12,454 acres and mapped 3,342 weed sites. Weed controls were implemented on 5,196 acres. A broad public education campaign aimed at the residents of the Truckee Meadows was conducted with a newspaper insert on weeds; a one-hour High Desert Forum radio feature on KUNR public radio; design and content for a weed group Web site (www.washoeweeds.org) was completed; Weed Warrior volunteers transcribed messages from the hotline; three versions of bus tail panels were displayed on 10 Regional Transportation Commission busses for four months and two, 2-hour volunteer weed "Dig-It" events. The outreach campaign was successful in increasing weed reporting via the hotline and Web site. The Web site had been accessed 863 times by late-December 2005 and 27 Web-based weed reports were made by residents, in addition to 14 calls to the hotline. Transit advertising data estimates that each bus placard was viewed by about 457 people per day over the 120 day period, for a total viewership of 548,400, with each person seeing each panel approximately 11 times during the month, for 6,032,400 gross impressions.

A research trial was conducted to determine the effectiveness of Christmas tree mulch from the annual recycling program as a control method for tall whitetop. In spring 2005, plots were established to study the use of varying depths of Christmas tree mulch in controlling the tall whitetop. Results from the mulch study were variable, but average canopy cover decreased with increasing mulch depth, and average number of stems also decreased with increasing mulch depth.

Source of Funding;

Smith-Lever
State Matching Funds

Scope of Impact:

State Specific
Integrated Research & Extension

Theme: Alternative Agriculture**Issue:**

Alfalfa or grass hay is produced on more than 90 percent of Nevada's irrigated agricultural lands. The lack of alternative crops limits producer options when hay prices fall or input costs such as electricity rise. This situation is compounded by threats to irrigation water from urban communities and natural drought. An increase in higher value crops or crops that use less water will enhance agriculture's contribution to rural communities and the state's economy, as well as creating opportunities for agriculture careers. University of Nevada Cooperative Extension (UNCE) is collaborating with private cooperators and agencies in developing applied research field trials that determine the survival and production potential of alternate crops.

What Has Been Done:

Currently six crops are being evaluated: 1) tef 2) wine grapes 3) plants for urban use 4) native seed 5) poplar trees and 6) sea berries. All of these crops can provide significantly increased income and reduce water use for Nevada's agriculture producers. For the first time in 2005, producers planted and/or harvested commercial size acreages of tef, wine grapes and turf grass (Churchill County).

A successful hybrid poplar trial of 300 trees at the Newlands Agricultural Research Station in Fallon is in its sixth year of production. The trees have grown to heights of nearly 40 feet in this time. There has been interest in the poplar species as a source of lumber products, and this is being explored.

UNCE assisted a Churchill County sod producer with a turf grass project. He signed a contract with Natural Resources Conservation officials to establish 45 acres over two years using sprinkler irrigation on a field that produced alfalfa. Significant savings of irrigation water will be realized as turf grass is significantly more profitable than alfalfa (approximately \$6,000 per acre gross wholesale value as compared with approximately \$700 per acre for alfalfa).

A project was initiated to test the production potential of tef, an annual grass that produces seeds to make gluten free flour, which can be used in rotation with alfalfa. A 7-acre trial was established comparing tef production with Sudan grass; the trial was repeated in 2004. Partners include the Bureau of Land Management, Nevada Department of Agriculture, Nevada Agricultural Experiment Station and farmers.

Impact:

The first commercial turf grass acreage was planted in 2005 with a total of 20 acres of turf grass established under sprinkler irrigation, which has improved water use efficiency by approximately 10 percent and resulted in a significant savings of Irrigation water. The first harvest is slated for 2006 and turf grass gross revenues generally exceed \$6000.00 per acre as compared with approximately \$700.00 per acre for alfalfa.

In 2005, the first-ever, large scale tef plantings and harvest of tef hay in Churchill County resulted in over 88,000 pounds of tef seed and 280 tons of tef hay. Tef produces over \$200 more revenue per acre than alfalfa, while using less than two-thirds as much water at a savings of slightly more than 50 percent of the operating costs.

Source of Funding:

Smith-Lever Act funds
State matching funds
Producer Support

Scope of Impact:

State Specific
Integrated Research and Extension

Themes: Home Lawn & Gardening and Urban Gardening

Issue:

Nevada is one of the fastest growing states in the nation and many new residents do not know how to garden in these arid land conditions. Experienced and novice gardeners from around the country have trouble growing plants and vegetables in Nevada. There is a great need to assist these new neighbors, and there is also a big demand for plant science knowledge from long-time citizens.

What Has Been Done:

Master Gardeners, educated by University of Nevada Cooperative Extension (UNCE) professionals, provide research-based horticulture information to the increasing population of Nevadans. They are local volunteers who learn advanced plant science skills through at least 50 hours of classroom instruction. Then, the student gardeners volunteer a minimum of at least 50 hours a year by giving their newly acquired knowledge to other citizens. Master Gardeners educate through the media, give talks and workshops, answer phone calls, send out informational materials, develop community gardens and teach in the schools, at garden clubs, senior centers, hospitals, childcare centers, nurseries and farmers markets. The Master Gardener program is also available to some prison inmates to help them with career development.

Impact:

There are nearly 600 active Master Gardeners statewide. In 2005, they handled nearly 20,973 phone calls requesting horticulture information, and replied to emails and mailed out requested publications. Master Gardeners volunteered more than 31,000 hours around the state educating people in plant-science, the equivalent of 17 full-time employees.

To this date, more than 100 inmates have completed the 70-hour program with all but two students passing the comprehensive final exam. Only one prisoner is known to have re-entered any southern Nevada prison. This is in accord with the results of other research that found decreased levels of recidivism among inmates who engaged in horticulture study. Self reports (n=30) of the increase in horticultural knowledge before and after taking the course showed that students who completed the course in 2004 and 2005 perceived an average increase in knowledge of 2.7, out of a maximum of 4. Qualitative statements included “I can take all the self-esteem classes they can offer, but this gives me something real.” Another inmate said, “This is the best thing I’ve ever done”. A former inmate attending a pruning seminar made it a point to tell how grateful she is for the horticultural classes she took in prison and that she and her roommate now work for NDOT because of the skills she gained from the program.

Source of Funding:

Smith-Lever Act funds
State matching funds

Scope of Impact:

State Specific
Integrated Research and Extension

Themes: Animal Production Efficiency

Issue:

Management and marketing are key components of success and profitability of any beef cow/calf operation. The choices needed to make accurate decisions are complex, difficult and often impractical as most producers know. What producers were asking for was a tool that provided flexibility (based upon management practices selected) in real-time that accurately predicted the economic investment necessary to take an animal from recently weaned calves to market/breeder standards. Producers needed something that would allow them to play “what if...” and tell them the subsequent effects on their wallets.

What has been done?

What faculty at the University of Nevada developed were three software packages that would enable producers to evaluate various management practices and their potential impacts on profitability. “Feedlot” was design to help producers estimate the economics of retained ownership of yearlings through the a feedlot. The second package “Grassfat” was designed to track your yearling cattle through the pasturing stage of production. And, “Calf back” was designed to track calves after weaning through the production process and allows producers to vertically integrate and diversity their operation while spreading marketing risk throughout the year.

Impact

This software, available for free at <http://www.ag.unr.edu/cabnr/resources.htm>, lets producers check rapidly many different scenarios and possible prices, costs, etc., and how they will affect profits. Over the last year and a half, visitors from 42 states and 15 countries have downloaded over 1031 copies of the software. Ron Torrell of Elko, NV claims that by using this software “budgeting your production alternatives can save you money by avoiding costly mistakes.”

Source of Funding:

State matching funds

Scope of Impact:

State Specific

Themes: Biotechnology

Issue:

DNA microarrays are powerful analytical tools for comparing expression patterns between thousands of different genes in organisms as diverse as animals, plants and fungi. Life science researchers require a reliable research tool to successfully complete biological assays that are designed around microarray technology.

What has been done:

Researchers at the University have taken an integrated functional genomics approach as a first step toward understanding how growth is affected and wine quality improvements might arise following low-water-use techniques. Our group in collaboration with Affymetrix designed the first Vitis GeneChip® microarray. The GeneChip® contains more than 16,000 distinct probe sets for V. vinifera (wine grapes) and related Vitis species, and represents approximately 30 to 50% of the grape transcribed elements within the genome. On average, gene expression exhibited a coefficient of variation of 16% across technical replicates.

Impact:

These microarrays are of high quality and give researchers high technical reproducibility. Ultimately, the data sets obtained from Vitis GeneChip® microarray will contribute to a reliable prediction model for wine characteristics, greatly facilitating future gene discovery and enable improvements to be made in both production efficiency and wine quality under environmentally adverse growing conditions

Source of Funding:

Hatch Act funds
State matching funds

Scope of Impact:

State Specific

Themes: Risk Management

Issue:

The goal of this project is to develop and deliver a comprehensive risk management education program to livestock and forage producers in the State of Nevada. This program helps producers understand the risks they face in agricultural production and teaches strategies to mitigate those risks in order to increase the probability of economic survival for the farm and the personal security of the farm family.

What has been done:

The educational program consist of two-day seminars covering financial management, as well as market, price, production, and legal risk. Producers learn financial planning and management techniques, as well as marketing techniques for enhancing value and accessing niche markets. Producers also learn how to protect their markets through contracts and protect themselves from price risk through contracts and use of futures and options markets. Crop insurance programs and other production risk techniques are also discussed.

Impact:

A total of 36 producers attended the seminars. Pre and post-seminar tests for two-day seminars show that participants had at least a 150% knowledge improvement after attending the seminar. The post-seminar evaluations indicated that 92% of the respondents considered the seminar as “very helpful,” 84% evaluated the seminar as applicable or very applicable, and 96% said they would “attend future workshop/seminars on risk management issues.” The six-month follow-up evaluations indicated that 73% of the participants used the risk management techniques in their operations/job. Forty-five percent used the financial risk management techniques, followed by market/price techniques at 36.36%. The participants agreed that the seminar provided information for enhanced planning. The seminar helped them be “more efficient and worry less about the future” and to “better understand risk management” factors. Two participants mentioned that their operations had seen increases in net revenues/profits from 6-8% since attending the seminar.

The Niche Beef Marketing workshop reached 41 producers, which covered topics such as livestock sales, marketing, and processing. Post-seminar evaluations indicted that more than 70% considered the Niche Marketing Workshop important. When asked to evaluate the applicability of the “material presented in this seminar into your operation/job” most of the respondents (more than 50%) evaluated the seminar from 6 to 7, where 1 means “none” and 7 means “a great deal.” Additionally, all participants said they would “attend future workshop/seminars on risk management issues”. Six-month follow-up seminar evaluations indicated that 30% had found the seminars very applicable to their operations.

Source of Funding:

USDA-Risk Management Agency
State matching funds

Scope of Impact:

State Specific

Themes: Animal Health

Issue (Who cares and why?)

Epizootic Bovine Abortion (EBA), commonly known as Foothill Abortion, is one of the major diseases responsible for reducing calf production on ranches in western and northern Nevada, California, southern Idaho and southern Oregon. Although infected pregnant cows do not show visible signs of illness, many of them abort their fetuses at six to nine months of gestation. A significant number of infected cows carry their calves to term, but the calves delivered are weak, fail to thrive and tend to die within the first weeks of independent life.

Although the organism which causes EBA has not been identified, it's been known for 40 years that the disease is carried by ticks (*Ornithodoros coriaceus*), and that cows get their infections from tick bites. Although it is known that this tick can be trapped in geographic areas near diagnosed cases of EBA, it is not clear whether the

tick is distributed throughout geographic areas and habitats which are distant from current defined location of EBA, nor is it known whether ticks from a variety of habitats are uniformly infected with the bacterial agent which causes EBA..

What has been done?

Researchers at the University of Nevada determined the geographic distribution of the tick vector in Nevada and where, in the geographic range of the tick, ticks are present which carry the microbe causing EBA. Altitude and vegetation types were determined once range was identified. Ticks were primarily located in Northern, and Northwestern regions of Nevada. Few ticks were collected in central and southern Nevada. The bacterial cause of EBA (AoEBA) was identified in nymphs, male and female ticks collected from all areas sampled in Nevada. The percentage of AoEBA positive ticks ranged from 5-20% in nymphs, 13-40% in males and 9-27% in females.

Impact

University of Nevada's Dr. Mark Hall has defined the regions and infectivity of EBA ticks in Nevada. Dr. Hall stated that "It is clear that most tick population and most infected tick populations reside in the northern and northwestern sections of the state and that all populations of the tick are infected with the bacterium which causes EBA". The University is now assuring ranchers in the southern and southeastern parts of the state that their cattle have minimal risk of being infected with EBA.

Dr. Bill Kvasnicka, retired UNR veterinarian, recommended cattle producers in tick infested areas use this geographic information to allow them to avoid ranges which put their cattle at risk and/or to graze infected ranges at times when there is little risk of active tick movement or to delay putting their pregnant cows onto the range until their window of susceptibility to EBA has passed.

Source of Funding:

USDA – Animal Health
State matching funds

Scope of Impact:

State Specific

Themes: Plant Genomics

Issue (Who cares and why?)

Climate, geological, geographical, and hydrological stresses, a.k.a. abiotic stress, cause extensive losses to agricultural production worldwide. Acclimation of plants to abiotic conditions such as drought, salinity, or heat is mediated by a complex network of transcription factors (the translation of DNA code into proteins) and other regulatory genes that control multiple defense enzymes, proteins, and pathways. Associated with the activity of different transcription factors are transcriptional co-activators that enhance their binding to the plant's transcription machinery. Although the importance of stress-response transcription factors was demonstrated in transgenic (genetically engineered) plants, little is known about the function of transcriptional co-activators associated with abiotic stresses..

What has been done?

Researchers at the University of Nevada focused their attention on a couple of genes that would hopefully prove to import stress tolerance enhancers transgenic plants. Using some of functional genomics latest advances in technology, microarray analysis, RNA gel blot analysis, our scientist reached a number of molecular milestones.

Impact

The transcriptional co-activator MBF1c has been shown to enhance the tolerance of transgenic plants to heat stress and osmotic stress or salinity stress. While the co-activator Zat12 is enhancing tolerance to oxidative and osmotic stress. Developing plants with enhanced tolerance to different abiotic stresses and their combination is

essential for agricultural production. Our analyses of transgenic plants expressing MBF1c demonstrate that this transcriptional co-activator plays an important role in plant protection against different environmental stresses. In addition, at least with osmotic and heat stress, the tolerance MBF1c induces in plants toward these stresses was maintained even when they were combined. Our findings thus offer a transgenic strategy to develop plants and crops with enhanced tolerance to different abiotic stresses. These findings are now starting to attract the interest of national biotech companies.

Source of Funding:

State matching funds
Grants

Scope of Impact:

Regional Specific

Themes: Rangeland/Pasture Management

Issue:

When a Nevada ranchers or federal agencies like the Bureau of Land Management wants to re-seed areas of disturbance, most turn to either commercial companies or regional plant material center for supplies. This would seem sufficient, but most commercial companies offer a generally assortment of sage-country/high desert mixes that don't necessarily thrive in all on Nevada's regions. On the other hand, seeds cultivated from a plant materials center in Idaho survive in the northernmost portions of Nevada, while Arizona centers can be applied to southern Nevada. Leaving a large gap between the north and the south.

What has been done:

Many grass species (including Indian ricegrass) with commercially available seed, have not been assessed under climatic conditions common to much of Nevada. This project assessed three commercially available cultivars of Indian ricegrass under Nevada climatic conditions. Using experimental plots each cultivar ability to survive and total numbers of plants was determined. By measuring aboveground biomass production, seedling density, foliage cover, water use efficiency, and seed production characteristics University of Nevada's Dr. Barry Perryman determined the overall best.

Impact:

With the results all in, the cultivar Paloma from Pueblo, Colorado out perform the competition in all categories. Dr. Perryman is now encouraging all commercial producers and plant material centers to grow Paloma Indian ricegrass for use in Central Nevada.

Source of Funding:

USDA-CSREES
State matching funds

Scope of Impact:

Regional Specific

Themes: Invasive Species

Issue:

Ips confusus is an aggressive tree-killing bark beetle that attack both Colorado and single leaf pinyon pines. In fact, the largest outbreak of bark beetles ever recorded is affecting drought-stressed pinyons throughout Nevada and other parts of the Southwest. Over the past two years, bark beetles have killed over 3.1 million pinions in

Nevada alone. We hope research on pheromone biogenesis will lead to the development of new control methods-enhancing the health, quality, and productivity of Nevada's pinyon pines

What has been done:

All bark beetles rely on volatile chemicals (pheromones) to attract mates and reproduce. University of Nevada researchers are developing new strategies to control *Ips confusus* based on disrupting pheromone production. In the short amount of time since this grant was funded, researchers have made tremendous progress. They demonstrated that feeding by male beetles stimulates the release of a brain factor that works in concert with juvenile hormone III to stimulate pheromone production. The UNR team also found the major pheromone component, ipsenol, was produced only by those males that had been treated with juvenile hormone III.

Impact:

The long term goal of this project is to develop effective pest management tactics targeting the chemically-mediated mating system of the beetles. Populations may be managed, at least at a local level, by disrupting pheromone biosynthesis. Moreover, certain portions of the RNA molecule have the potential as a delivery mode for target-specific insecticides. Through using RNA components it may be possible to knock down important genes related to a beetle's fitness, survival and reproduction. Because RNA could be developed against bark beetle-specific genes, the resulting control method would be species-specific, safe, and effective.

Source of Funding:

USDA – Hatch Act funds
State matching funds

Scope of Impact:

National

GOAL 2: SAFE AND SECURE FOOD AND FIBER SYSTEM

Overview: Our POW goal is to conduct research and outreach programming to prevent food borne illness in Nevada.

Data from Nevada research has been incorporated into the Nevada Beef Quality Assurance Program as well as the Hazard Analysis and Critical Point (HACCP) management program to improve consumer confidence in Nevada's beef industry. Food safety is also a part of all nutrition and food preparation training conducted by UNCE under Goal 3.

UNCE faculty have continued working with the Nevada Cattlemen's Association to promote and teach education programs related to the Beef Quality Assurance Program to help improved food safety. Each year the Beef Quality Assurance participants expand in numbers, and to the next level of certification among producers.

NAES research has focused on livestock health and improved nutritional quality of meat products.

Federal and State Funding by Plan of Work Goals

| | <u>Goal</u> | <u>Federal \$</u> | <u>State \$</u> | <u>County</u> | <u>Total \$</u> | <u>FTE</u> |
|--|-------------|-------------------|-----------------|---------------|-----------------|------------|
| Nevada Agricultural Experiment Station | II | -- | 119,283 | | 119,283 | 3 |
| University of Nevada Cooperative Extension | II | 5,400 | 5,400 | --0-- | 10,800 | .10 |

Theme: Food Quality/Food Safety

Beef Quality Assurance helps deliver a safe product

Issue:

Bovine Spongiform Encephalopathy (BSE) was discovered in the United States in 2004, which stopped exports of U.S. meats. Food-borne diseases, such as E. coli-contaminated meat, sicken thousands of American consumers annually. The American consumer has demonstrated that the safety and quality of the food they eat is one of their top priorities. Thus, Beef Quality Assurance (BQA) has become a national initiative of top priority to the National Cattlemen's Beef Association (NCBA), Nevada Cattlemen's Association and the Cooperative Extension System throughout the nation.

What Has Been Done:

BQA is an ongoing program and teaches cattle ranchers in all 50 states about animal genetics, cattle handling, feed purchasing, record keeping, testing and other procedures to produce beef without residue of animal health products or pesticides. Since 2000, University of Nevada Cooperative Extension (UNCE) has taught safety and quality assurance practices to more than 600 Nevada beef producers in workshops, during conventions, via distance education and in chute-side, on-ranch situations. UNCE specialists use a 44-page, Nevada-based BQA reference book, computer technology and an informational CD produced by the NCBA, to teach BQA principles. Participants work closely with veterinarians, scientists and other specialists to keep cattle healthy, improving overall quality and consumer confidence. Local partners include the Nevada Beef Council, Nevada Cattlemen's Association and Nevada Department of Agriculture.

Impact:

Over 330 Nevada cattle producers have received national level 1 certification in the BQA program; more than 65 have become level 2 certified. By becoming BQA-certified, producers sign an affidavit that they will implement and follow the guidelines taught in the educational program. Western Video and Superior Livestock, the two auction houses that sell more than 80% of Nevada cattle, list cattle as Nevada BQA-certified on consignments originating from BQA-certified ranches. Producers feel a better demand is realized for cattle processed under BQA guidelines. This program is having an impact on the way cattle are processed and marketed. A post survey conducted by the Nevada Cattlemen's Association shows that 90% of participants who became

certified have changed the way they process cattle. The Nevada BQA program is part of a national effort, which has resulted in a 25% reduction in the amount of injected site lesions due to improper vaccination protocol on beef cattle.

Source of Funding:

Smith-Lever Act funds
State matching funds.

Scope of Impact:

State Specific

Themes: Foodborne Pathogen Protection

Issue:

The negative effects and outbreaks of food-borne pathogens such as toxin-producing E. coli are on the rise. Beef cattle are known reservoirs of such pathogens. Post-harvest control methods alone have not been successful in reducing the risk of beef contamination of toxin-producing E. coli. Therefore, the role of pre-harvest control methods (e.g., dietary manipulation) is becoming important. This project identifies the dietary factors that can be implemented in beef cattle production systems to reduce the shedding of the toxin-producing E. coli. This on-farm management step is critically important to produce safer beef for humans.

What has been done:

UNR scientist Hussein Hussein identified beneficial dietary management practices that reduce the prevalence of human food-borne pathogens Shiga-like toxin producing Escherichia coli (SLTEC) in beef (feedlot and pasture) and cull dairy cattle. This involved fecal sampling of cattle in the four seasons and data collection on farm operation and management that relate to identification of pre-harvest control measures. The analytical aspects of this research are also completed and Hussein's team are currently finishing characterization of the SLTEC isolates at the molecular level. This involves detection and expression of the virulence genes. Additionally, a sets of extension publications are due to reach beef and dairy cattle producers in Nevada and California in 2006.

Impact:

This project has provided, for the first time, a database on prevalence of SLTEC on Western farm environments. The data illustrated prevalence of SLTEC serotypes of high virulence. Additionally, the expected analysis of the pre-harvest data will provide directions on how to decrease carriage and fecal shedding of SLTEC by cattle in a Western US environment.

Source of Funding:

Smith-Lever Act funds
State matching funds.

Scope of Impact:

State Specific

GOAL 3: HEALTHY, WELL NOURISHED POPULATION

Overview: Our POW goal is to conduct research to better understand healthy life style habits, and educational programs that focuses on learning and adopting healthy life style habits.

Many studies have documented the impact of nutrition on learning and health problems such as obesity among youth, diabetes, heart disease, hypertension and stroke among minorities as well as other adults. Therefore, major UNCE programs have been directed at improving the nutritional knowledge and eating behaviors of youth, especially those from minorities or limited resource families. Special efforts have also been made to reach minority audiences in these programs and examples are given below.

NAES research has focused on nutritional intervention strategies with dietary fat to assist in the treatment of human cancers and research on humanizing organs in sheep tissue through stem cell implantation.

Federal and State Funding by Plan of Work Goals

| | <u>Goal</u> | <u>Federal \$</u> | <u>State \$</u> | <u>County</u> | <u>Total \$</u> | <u>FTE</u> |
|--|-------------|-------------------|-----------------|---------------|-----------------|------------|
| Nevada Agricultural Experiment Station | III | 67,044 | 1,149,266 | | 1,216,310 | 18 |
| University of Nevada Cooperative Extension | III | 88,889 | 470,069 | 558,522 | 1,117,480 | 8.97 |

Themes: Human Health & Nutrition

Issue:

The prevalence of diabetes in the U.S. has increased from 1.5 million in 1958 to 20.8 million in 2005. Individuals of Hispanic origin are 1.7 times as likely and African Americans 1.8 times as likely to develop diabetes as non-Hispanic whites of similar age. The growing numbers of diverse populations make reaching out to these groups imperative. The direct cost of hospitalization for diabetes in Nevada in 2002 was \$82 million, not including outpatient medical care and loss of productivity. Individuals with diabetes spend \$7,400 more annually on health care than those who do not have the disease. Preventing diabetes translates into huge medical savings to patients and the community.

What Has Been Done:

University of Nevada Cooperative Extension (UNCE) developed An Ounce of Prevention, a diabetes prevention program targeting Hispanics, African Americans and Native Americans who are at an increased risk for developing the disease. Lessons in both English and Spanish help clients learn how to reduce their risk by: making lifestyle modifications to prevent or delay the onset of diabetes and its complications; increasing physical activity; and adopting healthy eating habits.

Four separate, culturally sensitive curricula were developed and published: *An Ounce of Prevention African American; Native American; English Version for Hispanics;* and *Mas Vale Prevenir: Version en Espanol*. More than 1,000 Las Vegas residents have completed the program. An Ounce of Prevention was expanded through a train-the-trainer component; Native American health representatives and African American church volunteers have been taught how to educate others about diabetes.

Impact:

In 2005:, 145 students completed the redesigned tool; and of the 72 students attending the "Healthy Hearts" program workshops, 53 completed both the pre- and post surveys. The 49-item survey instrument was completed at both the first workshop and again, 6 weeks later at the last workshop. The redesigned post-pre test measures knowledge of diabetes, risk factors for diabetes, food choices, and physical activity.

Knowledge of diabetes and risk factors shows a statistically significant increase in participants' knowledge of diabetes and risk factors from pretest to posttest. Participants were asked to assess their own level of risk for diabetes, and over 58% of participants reported having at least one of the four diabetes risk factors. Results showed a significant in scores from the pretest to posttest on the addition of fruits and vegetables to the diet.

Results also showed an increase in the number of participants who walk each day as well as an increase in walking pace.

Source of Funding:

Smith-Lever Act funds
State matching funds
Grant funds

Scope of Impact:

State Specific
Integrated Research and Extension

Themes: Human Health & Nutrition

Issue:

A needs assessment identified target audiences and educational priorities for eligible food stamp recipients in Nevada. The assessment determined there was a need to increase the consumption of low-fat, calcium-rich foods among children (particularly females), ages 11-14 years. Youth in this age group have lower intakes of calcium, among other nutrients. If calcium needs are not met during this critical development stage, the risk of osteoporosis increases in later life.

What Has Been Done:

To reach the target audience of 11-14 year olds with the “Calcium, It’s Not Just Milk” message, we used two primary communication strategies: 1) an awareness component, which featured special food tasting events; and 2) a school-based education component, which included classroom teaching. In 2005, three special food tasting events were held at Bridger and Cashman Middle Schools, which reached 2,413 students at each event. At Cashman, a food tasting event was offered at science night at the school that involved parents and students. The five day Calcium, It’s Not Just Milk curriculum was taught to 216 students at Bridger and Cashman and to 469 students at Traner.

Impact:

The campaign has reached more than 9,500 students over the past five years. The pre- and post-test food frequency data showed that the students significantly increased their consumption of milk and yogurt. The pre- and post-tests included eight knowledge questions to assess change in the students’ knowledge and understanding of calcium’s role in growth and bone health, distribution of calcium in the body, importance of physical activity, and disease prevention. A dramatic increase in knowledge was seen of how many milligrams of calcium they need each day, with only 3.4 percent of the students answering correctly on the pre-test and 53.1 percent answering correctly on the post-test.

Source of Funding:

Smith-Lever Act funds
State matching funds
Grant funds

Scope of Impact:

State Specific
Integrated Research and Extension

Themes: Human Health & Nutrition

Issue:

Childhood and adolescence are the critical periods for development of good health practices; many health behaviors established in childhood persist into adulthood. Because many chronic diseases are attributable to poor diet, physical inactivity and overweight, it is essential to start good health practices as early as possible. Of persons living in Clark County, almost 26 percent are under the age of 18 and 16.4 percent are children living below the poverty level.

What Has Been Done:

University of Nevada Cooperative Extension (UNCE) collaborated with the American Culinary Federation of Las Vegas and developed a nutrition education curriculum that promotes practices engendering lifelong, healthy lifestyles in children. Chefs for Kids teaches nutrition to children ages 6-8 in 12 Clark County “high needs” elementary schools. Topical newsletters and monthly wellness calendars written in both English and Spanish are sent home to families to expand instruction into the home.

Every week, educators teach second-grade students about the origin, use and need for food. Students also learn about healthy food combinations and choosing foods that provide the greatest benefit to their bodies. Additionally, the chefs donate 300 hours yearly preparing much-needed breakfasts for the students at each participating school, with food donated by local properties and purveyors. The program is partially supported by a social function that raises more than \$90,000 yearly in private funds.

In 2005, the Chefs for Kids nutrition education program was implemented at twenty-one schools and reached approximately 1700 second-grade and 2726 first-grade children. The Chefs for Kids program has reached more than 20,000 students since its inception. To reach an even broader audience, UNCE collaborated with KLVX, the Las Vegas public television station, and developed “Adventures with Chefs for Kids,” a series of five videos featuring puppets. The videos were transmitted to all Clark County first-grade classrooms through the instructional television system, augmenting a classroom curriculum developed by UNCE nutritionists. More than 2,100 copies of the curriculum were distributed in Nevada and other states.

Impact:

In 2005, evaluation findings for the second grade, intensive program are as follows: The first objective, hand washing, was evaluated after two food safety lessons were taught and 74 percent of the students were able to respond correctly with no steps omitted. The second objective was measured following lessons on the food groups and on the Food Guide Pyramid, in which children listed their favorite foods according to where they fit in the Food Guide Pyramid. A total 86 percent of children were able to list favorite foods with absolutely no errors. Another 8 percent of students listed foods with only one error. Only 2 percent of students scored lower than 70 percent on this evaluation. The third objective, students will choose fewer high-sugar/high-fat snacks, students were asked to choose three snacks out of ten possible choices. In the pretest, only 19 percent of students chose three snacks rated as “more healthful” as compared with the post-test in which 63 percent of students chose three snacks rated as “more healthful.”

For first grade students, 82 percent could name the Food Guide Pyramid when shown a picture of it. This score did show significant improvement from the previous year’s score of 62%. For food group name recognition and categorization, 88 percent of students were able to name all five of the food groups, and 91percent of students could name at least one food from each of the food groups correctly.

Source of Funding:

- Smith-Lever Act funds
- State matching funds
- Grant funds

Scope of Impact:

- State Specific

Themes: Human Health & Nutrition

Issue:

National data show a disparity between the health of low-income households and that of higher income households. According to Healthy People 2010, income is associated with differences in the occurrences of illness, including heart disease, diabetes, obesity, elevated blood lead level and low birth weight. The mission of EFNEP (Expanded Food and Nutrition Education Program) is to assist families with limited financial resources by educational support and experiential learning to apply acquired knowledge, skills, attitudes and changed behavior to improve nutritional and health status in order to prevent chronic disease and enhance family wellbeing. Practical application allows learners to see the relevance of information to their daily lives.

What Has Been Done:

University of Nevada Cooperative Extension (UNCE) engages adults and youth to improve nutrition through building basic skills. The key elements of education are food safety, wise use of food resources, buying, planning and preparing nutritious meals, encouraging physical activity, modifying behavior related to food practices and money management lessons. Program materials are available in English and Spanish.

EFNEP programming is conducted by paraprofessionals in small group classes at 19 agencies throughout Las Vegas. The small group classes are one hour in length and conducted each week for eight weeks. In 2005, more nearly 500 program families were enrolled, for a total of more than 2,400 family members reached through EFNEP programming. The EFNEP program was expanded to new venues including elementary schools and low income areas throughout the valley.

The youth phase, delivered during summer months, helps youth make healthful food and activity choices, and promote images about food and body size that are consistent with good health. The education is delivered through Boys and Girls Clubs, Scouts, recreation centers and after-school programs. EFNEP paraprofessionals trained nine volunteers who conducted summer nutrition education programming for more than 2,300 youth at several Las Vegas sites.

Program partners are Bridge Counseling Center, Cambridge Recreation Center, Cambridge Resource Center, CHOICES, Family to Family, Healthy Families, Healthy Families Resource Center, MASH Village, McCabe Family Resource Center, Parkdale Resource Center, Salvation Army, Shade Tree, Variety Day Home, East Valley Family Services Center and Headstart.

Impact:

In 2005, EFNEP paraprofessionals worked with 544 families with the race/ethnic breakdown of 53 percent Hispanic, 32 percent white, 11 percent black, 1 percent American Indian, and 3 percent Asian or Pacific Islander. Of these families, 66 percent have incomes at or below the poverty level. Results of the pre/post evaluation showed 98 percent made a positive change in consumption of servings of grains, fruits, vegetables, meat/alternatives, and dairy. Food resource management and nutrition practices improved for the majority, and food safety practices of NFE participants improved, with 44percent more often following recommended practices of not allowing meat and dairy foods to sit out for more than two hours and 63 percent more often followed the recommended practice of not thawing foods at room temperature.

Source of funding:

- Smith-Lever
- State matching funds
- USDA Food Stamp Nutrition Education Program

Scope of Impact:

- State Specific

Themes: Human Health & Nutrition

Issue:

The prevalence of childhood obesity has dramatically increased nationwide. The underlying causes are many, ranging from genetic propensity to socioeconomic, cultural and environmental influences resulting in unhealthful eating and physical activity practices. A person's relationship with food and physical activity begins in infancy and is molded during childhood. It goes beyond food selection, preferences and quantity. It goes to the very core of adult-child interactions based on either trust (potentially supportive) or control (potentially damaging).

What Has Been Done:

Given the multi-dimensional causes of childhood obesity, educational programs are composed of a group of efforts under the Childhood Obesity Prevention in Nevada umbrella. No one program can achieve the overarching goal to reduce the incidence of childhood obesity; thus, the issue is addressed with a multi-pronged approach. University of Nevada Cooperative Extension (UNCE) efforts focus on adults who directly feed children (i.e., parents or childcare providers) or those who work with these adults (health professionals).

Enough is Enough is a program that demonstrates to low-income parents the appropriate portion sizes for young children through a visual teaching tool. *Tummy Talks*, a children's storybook relating the concept of self-regulation of food intake to preschool children, was completed and pilot tested; 25,000 copies were printed.

TV Moves Me: Field testing was conducted with 40 English-speaking low-income mothers of 55 preschoolers. Slightly over half were of Hispanic descent. Almost 2/3s reported that their preschooler watched more than the AAP recommended daily limit of 2 hours. It took most parents between 4½ to 5 minutes to read the entire book (including the parent's pages) about being active, the importance of exercise and fitness, and less TV viewing. Greater than 90 percent had very positive reactions when asked if their child would like the book. Mothers with the youngest children (25 percent) thought their child would like the colors and graphics whereas another 50 percent believed their child would understand the message. Finally, 38 of the 40 mothers would be comfortable reading the book over and over to their child (a prerequisite for children's books).

Nurturing Partners' concepts are taught in schools and homes. UNCE staff facilitate changes in knowledge, attitude and practices of teens regarding nutrition, health and parenting issues. The lessons include making healthful food and nutrition choices, maternal health care, infant care skills, child development, personal development, and financial and home management. Teens (ages 10 to 19) were selected because of the high birth rate in this population in Nevada and Las Vegas. The staff works in alternative high schools to bring core program elements to parents or prospective parents. Weekly classes were presented to more than 5,200 teens at 11 schools in 2003. Home visitations continue to support the most vulnerable pregnant teens.

Mom's Special Gift creates a breastfeeding-friendly environment in southern Nevada among low-income mothers. Twenty-four University of Nevada School of Medicine pediatric residents were trained in 2004 to 2005 to learn more about the advantages of breastfeeding. They worked with more than 200 women who were breastfeeding. Community partners are Clark County high schools, local Women, Infants and Children (WIC) offices, University Medical Center, School of Medicine, Sunrise Hospital, Family Resource Center, Probation Judicial Studies and Child Haven.

Impact:

Nurturing Partners impacts High School Classroom Short-Term Results in the Las Vegas area found significant improvements in nutrition knowledge were noted of the 283 students answering the pre and post nutrition knowledge questionnaires. Also, teens ate more vegetables and fruit; decreased consumption of fast foods, sodas, junk foods and foods high in fat; and ate out in fast food restaurants less often.

Among the more than 130 WIC staff who received breastfeeding training during the Nutrition Education Conference, 91% said they would make changes in educating women about breastfeeding; 82% of agencies would like to receive on-site assistance to facilitate this change process; and all participants expressed interest in writing grants to receive additional funds and in improving facilities to create a learning-centered environment. Medical residents trained about breastfeeding attributed much of their preparation to this knowledge.

Source of Funding:

Smith-Lever Act funds

State matching funds

Grants

Scope of Impact:

State Specific

Integrated Research and Extension

GOAL 4: GREATER HARMONY BETWEEN AGRICULTURE AND THE ENVIRONMENT

Overview: Through the deliberate incorporation of diverse and often conflicting interests, the POW goals of the community-based decision-making for natural resources include:

- To catalyze decision-making processes that build communities and produce sustainable agreements
- To facilitate the development of innovative collaborations for the conservation and enhancement of natural resources
- To analyze and strategically confront barriers to implementation of community-based decision-making and collaborative utilization models for public lands

Given the nature of Nevada, water and wildfire related educational programs continue to be a primary focus of the University of Nevada Cooperative Extension Service (UNCE). In both of these areas, UNCE faculty have made a significant impact and received local and national recognition for their efforts.

In the “living with fire” related educational programs, UNCE faculty continue to have a significant impact on people’s awareness and preparedness for wildfires. The program has grown and expanded each year, and many request are received for materials and assistance from other states as well as from the Federal level. This is an integrated research-extension effort, and has led to statewide cooperation and involvement of Federal, state and local organizations concerned with wildfire prevention and preparedness. Additionally, other states (especially California) are participating or adapting many of these programs for their states.

Water quality is a concern for both urban and rural communities in Nevada. Major UNCE efforts have been devoted to working with local groups and organizations to reduce non-point source pollution, and to clean up various waterways – especially Lake Tahoe. Additionally, having education programs for rural public community water supply operators has been important.

NAES research has focused on predicting hazardous spills in local water supplies, evaluating livestock grazing for vegetation management, compatibility of wildlife and livestock on irrigated pastures, arsenic and mercury contamination from mining in Nevada watersheds, using NAES field labs to conserve municipal water supplies, and evaluating various range management systems for post wildland fire grazing.

Federal and State Funding by Plan of Work Goals

| | <u>Goal</u> | <u>Federal \$</u> | <u>State \$</u> | <u>County</u> | <u>Total \$</u> | <u>FTE</u> |
|--|-------------|-------------------|-----------------|---------------|-----------------|------------|
| Nevada Agricultural Experiment Station | IV | 528,414 | 2,763,346 | | 3,291,760 | 57 |
| University of Nevada Cooperative Extension | IV | 564,213 | 3,006,856 | 3,579,079 | 7,150,148 | 89.3 |

Theme: Water Quality/Soil Erosion/Natural Resources Management

Issue:

Lake Tahoe has been losing its world-renowned clarity at the rate of over a foot a year for more than 30 years. The loss of water quality and clarity can be attributed almost entirely to human impacts. There is an urgent and continuing need to educate residents and visitors about the relationship between their daily activities and the loss of valued resources. Most polls say that people want to protect their environment, but don’t know how. Educators, agency staff and community leaders recommended increased and continued outreach education to motivate homeowners to support restoration projects and implement Best Management Practices (BMPs) on their property.

What Has Been Done:

University of Nevada Cooperative Extension (UNCE) joined University of California Cooperative Extension to form The Lake Tahoe Environmental Education Coalition (LTEEC), a collaboration of 30 agencies, educational organizations and non-profits interested in improving the effectiveness of environmental education throughout the Tahoe basin. Environmental and water education efforts have continued through Contractor Workshops, TV reports, developing training materials, newsletters, etc.

In 2005, UNCE assisted the Sierra Watershed Education Partnerships (SWEP) in making DVDs of the new "Teach Tahoe" program. This resulted in producing DVDs and videos that combine 20 of the past TV reports into four lessons. Each is complemented by readings and activities. This program was piloted and evaluated in classrooms during 2005. Working with Sierra Watershed Education Partnerships materials on "Teach Tahoe" were distributed with lessons and 30 teachers were trained to use them.

Impact:

On a scale of 1 to 5, teachers trained to use Teach Tahoe rated the need for this program at 4.8, and they rated their interest in using the curriculum at 4.6. Half of the teachers trained said they would use the Teach Tahoe video to launch their place-based learning unit (n=30). In a later survey, all teachers who reported using the video in class stated that it stimulated the students' interest in learning more (n=5).

As an outcome of training the Cub Scout Pack in Tahoe City, the leader and scouts labeled 46 storm drains in Tahoe City, Carnelian Bay and Tahoe Vista with the message, "No Dumping—Drains to Lake." They volunteered a total of 21 hours on this program.

Our 2005 longitudinal phone survey shows gains in public knowledge regarding water quality protection. In 1997, 42% of respondents knew that runoff from yards and streets goes directly into streams and Lake Tahoe. In 2005 48% of respondents knew this crucial fact. In 1997, 31% of respondents could identify the meaning of the term Best Management Practices (BMP). In 2005, 39% of respondents know this definition, a 25% improvement in public knowledge.

The 2005 survey also shows behavior change. There was a 171 percent increase in use of native and adapted plants over the 1997 survey, a 183% increase in the use of slope stabilization and a 168% increase in directing runoff to infiltration systems.

Through the joint efforts of Coalition members in 2005, 1622 BMP Site Evaluations were performed on private properties, and 1532 BMP Certificates of Completion were awarded by TRPA. Since our BMP Retrofit partnership formed in 1999, TRPA has issued 5692 Certificates of BMP Completion. This is a desired mid-term outcome, showing behavior change, because every property that earns a Certificate of Completion must have BMPs implemented correctly.

At our 2005 Contractors Workshop, the average score on the pre-tests was 68.4% (n=49), and that on the post-test was 87.1% (n=64). In addition, largely because of the commitment which our BMP Retrofit group made to holding our workshops at the Demonstration Garden, the garden itself went from about 10% completed to about 70% completed in the first half of the 2005 summer season. In fact, the Garden was transformed by the preparations for this event and by the contractors themselves into a functioning teaching and learning facility, which demonstrates all five categories of best management practices, plus many other gardening features and methods. I organized a major event at the garden which drew 26 property owners during our summer "Living at Tahoe" series in July.

In 2005 "The Lake Tahoe Report" is seen by 40,000 people on TV nightly, 10,000 of whom live in the basin, with a \$200,000 value if the spots had been purchased. Two focus groups were used to evaluate the effectiveness of the TV segments. At the first meeting, the average score on the pre-test was 33% and 76% on the post-test; at the second meeting, the pre-test average was 38% and the post-test 72%. The two groups rated the importance of the subject matter a 4.9 on a scale of 1-5, and they rated the educational effectiveness and the interest/entertainment value 4.4 each.

Source of Funding:

Smith-Lever Act funds
State matching funds

Grants

Scope of Impact:

Multistate Integrated Research and Extension – NV & CA

Theme: Integrated Pest Management/Pesticide Application

Issue:

Central Nevada forage growers, particularly those in the Diamond Valley, have suffered severe losses in their timothy hay crops from tiny mites. The few control agents now available for timothy hay are expensive and require a special use permit. University of Nevada Cooperative Extension (UNCE) identified a critical need to obtain registration for pesticides suitable for use on cool season grasses to control the mites. In 2003, the UNCE plant and soils specialist brought this need to the national IR-4 program.

What Has Been Done:

The UNCE plant and soils specialist met with the Nevada Hay and Forage Growers Association (NHFGA) to identify potential products for submission to the IR-4 research program that would control the damaging mites. The team identified three potential pest control agents for submission in 2003. IR-4 has funding to initiate research on only 15 new fungicides, insecticides and herbicides each year; however, the miticide Acramite put forward by Nevada was selected as one of these 15 top priorities out of 350 requests nationwide. Acramite is used to control plant-feeding mites. IR-4 researchers are developing residue and tolerance data for the miticide; two sites in Eureka County monitor the efficiency of Acramite. In 2004 Nevada field trials were started to evaluate 12 pesticides to help ensure farm sustainability.

Nevada partners include the NHFGA, Nevada Department of Agriculture and USDA.

Impact:

In 2005, registration was granted for use of a miticide (acramite) in Nevada that we had successfully submitted for residue research in 2003. This action provides Nevada growers with a critical weapon in the fight against mites and other important pests of grass hay. The second product we submitted for research (zeal) was granted a “B” priority and was one of 35 granted that priority from over 300 submitted nationally. The \$144,000 grant application was successful and the ECEE and Nevada’s IR-4 Coordinator are listed as key personnel. Nevada growers will benefit greatly from this work as it provides significant resources from other states to solve a critical problem in Nevada.

It took three years to test the miticide by IR-4 researchers and for the chemical product to be available for use under the new label authorization. In the process, Nevada organized a coalition of faculty from western states to identify additional needs and develop appropriate programs. The Arid Southwest IPM Network, comprised of Nevada, Arizona, California and New Mexico, was organized and received a regional IPM grant. The new regional collaboration will culminate in an IPM information network. It will be used to identify regional IPM needs, develop pest management strategic plans and establish priorities for future funding. It will also include a Web site that will serve as the primary information source related to IPM functions for this multi-state project.

Source of funding:

Smith-Lever
State matching funds
IPM funds

Scope of Impact:

Multistate Integrated Research and Extension (CA, NV, AZ, NM)

Theme: Wildfire Science & Management/ Natural Resource Management/Land Use

Issue:

Living with Fire (LWF) is a comprehensive, multi-agency project aimed at teaching homeowners how to live more safely in high wildfire-hazard environments. The collaboration is enhanced by the Sierra Front Wildfire Cooperators, a group of 12 Nevada and California firefighting agencies, who came together to help communities prepare for dangerous wildfires. The importance of wildfire education was identified in a 1997 needs assessment involving local fire officials. Between 1999 and 2001, fire consumed 3.2 million acres in Nevada. More acres burned in Nevada during the 1990s than in the previous 40 years combined.

What Has Been Done:

The collaborators focus on pre-fire activities that reduce the wildfire threat around homes, thus improving the survivability of those homes and occupants. In 2004, responding to a request from fire departments, educational materials were made available in VHS and DVD formats. The popular *Living With Fire: A Guide for the Homeowner* tabloid continues to be distributed locally and throughout the West and nation. The spin-off, non-profit Nevada Fire Safe Council continues to assist the state's high fire-hazard communities in reducing their wildfire threat.

Cheatgrass Awareness Campaign has been initiated in 2005. Cheatgrass is an annual grass common to much of northern Nevada. When dry, it is extremely flammable and is considered a dangerous wildfire fuel. Concerned about the abundant cheatgrass crop in 2005, the Nevada State Office of BLM contacted UNCE concerning the implementation of a cheatgrass awareness campaign prior to the Fourth of July weekend. BLM offered to pay for the expenses if UNCE developed and distributed the materials. UNCE faculty: 1) coauthoring a special publication and fact sheet concerning cheatgrass issues and 2) finalizing the publications based on peer review comments and working with the publication layout person.

In Carson City The 20 Nevada Division of Forestry (NDF) seasonal employees took what they learned in firescaping class, and incorporated it into their defensible space evaluations of 137 Carson City homes adjacent to the burned area. They used a defensible space checklist developed by a Waterfall fire staff member who redesigned it from "Living With Fire" materials. This is a significant accomplishment, as NDF has previously been hesitant to use these education materials. A strong positive working relationship has been developed between UNCE and NDF.

Impact:

The Nevada Fire Safe Council is a key entity in reducing Nevada's wildfire threat to communities. To date, the NFSC has acquired over \$5,000,000, including approximately \$1,200,000 in grant funds and \$62,000 in dues and gifts in 2005. 19 communities became Fire Safe Council chapters in 2005, bringing the total to 43 communities. There are now over 2000 paid members with 923 individuals joining in 2005.

Comprehensive wildfire mitigation plans have been completed for all seventeen Nevada counties, seven which have been approved by their respective Boards of County Commissions and are now eligible for Healthy Forest Initiative funds.

More than \$107,000 for 2005, over \$800,000 since inception in 2002 of in-kind services and funds from communities were documented in support of NFSC projects. Approximately \$1.8 million were spent on fuels reduction projects in 2005 in 18 Nevada communities resulting in 7962 tons of wildfire fuels being removed and 1089 acres treated. The California side of the Lake Tahoe Basin is now included in the NFSC.

The Nevada legislature approved funding the NFSC request for \$1.5 million. Senator Dean Rhoads, Chairman of the Nevada Legislative Committee on Public Lands, stated in a letter sent to every Nevada Mayor and Board of County Commissioners that his committee "strongly supports the goals, mission, and ideals of the Fire Safe Council and ... hopes that all areas at risk for wildland fire will participate in this worthwhile organization."

The cheatgrass special publication was inserted into every major northern Nevada newspaper (117,000 copies). The BLM contributed \$16,000 to pay for printing and newspaper insert fees and The Reno Gazette Journal contributed a full page ad featuring the special publication which was valued at \$6,000. Additionally, the BLM distributed the special publication to every one of their western and national offices. Idaho and Utah developed and printed, with UNCE's permission, their own version of the special publication.

In Carson City revegetation of burned areas was a priority. Working with UNCE, NDF, NFSC, staff and volunteers potted 4,550 Jeffrey pines in containers for 2006 planting. Seventy-eight willows were planted to stabilize Ash Canyon Creek. Of the 1,000 trees planted with the Scouts, 497 (50%) survived because the volunteers watered them. Only 10% had been expected by NDF to survive. Two thousand two hundred cubic yards of fuels was reduced to 25 cubic yards of mulch for 20 property owners.

Source of funding:

Smith-Lever
State matching funds
Bureau of Land Management
Grants

Scope of Impact:

State Specific
Multistate Extension – NV & CA (besides other states adopting program and using materials)

Themes: Hazardous Materials

Issue:

Increased energy consumption has led to a significant increase in the use of coal to generate electricity, resulting in increased generation of coal combustion by-products with fly ash the major component. Coal combustion by-products that are recycled provide a beneficial use and constitute savings in landfill space. Ash produced by coal combustion calcium and silicates that 1) lend itself nicely to creating a concrete like substance; and 2) in western US as an agricultural fertilizer and liming agent.

However, ash (be it coal wood ash, coal fly ash, or incinerated sewage sludge) contain mercury that is readily transferred between environmental compartments. Therefore, it is important that consideration and a better understanding of the fate mercury when amending soils with ash materials.

What has been done:

University of Nevada scientists Jody Ericksen and Mae Gustin conducted agricultural soil amendments (fertilizers) and soil stabilization (liming agent) experiments to measure how much mercury was released with dry verses wet verses tilled soils and night verses daylight hours. Three forms of ash were tested in these conditions, coal wood ash, coal fly ash and incinerated sewage sludge. Another set of experiments were conducted to determine mercury emissions from pads of consolidated ash material found in livestock areas. Investigators using the same wet/dry, night/day, added a third parameter disturbed (hoofed) verses undisturbed to better simulate condition experienced from livestock usage.

Impact:

University of Nevada's Dr. Mae Gustin asserts that there are many economic advantages to finding useful applications for ash material and minimizing disposal to landfills. The bottom line was ash created by incinerated sewage sludge emits the most mercury in general. Using ash in consolidated form (pads) scored the lowest in emissions, while stabilizers (liming agent) were the worst. These results are now helping the EPA and the state of Minnesota, a underwriter of the research, make better informed decisions on how to dispose of ash by-products.

Source of funding:

Environmental Protection Agency
State matching funds

Scope of Impact:

National

Themes: Hazardous Materials

Issue:

In the environment, mercury is transformed into methylmercury when oxidized. The methylation of mercury is primarily a natural, biological process which is highly toxic, building up in living tissue and increases in concentration up the food chain, i.e. microorganisms like plankton, to small fish, then to fish eating species like osprey, bears, and humans.

Understanding how much methyl mercury production occurs in Steamboat Creek running through Reno, Nevada's Truckee Meadow will determine how much or how little restoration is needed.

What has been done:

This project is unique in that it compiled data on mercury methylation associated with wetlands having different sediment and water mercury concentrations. By collecting this information University of Nevada researchers are beginning to extend their understanding of the cycling of old versus new mercury in wetland systems and the association of methyl mercury production with nutrient removal processes i.e. restoration efforts.

UNR researchers also conducted site comparison using across naturally occurring wetlands and artificial wetlands created at the northern end of Steamboat Creek. Through manipulations and comparison of the different experiment settings in the constructed wetlands researchers developed management scenarios that should reduce impacts to down stream systems, like Truckee River and Pyramid Lake.

To expand this novel concept to arid ecosystems, a wetlands mercury cycling model is being developed that may be used to help implement remediation strategies for wetland /riparian setting with mercury contamination across the western United States.

Impact:

Results from this research were complicated and will serve as a guideline to water management officials who will have to make some hard choices. On the one hand, building wetlands creates a natural water filter trapping sediments, nutrients and even pollutants. While on the other hand, these same attributes foster and promote the growth of bacteria. Some of these bacteria, while necessary in the water filtering process, produce methylmercury as a bi-product. Results also indicate that running partially treated municipal wastewater into wetlands only exacerbates the issue by providing even more nutrient into the ecosystem while providing a cost-effective natural mechanism for treating certain levels of water contaminants.

Source of funding:

USDA-CSREES
State matching funds

Scope of Impact:

State Specific

Agricultural Waste Management

Issue:

Industry, labor, government, and environmentalists agree on one issue: that acid mine drainage is the number one environmental problem facing the mining industry. Acid mine drainage occurs when sulphide-bearing minerals in rock are exposed to air and water, changing the sulphide sulphur to sulphuric acid. This acid can dissolve heavy metals found in waste rock and tailings such as lead, zinc, copper, arsenic, selenium, mercury, and cadmium, into ground and surface water. Acid mine drainage and heavy metals pollution can poison ground and drinking water. It can also destroy aquatic life and habitat.

Sulfate-reducing systems have the potential to remediate acid drainage at abandoned mine sites by reversing the oxidation processes which are responsible for creation of the acidic water and the release of the metals. In this process, a carbon source is used to biologically reduce sulphuric acid to hydrogen sulfide, followed by precipitation of metals (and others) as metal sulfides. This process raises the pH of the water and effectively removes most metals, and also reduces sulfate concentrations.

What has been done:

For the completed project, University of Nevada scientists have developed a metals and sulfate reducing bioreactor for use as treatment systems for acid mine drainage, utilizing inexpensive alcohols (methanol, ethanol and ethylene glycol) as carbon sources that can be dripped into bioreactors. To date, investigators have demonstrated that each of these alcohols can serve as a carbon source for sulfate reduction and metal precipitation. This year, scientists installed a recirculation system that has proven to remove 99 percent of all metals found in the mine's waste water.

Impact:

The University of Nevada alcohol driven bioreactor demonstrates one of the most cost-effective method of treating acid mine drainage, and has wide applicability to other sites. At a cost of about \$2.00 per day to treat roughly 8000 gallons of water (the maximum flow from Leviathan Mine, CA), remediation efforts could effectively treat this facility for the next thousand years and still not have spent as much as some lime treated facilities — the previously least expensive method. The combination of passive treatment and low sludge generation render this process appropriate for a wide variety of acid mine drainage sites. Four new bioreactors were installed at Silver Equity Pit Lake to treat high levels of zinc. These bioreactors are proving highly successful for treatment of zinc contaminated fluids that may not have high acidity, reducing toxic zinc levels to below 0.1mg per liter.

The U.S. EPA, ARCO (Atlantic Richfield Corporation) and the State of California are regarding this system as a new industry standard that will have applications elsewhere. Because of the high success of this project, the regulators (EPA and State of California) and ARCO are developing plans to treat all water coming from Leviathan Mine.

Source of funding:

State matching funds
Grants

Scope of Impact:

National

Themes: Water Quality**Issue:**

Perchlorate is now found commonly in many agricultural waters, as well as in a variety of foods, including vegetables and milk. This substance is know to interfere with iodine metabolism and cause thyroid function problems. The purpose of this project is to determine whether perchlorate is formed as a natural product, through oxidation of chloride by sunlight and a variety of soil surfaces and/or nitrate..

What has been done:

The production of perchlorate from oxidation of chloride in the presence of nitrate and/or titanium dioxide on dry surfaces was demonstrated in a series of experiments. Samples of desert soils obtained from several sources in southern Nevada and southern California were analyzed for perchlorate to determine if it was observed in desert soils.

University of Nevada scientists determined that desert soils can photochemically catalyze (sunlight) the production of perchlorate. The concentrations observed varied widely, from non-detectable to over 100 micrograms/kg on the soils. They also confirmed earlier studies that showed that perchlorate was generated on irradiated (sunlight simulators) surfaces. Finally, using desert soils containing 1000 mg/kg of chloride, we were able to demonstrate conclusively that perchlorate is formed on sunlight-irradiated soils following 1-4 months in sunlight. The concentrations observed were up to 90 micrograms/kg, but were well above detection limits.

Impact:

This research has been highly successful and can potentially have a major impact on arid regions' water management. Our scientist demonstrated that a contaminant of considerable concern, perchlorate, is naturally produced in sunlight. With the EPA moving to set limits of perchlorate in drinking water to 4-6 ppb, our data indicates that runoff from soils that are irradiated by sunlight are well above this concentration. Thus, accounting for perchlorate found in a variety of irrigated vegetables.

Source of funding:

USDA – W45
State matching funds

Scope of Impact:

National

Themes: Water Quality**Issue:**

One of the repercussions of fires, regardless of its cause, and logging, be it selectively done or clear cuts, is increased runoff. A force that leaches forest nutrients out of the affected soil and transports it into local water sheds boosting algal growth and decreasing water clarity. The question is, does controlled burns and selective harvesting practices influence the degree of nutrient leaching to a greater or lesser degree than doing nothing?

What has been done:

To answer this question, scientist compared the effects of prescribed fire and mechanical understory biomass removal on forest health and productivity, wildfire fuel loading, soil fertility and productivity, and recharge and discharge water quality as affected by nutrient transport processes.

Impact:

While forest harvest and controlled burning may have initial impacts on nutrient release and, therefore, surface water quality, these effects appear to be minimal compared to the inorganic nutrient contributions from the unmanaged control sites. Fire exclusion and the lack of mechanical harvest techniques are conducive to increased nutrient discharge potential, and may be exacerbating the problem of nutrient discharge loads to Lake Tahoe. Furthermore, unlike controlled burning, wildfires have been shown to create an immediate and large magnitude nutrient mobilization. Overall, findings suggest that controlled burning and/or mechanical harvest as management strategies have the potential to actually improve long term surface water quality by reducing the nutrient content in surface runoff, while improving the overall health of forest ecosystems.

Source of funding:

State matching funds
Grants

Scope of Impact:

State Specific

Themes: Water Quality**Issue (Who cares and why?)**

Perry Canyon, located in the western watershed of Pyramid Lake, contains several abandoned mining sites that discharge acid mine drainage into the drainage of Perry Canyon, which is a tributary to Mullens Creek and ultimately Pyramid Lake. This research will study the impacts on the Pyramid Lake Paiute Indian Tribe.

What has been done?

A ground water flow model was built for the Mullens Creek basin and couple with a contaminant transport model of the Perry Canyon to simulate the discharge of contamination since the abandonment of the mine sites. A final report was submitted to the Pyramid Lake Paiute Tribe Environmental Affairs Office. The report of the modeling results indicated that Perry Canyon acid mine drainage (AMD) was unlikely to be affecting the tribal drinking water wells at this time. Using the most conservative estimate of sulfate transport in simulation trials of the model, it was possible to see a 20-50 mg/l increase in sulfate at the wells today. Under more realistic transport scenarios, it appears that sulfate transport is currently limited to 1-2 miles downstream of the mouth of Perry Canyon. However, eventually the sulfate levels will continue to move downstream from the canyon mouth toward Pyramid Lake.

Impact

The tribal environmental managers included the University of Nevada report in their final report to EPA and the mine site is currently being monitored. The results of the modeling done under this study indicates that some remediation and clean-up of the mining areas and efforts to reduce AMD production are warranted to reduce the long term impacts of the discharge on the water quality of the adjacent aquifer.

The results of the modeling showed that ground water contamination from the mining area is unlikely to have reached the tribe's wells at this time, however if AMD discharge continues, elevated sulfate levels will be eventually reach the production wells. Based on the results of this modeling study, the tribe is continuing to work with the U.S. Bureau of Land Management to remove the mine tailings from Perry Canyon and to eliminate the source of pollution. The modeling results show that some mitigation of the mining area will be necessary to protect the long-term safety of the Tribe's drinking water.

Source of funding:

Environmental Protection Agency – Office of Water
State matching funds
Grants

Scope of Impact:

State Specific

Themes: Natural Resource Management

Issue:

Cheatgrass is a non-native invasive plant that is having profound impacts on Great Basin rangelands. Because cheatgrass quickly develops a large root system in the spring, by the time native grass seedlings start to grow in April or May, cheatgrass has stolen most water out of the top foot of soil. Although mature native grasses can get water from lower soil regions, seedlings cannot get their roots deep enough into soil to access water before drought sets in, and thus, die of thirst. Without this ability to reproduce, native grasses inevitably decline, and so over time, cheatgrass becomes more and more common until eventually it dominates. Cheatgrass also encourages fires. Because it dries up earlier in the year and burns easily, where cheatgrass is abundant wildfires occur earlier and more often, which damage or kill native grasses and make it impossible for sagebrush to grow back after fire. A decrease in sagebrush also means decreased numbers of native wildlife species because many shrub-steppe animals depend on this shrub for food, hiding, cover, or nesting. This project will identify strategies to control cheatgrass on Great Basin rangelands, restore native species, and increase biodiversity using replicated experiments across the Great Basin.

What has been done:

Thus far, University of Nevada's Dr Bob Nowak has discovered that: (1) Herbicide application, sugar application, or weeding, all of which reduced cheatgrass density, increased re-vegetation species establishment. (2) Sugar application reduced cheatgrass seed output and subsequent year's density at most test sites; however this is not a

cost-effective way to reduce resources on a large scale. (3) Several readily-available native plants (e.g., bluebunch grass) performed at least as well as or better than crested wheatgrass. And, (4) There are differences in establishment success within re-vegetation species between different accessions, indicating the importance of basing selection of restoration stock on both species and plant material origin.

Impact:

It is Dr. Nowak's recommendation that active partnerships among governmental agencies, universities, cooperative extension, and land managers, convey knowledge of the processes, techniques, and results discovered during these experiments to ranchers and other rangeland professionals. Dr. Nowak advocates the use of techniques such as herbicide application, burning, or other methods of reducing cheatgrass prior to planting to increase success of restoration efforts. Cheatgrass control may be more successful on nitrogen-depleted lands, thus, other management techniques that reduce soil nitrogen (e.g., sugar application) may enhance cheatgrass control efforts. Native plant materials could be used in the place of non-native crested wheatgrass without sacrificing re-vegetation success.

Source of funding:

USDA/CSREES – Integrated Food & Future Agricultural Systems
State matching funds

Scope of Impact:

Regional Specific

Themes: Forest Resource Management

Issue:

Pinyon-Juniper (P-J) encroachment often leads to the loss of understory vegetation, including grasses. As P-J woodlands become denser and the understory vegetation sparser, the seed source for grasses and forbs may also become sparser, but no data is available to document the relationship between seed bank and P-J tree density. Because soil seed banks are a major source for re-vegetation after a disturbance like wild fires, we need to know if the abundance and diversity of species in the seed bank changes with P-J tree density.

What has been done:

Scientist at the University of Nevada first determined the relationship between density of the tree canopy in P-J woodlands and the diversity and abundance of seeds in the soil seed bank. Using the latest computer simulation models, created a statistical model that predict the relationship between canopy density and seed bank's diversity and abundance. Scientists using controlled burn in P-J woodlands, determined the seed banks survival rates.

Impact:

As pinyon-juniper woodlands in the western portion of the United States continue to increase in distribution and density, understory growth will continue to decline and the occurrence of crown fires increase. After a crown fire, mountain sides are open to both soil erosion and invasion by exotic species, and therefore rapid re-establishment of native species is highly desirable after a fire. In systems where initial abundance and distribution of plant species drive succession, soil seed banks can be used to predict the composition of new plant recruitment.

This project is informing land managers on how they should respond to disturbance and encroachment in P-J woodlands. For example, when a catastrophic fire occurs in P-J woodlands, land managers need to know if there is a sufficient seed source for new plants and what species are likely to occur in order to better plan rehabilitation efforts. Furthermore, our research shows that the seed bank become lower as the stand becomes denser, then managers need to know when a site will lose its ability to rebound from a major disturbance in order to plan intervention efforts to reverse encroachment.

Source of funding:

USDA – Forest Service
USDA/CSREES – Integrated Food & Future Agricultural Systems
State matching funds

Scope of Impact:

Regional Specific

Themes: Biodiversity/Land Use**Issue (Who cares and why?)**

The general dogma about curlew behavior – a bird listed by USFW as “of concern species” with only an estimated 20,000 remaining worldwide – is an animal that will nest only in wet meadows with short-grass and no shrubs, e.g., prairies. These environmental factors help mitigate the physiological constraints of an extremely long fledgling period, exposing chicks to all sorts of dangers. When compared to Nevada’s common shore birds, the curlew typically requires double the time to fledge (70 days). The USFW states that the major threat to curlews is degradation of their native grassland breeding habitat. However, recent observations have found hundreds of curlews living in Eastern Nevada, a sagebrush community, with little to no water. What has brought these birds to Nevada?

What has been done?

Over the past 4 years University of Nevada researchers in cooperation with local ranches of the Humboldt and Ruby valleys have developed a grazing strategy that reduces risk of survival in Nevada’s curlew populations. By following a few simple rules: grazing cattle in low-land valley pastures during the fall/winter months, moving the cattle off the pastures for spring/early summer months, using annual snow melt runoff to irrigate pastures and waiting until mid-July to cut a single hay crop, research data shows curlew populations are above average. To gain a better perspective of how these management practices might help curlew populations, University of Nevada scientists conducted annual censuses that determined not only total numbers and nesting success, but how many birds decided to return to Nevada as opposed to some other traditional spring breeding ground.

Impact

With the helping guidance of University of Nevada researchers, ranchers along the Humboldt and Ruby valleys have begun a management practice that greatly enhanced Eastern Nevada’s curlew population. What used to be flocks in the teens, now are flocks in the hundreds calling hayfields across Eastern Nevada their new home. These findings have generated quite the buzz for US Fish and Wildlife officials and environmentalists alike. So much so, that this year at the 2006 Shorebird Science in the Western Hemisphere conference a symposium will be held just for Long-billed Curlews.

Source of funding:

USDA – Hatch Act funds
State matching funds

Scope of Impact:

Regional Specific

Themes: Water Quality**Issue:**

In the semi-arid West, heap-leach mining ponds attract migratory birds with false promises of food, shelter and water. When heap-leaching initially took hold, thousands of migratory birds died each year and federal standards were established to minimize risk to the environment. Currently, Federal standards for arsenic are 10

parts per billion and 50 parts per million for cyanide, based upon a human weighting 150 pounds. This project addresses the issue arising around most migratory birds that frequent these mining ponds don't weigh 150 pounds.

What has been done:

Young homing pigeons were obtained and trained. They were trained to home out to distances as far as five hundred miles. Their time to return was used to benchmark abilities. The effect of non-lethal exposures to arsenic and cyanide were tested on their ability and speed to home to their roost. The birds were taken out for release, but approximately fifteen minutes prior to release the birds were dosed with the appropriate test compound or solvent control. The birds were then be released and the time required for their return to the roost determined. These results provided us with evidence regarding whether avian non-target exposure to these compounds poses a biological threat to these birds.

Following the last dose run, birds were allowed to rest for 45 days prior to the start of breeding season. Following breeding, embryos were collected at 2-day, 6-day and 12-day stages and whole embryo RNA was extracted. A set of primers were developed for these studies based upon primers used for chick embryos. We then used these primers to test for gene expression of developmental markers in the various embryos we collected.

Impact:

The take home message of these findings is that with exposure to arsenic and cyanide flight times were significantly increased, biological tissue damage occurred, and reproduction was inhibited. Taken together these studies demonstrate that current federal standards are not safe and that these levels should be decreased to at least EPA's current drinking water limits if preserving our natural resources is a priority.

Source of funding:

USDA – Hatch Act funds
USDA – W45
State matching funds

Scope of Impact:

Regional Specific

Themes: Integrated Pest Management

Issue:

Saltcedar has taken over stream banks and lake margins across the west, according to Tom Dudley, associate research professor in the Department of Marine Science Institute, University of California – Santa Barbara.

With roots that can seek groundwater as deep as 100 feet underground and the ability to drink water too salty for other plants, saltcedar (a.k.a. tamarisk) leaves other southwestern plants unable to compete. It spreads rapidly and can survive almost anything, from being submerged in water for more than a year to being consumed by wildfire.

Originally brought to the U.S. as an ornamental plant and to stabilize soil, saltcedar is at least partially to blame for lack of adequate water flowing into a number of lakes in Arizona, Nevada, New Mexico, Texas, and Utah. Dudley says saltcedar has caused major economic damage to agricultural producers in semi-arid to arid regions. Mechanically and chemically removing the plant is costly. "Farmers can't economically justify the cost to control saltcedar, and they want to put the land back into production."

What has been done:

The newest enemy of the invasive saltcedar is a tiny leaf beetle called *Diorhabda elongata*. Researchers at the University of Nevada are finding that the beetle, from China, is successfully killing off the tree. The quarter-inch long beetle is a good biocontrol of saltcedar because both larvae and adults feed exclusively on the plant, and the adults produce two or more generations of offspring per year. They not only eat the green vegetation, but in doing so create holes in the leaves through which water escapes, causing branches to wither and die.

The beetle was first introduced to Nevada inside multiple enclosed areas across several ecosystems so that researchers could study the effects beetles had on saltcedar. The beetles were then introduced to the wild in Pershing County, Nevada 2002. In late 2005 the Saltcedar biological control program has expanded to include California, Nevada, New Mexico, and Oregon.

Impact:

According to Dr. Dudley, using the beetles has obvious advantages over bulldozing the saltcedar. It is less disruptive and can easily treat a large area. Except for the cost of the research, it is basically free, whereas mechanical clearing costs \$1,000 to \$5,000 per acre.

Dr. Dale Devitt, a University of Nevada professor of soil and water based in Las Vegas noted that if, through removal or defoliation of saltcedar, the trees' water consumption could be reduced by half, an extra 50,000 acre-feet of water per year could make its way to Lake Mead. That's enough water to supply 125,000 people.

Allen Brinkerhoff a local grower in Pershing County, NV, said he is thrilled by the results the beetles have had on the saltcedar on his land. "They have done a good job. The effect is amazing." Two years ago the beetles defoliated 25-30 acres of Brinkerhoff's land and they now have defoliated over 1,000 acres of land.

The beetle is the first approved by the USDA as biological control agent for saltcedar in the United States.

Source of funding:

USDA – Agricultural Research Service
Nevada Arid Rangeland Initiative
State matching funds

Scope of Impact:

National specific

GOAL 5: ECONOMIC DEVELOPMENT AND QUALITY OF LIFE FOR PEOPLE AND COMMUNITIES

Overview: Our POW goals in rural economic development include conducting research and subsequent education for decision-makers on changing economic dynamics for their communities, developing leadership opportunities for community decision-makers, establishing and evaluating innovative decision-making models and extending research results in educational programs to stakeholders. In the area of youth and family development our POW goals include educating parents regarding quality childcare, conducting research and outreach on youth at risk, and conducting research and outreach learning on literacy.

UNCE's Project MAGIC (Making a Group and Individual Commitment) educational program was designed to teach at risk teens the skills necessary to become productive members of society. A decline in per capita incarceration was observed in those counties where MAGIC was implemented, and among youth participating. Project MAGIC continues its expansion to new areas and from rural to urban counties, and to Reservations. Results of this program continue to show a dramatic reduction in the % of youth returning to the juvenile justice system. Because of its success, the program has expanded into additional communities in Nevada and is being adopted or emulated by many other states.

Literacy programs have been important for the development of good parenting skills, as well as for helping youth. This has been especially important for families where English is a second language. Literacy programs have been developed in English and Spanish, and a version for use on Reservations. After school and other programs where students can receive help with studies have also been important.

Nevada scientists have evaluated the financial impact of rangeland fires on Nevada cattle operations and skyrocketing utility bills. In addition, recreational valuations in Nevada have been determined to provide an economic impact of recreation on rural communities due to river volume changes resulting from mining gold. In addition we have had the benefit of increased security at our Valley Road Field Lab by providing boarding and staging areas to the Reno Police Department horses at our equestrian center.

Federal and State Funding by Plan of Work Goals

| | <u>Goal</u> | <u>Federal \$</u> | <u>State \$</u> | <u>County</u> | <u>Total \$</u> | <u>FTE</u> |
|--|-------------|-------------------|-----------------|---------------|-----------------|------------|
| Nevada Agricultural Experiment Station | V | 349,176 | 720,347 | | 1,069,523 | 15 |
| University of Nevada Cooperative Extension | V | 456,743 | 2,415,371 | 2,869,876 | 5,741,990 | 69.12 |

Themes: Aging/Consumer Management

Issue:

More than 25 percent of the 85,000 new Clark County residents each year are seniors. With the majority of elderly residents being relative newcomers, many lack the traditional support structures associated with work and family. The elderly have the potential to make great contributions to the community or to overwhelm state and local budgets with medical and social service costs. The National Institutes of Health estimates that delaying nursing home entry nationwide for just one month would save the country \$3 billion annually. Equally important is the potential to facilitate successful aging and extend seniors' independent living status, a crucial potential quality-of-life benefit of the University of Nevada Cooperative Extension (UNCE) Seniors CAN program.

What Has Been Done:

Seniors CAN is a life skills educational program to improve older adults' quality of life and help them maintain their independence. Program objectives are to utilize the well-documented advantages of lifelong learning to enhance their sense of control over life, decrease loneliness and improve participants' self-esteem, which research demonstrates leads to improved health outcomes. Using the train-the-trainer teaching model, volunteer instructors – including graduate students, senior center directors, social service providers and older adult peer

educators -- were recruited and trained to expand the program. The program has received nationwide attention, with 31 states and Canada purchasing the curriculum for use.

The curriculum includes 15 lessons on nutrition, personal safety, food safety, finance, general health and productivity.

In 2005, Seniors CAN was taught 12 sites in Clark County. At the NALA Senior Center, the program was taught in Spanish. Each student receives an average of 32 hours of instruction over a four-month period. In 2005, a record 158 participants completed the 16-week program.

Impact:

By the end of 2005, more than 579 participants had completed the pre- and post-testing and the entire four-month program, with hundreds of others attending from one to ten classes.

Minority and low-income participants reflected an even greater level of improvement ($p < .001$), suggesting the program is more effective for those at higher risk. The 16-week intervention demonstrated statistically significant improvements in components associated with better health and a higher quality of life for the target population of independent-living older adults. A community-based educational intervention can be a cost-effective strategy to provide a model health intervention to reduce risk and promote the health and independence of older adults.

To date, nearly 20,179 Seniors CAN teaching contact hours has reached older adults in urban and rural Clark County. Comparisons between pre- and post-test scores for all participants who completed Seniors CAN show statistically significant improvements in knowledge, mastery or sense of control and a decrease in loneliness and stress. Participants reported they apply program information into their everyday lives on a lesson-by-lesson basis, and wellness-related behavior changed as a result of their participation. Many report the education gave them “more control of their lives,” a program goal directly related to the theoretical model connecting learning with self-efficacy.

Source of Funding:

Smith-Lever Act funds
State matching funds

Scope of Impact:

State Specific

Themes: Youth Development/4-H-Children, Youth & Families At Risk

Issue:

Washoe County, Nevada, has a high transient population and some schools have a particularly high concentration of low-income and transient families. Children 6- to 12-years-old need supervision after school while parents are at work. Parents with low or poverty level wages often cannot afford childcare for their school-age children. All children face risks as they grow and develop, but children who live in low-income housing or are homeless may be at higher risk for participating in risky behaviors. These children can benefit from positive, nurturing interactions with caring adults. Children who have strong interpersonal skills and support are less likely to participate in risky behaviors, such as drug use, early sexual involvement and dropping out of school.

What Has Been Done:

University of Nevada Cooperative Extension (UNCE) developed the 4-H After School Club (ASC) to teach children basic life skills including math, reading, science, positive communication, goal setting, self-responsibility, decision-making and good nutrition. Youth who have these life skills are less likely to participate in risky behaviors. Additionally, the program helps youth complete their homework by providing quiet space, materials, support and encouragement. The program is based on research, child development theories and a respect for each youth’s ability to make choices that are healthy and respectful of others.

The 4-H ASC is an educationally focused program for low-income and homeless youth. Grant funding was obtained to conduct the programs at 10 sites at high-risk elementary schools in Washoe County and Reno Housing Authority community rooms. The children receive a snack and help with their homework, and participate in other activities including reading and educational programs. Literacy skills are emphasized. Also offered are family centered activities such as family nights and a family newsletter, written in both English and Spanish. The youth participate in community activities, such as building flower and vegetable garden beds in the Master Gardener program, clean-up projects and canned food donations. Staffing opportunities have been expanded through university student work-study and internships, offering students real-life experiences before entering the workforce.

In 2005, 687 youth participated in the 4-H after school program. Seven newsletters were written, translated and disseminated to participating families. Nine Family Nights were offered for participating youth and their families.

In 2005, the Nevada 4-H ASC was one of seven nationally to pilot new alternatives and renewable energy projects. In 2006, the pilot program continues to the second phase on heat and heating, and students in White Pine County will join the pilot test of the science curriculum.

Program partners include the Reno Housing Authority, Washoe County School District 21st Century Community Learning Centers, Reno Department of Recreation, Food Bank of Northern Nevada and YMCA of the Sierra.

Impact:

Evaluation of the 4-H ASC has shown a significant increase in some children's reading grades and improvement of social skills for participants of all ages.

In alternatives and renewable energy projects youth participating had a 38% increase in knowledge in a pre-and-post-survey. In 2006, the pilot program continues to the second phase on heat and heating, and students in White Pine County will join the pilot test of the science curriculum.

Source of funding:

- Smith-Lever
- State matching funds
- U.S. Department of Energy grant
- Other Community Partners

Scope of Impact:

State Specific

Theme: Leadership Training & Development

Issue:

University of Nevada Cooperative Extension (UNCE) has worked with the Washoe County Department of Community Development's Citizen Improvement Process for several years. The need for this program arose based on evaluation results of programs. In particular, there was a need for advanced training and skill building for the county's Community Action Board (CAB) members to help them to participate effectively in local government issues that impact their communities.

What Has Been Done:

UNCE developed and implemented an Engaged Leadership program to assist chairpersons and CAB members in their efforts to create and sustain effective boards. This program is a custom-designed, six-session training and support to provide members with relevant information, hands-on practice, homework assignments and personal coaching.

In 2003, the program material and approach was revised based on evaluations from participants in the pilot program. New participatory exercises were developed, including a mock CAB meeting with roles, issues and

exercises for discussion. The key principles of leadership were incorporated, and CAB members were shown how to put the principles into action. They were taught how to facilitate meetings, manage conflict and set goals. This program, certified as part of a university professional development course, also included mentoring and coaching.

In 2004, Washoe County agreed to offer the training to all Washoe County Advisory Boards, Committees and Commissions, so that now the program is offered to 17 boards in Washoe County. The revised program began in February 2005. The program also expanded to include Carson City Advisory Boards, Committees and Commissions.

Impact:

In 2005 pre- and post-tests, respondents said they experienced the following gains from participating in the “Engaged Leadership Program”:

- more confidence in chairing or planning a meeting (38 percent gain)
- facilitating (21 percent gain)
- giving speeches or presentations (20 percent gain)
- making decisions in a group (16 percent gain)
- engaging in dialogue or discussions (27 percent gain)
- working through group conflict (33 percent gain)
- being a leader (32 percent gain) and
- feeling their participation is effective (33 percent gain).

These results are very similar to findings in from 2004 participants.

Source of funding:

Smith-Lever
State matching funds.

Scope of Impact:

State Specific
Integrated Research and Extension

Theme: Children, Youth & Families At Risk

Issue:

Nevada has one of the highest per capita juvenile incarceration rates in the nation. State and county costs for incarceration of Nevada juveniles is on the increase. Currently, the average cost to incarcerate a juvenile is \$84 a day with a seven-month average stay. In comparison, Project MAGIC is expected to cost just \$400 per family per year.

Several Nevada studies indicate that taxpayers support community-based, prevention programming. In a survey of Nevada’s rural counties, 71% of the local population indicated support to increase spending for programs that might prevent juvenile crime. A statewide survey of all adjudicated youth in state-run juvenile detention facilities found that few alternatives to detention exist.

What Has Been Done:

University of Nevada Cooperative Extension (UNCE) developed Project MAGIC, a collaborative prevention program to help juvenile offenders leave the criminal justice system and become productive members of society. The program, originally designed for rural, entry-level juvenile offenders and their families referred through probation, has expanded to urban and Indian Reservation populations. The after-school program is conducted three times a week over an eight-week period. The youth learn communication, self-concept, team

building, problem solving, decision making, self-responsibility, conflict resolution, aspiration building, goal setting and community leadership. The parent sessions include the same life skills.

The Las Vegas program targets entry-level juvenile offenders ages 12 to 18; they are court-ordered to participate. The targeted juveniles are either in the detention facility or on probation. Clark County processes more than 2,500 juveniles each month.

There are currently nine Nevada sites that conduct Project MAGIC programs – Elko, Battle Mountain, Winnemucca, Las Vegas, Carson City, Owyhee (including parts of Idaho), Hawthorne, Lovelock and Tonopah. Partners include school administrators, juvenile court judges, probation department personnel and others concerned about the welfare of young people.

Project MAGIC materials were translated into Spanish in 2005.

Impact:

The national award-winning Project MAGIC has graduated more than 3,000 juvenile offenders who have not reentered the justice system, saving taxpayers an estimated \$5.4 million in incarceration costs. Probation staff estimate only 10 percent of MAGIC graduates are further involved in the juvenile justice system compared to 30 percent in Nevada.

In 2005, 193 youth and 122 participants from 9 communities participated. Of those who responded to a survey, ethnicity included 37 percent Caucasian, 24 percent Native American, 11 percent Hispanic and 28 percent unknown, with 68 percent male and 32 percent female. Mean age was 14.8 years. At the conclusion of the program, youth reported seeing significant improvement in their grades, missing less school, thinking less about dropping out of school, increasing participation in positive school and community activities and seeing a decrease in serious family arguments. On average youth reported a 25 percent improvement in skills in decision-making, conflict resolution, goal setting and communication. Parents reported seeing what their child was learning in school as important for later life, thinking it would be wrong to drink alcohol and reducing the yelling and insults at home. They were also more aware of where their children were when not at home.

Source of funding:

- Smith-Lever
- State matching funds.
- CSREES Grant
- Bureau of Alcohol and Drug Abuse
- Other state and local agencies

Scope of Impact:

- State Specific
- Multi-state Integrated Research and Extension – NV & ID (besides other states adopting and using materials)

Theme: Children, Youth & Families At Risk/Leadership Training & Development (Military Youth)

Issue:

Youth today are exposed to a variety of alarming risk behaviors – youth violence, teen pregnancy, school dropout and substance abuse. Research suggests that an effective approach is to provide programs and activities that encourage positive development in youth. Positive youth development is highly related to a decreased likelihood of involvement with all types of risk behaviors. As youth develop, they need positive settings that offer the opportunity to build these important internal resources. It is particularly essential that teens be aware of the potential impact of their decisions and learn effective decision-making skills.

What Has Been Done:

University of Nevada Cooperative Extension (UNCE) developed Project Thunder on the Nellis Air Force Base in southern Nevada to increase the decision-making and leadership skills of teens; demonstrate positive decision-making and leadership skills through completion of community service projects and leadership roles; and increase youths' ability to see a positive vision of their future goals and dreams.

This program brings together middle and high school youth representing diverse backgrounds, and provides training in personal leadership, decision-making and civic responsibility. Adventure-based activities are used to help youth see beyond traditional barriers of race, religion, culture and class, and see themselves as part of a wider community. Youth attend residential leadership conferences, participate in adventure-based activities, such as repelling and trust exercises, take part in seminars and commit to working together on community projects.

Partners are the Nellis Air Force Base Youth Center, The Ruby Foundation, Monoco Middle School, Junior Achievement of Southern Nevada and church youth groups.

Impact:

In 2005, over 60 teens (61%) participated in community service projects totaling over 700 hours of service. Fifteen teens (25percent) demonstrated their leadership skills by participating on adult lead community committees, student government and teen councils. Twelve teens operate (from start-up to finished products) the snack shack for athletic events three evenings a week for approximately 12 hours per week. Two teens were invited to Washington, D.C. to compete for Youth of the Year in the Air Force Congressional award program.

Source of funding:

Smith-Lever
State matching funds.
USDA Military Grant

Scope of Impact:

State Specific

Theme: Community Development

Issue

Due to the overall downturn in some of Nevada's rural counties, coupled with the recent drought, economic profitability is especially important. While small business development courses have been offered in Nevada's urban and metropolitan areas, Washoe and Clark counties, for some time, the need for economic development in rural counties is even more critical.

For the second year, Cooperative Extension offered entrepreneur classes to residents of seven rural counties. Pershing and Lander County Extension Educators reorganized and updated the curriculum and partnered with Nevada Microenterprise Initiative, and Nevada Job Connect to offer four business planning classes to existing and potential small-scale entrepreneurs in seven counties through a series of interactive video and face-to-face classes. (Lovelock, Yerington, Battle Mountain, Hawthorne, Pershing, Tonopah, and Logandale) In the classes, students learned to assess the feasibility of their business ideas and then developed a complete business plan in order to seek outside funding. Participants also received instruction concerning the components of a business plan.

Impacts:

Nineteen people at five sites (Lovelock, Yerington, Battle Mountain, Tonopah, and Logandale) participated in the training. In a course evaluation for the multi-county class, 10 respondents gave the overall course a rating of 4.0 (1=poor, 5=excellent). In the Hawthorne program, statistically significant improvements were shown concerning (1) knowledge of business plan components; (2) market data collection and analysis; and (3) knowledge of the financial aspects of starting a business.

One of the most positive impacts from the Hawthorne program was the opening of a floral shop. The new owner stated that the class, "has been an eye-opening course and I am anxious to get into business."

At Tonopah, nine students attended these classes. One student is in the process of purchasing a car wash and another is running a florist business out of her home until an ideal shop location is available to rent.

Source of Funding:

Smith-Lever Act funds
State matching funds.

Scope of Impact:

State Specific

Theme: Community Development

Issue:

The Laughlin, NV and Bullhead City, AZ area (including Fort Mohave, Mohave Valley and Golden Valley) is considered one of the fastest growing rural regions in the nation, with an 85 percent population increase between 1990 and 2004. By 2010, it is estimated the region's population will exceed 100,000 people. Managing population growth and diversifying the economic base are the primary goals for the region. To achieve these goals, community leaders from both cities and surrounding communities requested that University of Nevada Cooperative Extension (UNCE) provide leadership and technical assistance programming to: create and maintain a community-based advisory committee; locate and analyze economic, fiscal and social data; build community awareness of economic, fiscal and social indicators; measure economic leakage and develop strategies to improve local spending; improve local business retention and identify expansion opportunities; and conduct needs assessments to improve quality of life.

The University of Arizona Cooperative Extension (UACE) is a partner in this effort.

What Has Been Done:

UNCE developed and implemented a five-year program, including the establishment of a 15-member regional advisory committee. In 2003, UNCE conducted workshops that identified and targeted priority issues. As a result, new community members joined the committee. A multi-regional technical economic model was developed and updated using primary data collection and newly released census data. UNCE also collected, analyzed, published and presented socioeconomic trend data, including more than 25 demographic and economic indicators.

UNCE & UACE Community Economic Development program played an integral part in 2005 by providing leadership and technical assistance education and training in the following areas:

1. How to locate, analyze and disseminate community and regional social, economic, and fiscal, social data.
2. How to measure economic leakage and strategies to improve local spending.
3. How to improve local business retention and identify business expansion opportunities.
4. How to create a community based advisory committees consisting of representation from regional communities.
5. How to conduct community and regional needs assessment to improve quality of life

Impact:

In 2005 using a 5-point Likert Scale, advisory committee members rated the following areas: program goals and objectives clearly states (4.87); program materials were relevant (4.83); instructor understood program material (4.95); monthly workshops met expectations (4.81). In addition, advisory committee members have used various social, economic and fiscal indicators to update community and regional plans and marketing information. Selected materials on demographics, consumer expenditures and trade leakage that were presented in workshops have been used to recruit new industry and businesses to the area. In addition, the community college in Bullhead City is reviewing published materials to find educational and training solutions to address the lack of skilled trade labor (i.e. construction).

To date, five businesses have used materials generated from this program to help with their final decision to

locate to the region, including Home-Depot (opened 2004), Sam's Club (opened in 2005), Super Walmart (opened 2004), Lowe's (to open in 2006), In & Out Burger (opened 2004).

Source of funding:

Smith-Lever
State matching funds.
Other state and local agencies or organizations

Scope of Impact:

Multi-state Extension – NV & AZ

Theme: Literacy/Children, Youth & Families At Risk

Issue:

The foundation for literacy is built during the preschool years through reading time. It fosters children's interest in reading and builds confidence, while helping to eliminate some of the severe consequences of poor literacy skills, including lack of grade retention, school failure, school dropout, delinquency, unemployment and underemployment.

The Nevada Literacy Coalition estimates that nearly 25% of youth and adults in the state have inadequate literacy skills, placing Nevada's children at extremely high risk for developing illiteracy related problems in the future. Studies show 51 percent of 3rd grade and 47 percent of 4th-grade students are below basic reading level. The percentage of Spanish speaking immigrants is expected to increase in Nevada over the next 25 years, and so it is likely that ever-larger numbers of children who are English-language learners and at risk for low achievement will be entering schools. Parents with limited language skills cannot always teach their preschoolers. Breaking the cycle is important to ensure that preschoolers have reading skills in order to succeed.

What Has Been Done:

Family Storyteller is a literacy program aimed at encouraging and training parents to play a vital role in the literacy development of their children. The program, developed by University of Nevada Cooperative Extension (UNCE), KNPB-TV, Washoe County Libraries and Washoe County School District, creates an opportunity for parents and young children to interact around literacy and language activities. Designed especially for families that may have limited language skills and few children's books at home, Family Storyteller is a six-week series of workshops targeting families at risk for low literacy and related problems. Each workshop includes a 10-minute video viewing, book-reading techniques, practice time for reading to children and other literacy activities. The program has also expanded to Las Vegas, where it is taught in both English and Spanish – in homes as well as group settings such as libraries, childcare centers, Classroom on Wheels and elementary schools. Cuentos en Familia is the Spanish version of the program. There is also a Native American Storyteller Project

In 2005, Cuentos en Familia expanded the traditional Family Storyteller program by enhancing the original workshop sessions to specifically help ELL parents learn to read the children's books in English. Follow-up training was provided to 3 ELL teachers in Carson City. Children's Cabinet staff were trained and delivered 113 workshops reaching 493 families at 16 pre- or elementary schools.

The UNCE collaborative team partnered with the Nevada Literacy Coalition to present train-the-trainer sessions in Henderson, Winnemucca, and Reno. These one-day, six hour training sessions reached 31 people, including teachers, school administrators, librarians, child care providers, and other human service personnel. Additionally, follow-up training was provided to 3 ELL teachers in Carson City. Children's Cabinet staff were also trained and delivered 113 workshops reaching 493 families at 16 pre- or elementary schools. UNCE staff conducted workshops reaching 8 families (8 ELL parents and their 17 children).

In 2005 the Family Storyteller was chosen by the National Early Childhood Extension Network as one of three programs to promote nation-wide with evaluation data aggregated from across the country. Outside Nevada, 235 curricula have been purchased for use in 29 other states.

In 2005 UNCE faculty conducted an invited train-the-trainer session for the Galt Unified School District

(California) sponsored by the local Rotary International club. The one-day, six hour training session reached approximately 30 school district personnel. UNCE faculty facilitated communication with school staff and the Rotary representative, helped develop the training agenda, and provided several hours of instruction at the training. In Nevada, UNCE faculty collaborated with the Washoe County School District to reach all school district Pre-Kindergarten sites. These sites serve families with children who are at-risk for educational difficulties. Trained school district staff delivered the curriculum and reached 174 at-risk families at 21 school sites.

A 398 page Child Enrichment curriculum manual was completed and published.

Impact:

Children’s literacy and language skills have improved as a result of Family Storyteller. Results of a comprehensive 3-year evaluation show both parents and children gains in English vocabulary and book knowledge. Program evaluations statewide show that after participating, parents and children read together more often. Their literacy and language activities increased, and parents used the skills taught in the program more often.

Through 2005 a total of 6045 Nevada families have participated, of which 68 percent are Hispanic, and 300 facilitators have been trained. Preliminary evaluation of Cuentos en Familia indicates that parents have: become more comfortable reading books to their children; noticed their children learning new English words and having better attitudes toward books; and learned new positive guidance techniques. Additionally parents and children made significant increases in their English vocabulary and print knowledge; parents used three out of every four extender activities sent home; parents and children’s enjoyment of reading books together increased; and the number of children’s books in the home increased.

In the Native American project, parents’ ratings of the major components ranged from 4.66 to 4.88, and they rated the literacy enhancement activities from 4.60 to 5.

In 2005, UNCE faculty conducted a mailed survey to see how the program was being used by other state Extension systems that had purchased it from Nevada. Sixty-three surveys were sent out and 21 were returned (33% response rate). Respondents estimated that they had conducted a total of 233 workshop series (M = 12.3) reaching 1,188 families (M = 218), and 76% had partnered with other agencies to deliver the programs. On a scale of 1 (very negative) to 5 (very positive), respondents rated the reaction of parents to the program as 4.55. Some respondents reported results of program evaluations that they conducted. One agent reported an average 57% gain in parents’ use of 12 book sharing skills, while another agent reported a 44% gain. Another Extension system used the program statewide and reported that “As a result of the Family Storyteller Program, 267 parents read books to their children and demonstrated that skill to their Literacy volunteer.” Other reported success stories using the curriculum included: 1) “There is one family in particular that I worried about because the parents didn’t seem too excited about my helping them. However, they did read to their 3-year-old and this little girl has memorized ‘Brown Bear.’ This helped them to stay motivated to read daily to their daughter. This family rarely read to the small children but that’s changed now.”; 2) “Hispanic audience really enjoyed receiving the books, after last program they wanted to celebrate by having a Mexican potluck, great group.”; 3) “Parents want to do it again with new books – not offered, but that’s how well they like it.”; and 4) “We have experienced a variety of success stories. Examples include the following statements: ‘It helped me know how to do things with reading I wouldn’t have done before,’ ‘I ask questions and point to things now,’ ‘After I did the activities with my children I felt good about myself, because I actually did it!’”

Source of funding:

- Hatch
- Smith-Lever
- State matching funds

Scope of Impact:

- State Specific
- Multistate Integrated Research and Extension – NV & CA (plus 29 other state that have purchased curriculum)

Theme: Children, Youth & Families At Risk

Issue:

Equine-Assisted Psychotherapy (EAP) is an emerging field in which horses are used as a tool for emotional growth and learning in struggling teenagers. EAP is a short term effort between a therapist and a horse professional. The participants learn about themselves and others by participating in activities with the horses, then processing feelings, behaviors and patterns. Much like the "ropes" course, EAP has the added dynamics of horses with personalities, attitudes and moods as unique as those of the individuals involved. Because of this, EAP produces endless experiences and situations for discussion, analysis and learning.

What has been done:

In collaboration with a licensed therapist (Ms. Osier-Tatar, Program Director for the Koinonia Day Treatment Program) and UNR's equine specialist, the goal is to generate a positive engagement with the students utilizing horses as agents of therapeutic change. Students learn about themselves and others by participating in structured activities with the horses, then processing their feelings and behaviors. EAP essentially reveals insights through analogy and metaphor. By relating their experiences with the horses to other people and issues in their lives, our students are beginning to examine their negative behaviors and understand how to change them into positive behaviors.

Impact:

According Ms. Osier-Tatar, the majority of teens who have participated in the early stages of UNR's EAP program are showing dramatic improvements in patience, trust, compassion, awareness and self-confidence. An accomplishment that more conventional methods can struggle with for many years and may never achieve EAP's success.

Participants of UNR's EAP program are learning to change their approach to life, act in more positive ways, and understand themselves better. And with their equine friends available to open their eyes to even greater possibilities, struggling teens have a remarkable chance of achieving their goals while standing tall and proud.

Source of funding:

State matching funds

Scope of Impact:

State Specific

Themes: Workforce Preparation – Youth and Adults

Issue:

Students of minority continue to make significant gains in college enrollment, but still lag behind their white counterparts in the rates at which they pursue a higher education - *Minorities in Higher Education Twenty-first Annual Status Report (2003-2004)*. These persistent gaps in college participation among whites and minorities tell us that we must be more creative and imaginative in developing strategies and finding additional resources so that more under represented students are successful on our campuses. According to University of Nevada's Dr. Stan Omaye "The long-term economic and social well being of Nevada and the country is connected to closing this gap."

What has been done:

MESA (Mathematics Engineering Science Achievement) is a structured, middle and high school, pre-college program designed to prepare under represented students for academic and professional careers in mathematics, engineering, science, and technology. Northern Nevada began its MESA program in September 2002. Currently, MESA is at Hug and Sparks High Schools and Clayton Middle School. In each school, there is at least one MESA Advisor, a science or math teacher who receives a small stipend. These teachers are responsible for implementing

MESA clubs or class periods where the students participate in hands-on, creative science activities, projects and competitions. Several times a week minority undergraduate and graduate students from UNR go to the MESA class to work as tutors with the students in small groups. In addition to these regular meetings, field trips are planned, and at least one campus visit to the University takes place per year. MESA students work with their advisor to develop Individual Academic Plans (IAP), to improve their study skills and to receive help on the college application and financial aid process.

Impact:

Though MESA is only a few year old, Dr. Omaye (Northern Nevada's Coordinator of MESA) has facilitated over 50 students' recruitment into MESA program and another 40 into MESA affiliated programs, with 3 students recently accepted into University of Nevada's science programs. Dr. Omaye asserts that though only 3 students thus far have enrolled into university science programs, most of our participants are still a number of years from graduating high school and appear destined for college. Dr. Omaye is also very excited to see a recent gift from the Terry Lee Wells Foundation that will support Hug High School's MESA program, one of Reno's most diverse secondary schools.

MESA has been named as one of the most innovative public programs in the country by Innovations in American Government, a project of the Kennedy School of Government at Harvard University and the Ford Foundation. MESA is also a winner of the Presidential Award for Excellence in Science, Mathematics and Engineering Mentoring.

Source of funding:

- National Science Foundation (EPSCoR)
- State matching funds
- Private Donations

Scope of Impact:

- State Specific

STAKEHOLDER INPUT PROCESS

In 2000, UNCE established a statewide Advisory Committee that represents a diverse cross section of stakeholders from both rural and urban communities, including minorities. This Advisory Committee has met at least twice a year since 2001 and continues to review UNCE programs and provide suggestions on additional program opportunities. It provides broad guidance on UNCE programming and policies, serves as a sounding board for setting program priorities, and has helped obtain support for UNCE from key state and county elected officials. CARET representatives also serve as members of this UNCE Advisory Committee.

In 2000, UNCE administration began a series of statewide “community stakeholder meetings.” Within their first year of being hired, UNCE funded campus based faculty are expected to conduct a formal needs assessment in order to identify critical issues in their subject matter area. For County Extension Educators, a very broad, community-based assessment is expected. For Area Specialists, a broad, issue-based assessment is expected. State Extension Specialists are charged with compiling local needs assessments and adding statewide data and impacts. Indeed, one of the criteria for annual performance evaluation is effective assessment of need. Following the initial needs assessment, faculty are required to continually assess needs through contact with stakeholders and periodically conduct a needs assessment in a similar manner as expected of newly hired faculty. Information on the “community stakeholder meetings” and other statewide needs assessments can be found at: <http://www.unce.unr.edu/Gateway/gateway.htm>

As a result of the above processes for stakeholder input, all of UNCE’s major educational programs are based on one or more needs assessments. UNCE has also used this information in ongoing strategic planning for the future.

The data collected by UNCE is also used as the basis for broad Nevada Agricultural Experiment Station research priorities and shared with other university faculty. In addition, NAES has conducted “rural tours” into the state and met with county and municipal decision makers, agriculture producers, state and Federal agency personnel and local high schools to obtain input into our research program. A newly formed citizens advisory committee meets quarterly and provides insight into NAES and College of Agriculture, Biotechnology and Natural Resource programming. Finally, the NAES has created a web page at <http://www.ag.unr.edu/naes/index3.htm> to connect stakeholders with campus faculty and Nevada Dividends, an impact database that is useful for establishing accountability.

PEER AND PROGRAM REVIEW PROCESS

There have been no significant changes in the peer and program review processes used by UNCE or NAES since the FY05 & FY06 Plan of Work Update submitted last year. These same procedures will continue to be used.

EVALUATION OF THE SUCCESS OF MULTI AND JOINT ACTIVITIES

As outlined in the previous POW, and continued for FY05 and FY06, University of Nevada Cooperative Extension (UNCE) and the Nevada Agricultural Experiment Station (NAES) will work together to build multistate, multi-institutional and multidisciplinary activities, and joint research and extension activities which address critical issues of strategic importance as well as those identified by stakeholders. All activities/programs of UNCE and NAES match needs/issues identified in the stakeholder input processes. Additionally, these activities/programs also address needs common to under-served/under-represented populations of the state, as well as activities/programs specific to the needs of these audiences.

For almost a decade, Nevada Agricultural Experiment Station (NAES) and University of Cooperative Extension (UNCE) have complied with the intent of Congress to *integrate agricultural research, extension and*

education functions to better link research to technology transfer and information dissemination activities. These efforts of both UNCE and NAES are continuing. NAES has used the program priorities established by and needs assessments conducted by UNCE faculty as an initial guide in allocating their research funds. Collaboration with community-based faculty and developing research components to Extension programs has been openly endorsed.

UNCE likewise has made specific efforts. Scholarship has long been recognized as an expectation of community-based faculty. All major programs are grounded in research theory and deliberate attempts are made to include campus-based faculty who hold joint UNCE and NAES appointments in their overall design. Programs are rigorously evaluated so as to contribute to the knowledge base of theory in practice. Not only are campus-based faculty expected to be involved in the evaluation design, but UNCE faculty are expected to take a scholarly approach to their work.

Integrated and multistate programs have generally realized the outcomes/impacts expected. The multi-state research program and Western Coordinating Committee projects are reviewed by RCIC (which is represented by both Extension and Research) for progress during the course of the project/program and at project termination. The reviews are documented and housed at the executive director's office in the western region. This process will continue to be used. Additionally, UNCE faculty and campus faculty on UNCE appointments are expected to demonstrate program results/impacts as part of their annual evaluations. Therefore, peers and administration both have an opportunity to review impacts/results of all UNCE programs.

Both UNCE and NAES have a long history of integrated and multistate programs/activities. In fact, many of the State Specialists with UNCE appointments also have NAES appointments so that their research is closely related to their educational programming. Additionally, many UNCE faculty are participants with NAES faculty on research projects. Integrated and multistate programming is increasingly the result of more proactive processes, and has helped to identify ways for cooperation even outside of specific programs. For example, UNCE has continued an arrangement with Utah State University Extension for their Dairy Specialists to provide dairy programming in Nevada.

MULTISTATE EXTENSION ACTIVITIES

See Appendix "A" for Multistate Extension Activities for 2005. This reported is generated from a database and formatted consistent with Revised CSREES-REPT, Supplement to the Annual Report of Accomplishments and Results. The amount of Federal dollars related to Multistate Extension Activities has risen for a number of reasons: 1) more faculty on Federal dollars are involved in multistate activities; 2) faculty are spending a higher percent of time on multistate activities; 3) faculty are more accurately reporting their multistate activities; and 4) Federal dollars are being targeted to those faculty with multistate activities.

INTEGRATED RESEARCH AND EXTENSION ACTIVITIES

See Appendix "A" for Integrated Extension Activities for 2005. This reported is generated from a database and formatted consistent with Revised CSREES-REPT, Supplement to the Annual Report of Accomplishments and Results. The amount of Federal dollars related to Integrated Extension Activities has risen significantly for a number of reasons: 1) more faculty on Federal dollars are involved in integrated activities, 2) faculty are spending a higher percent of time on integrated activities, 2) faculty are more accurately reporting their integrated activities; and 3) Federal dollars are being targeted to those faculty with integrated activities.

See Appendix "B" for Integrated Activities of the Nevada Agricultural Experiment Station (Revised CSREES-REPT), Supplement to the Annual Report of Accomplishments and Results.

Appendix A
U.S. Department of Agriculture
Cooperative State Research, Education, and Extension Service
Supplement to the Annual Report of Accomplishments and Results
Actual Expenditures of Federal Funding for Multistate Extension and Integrated Activities
(Attach Brief Summaries)
Fiscal Year: 2005

Select One: Interim Final

University of
Nevada Reno,
Cooperative
Extension only

Institution:

State:

Nevada

| <u><i>Established Target %</i></u> | Integrated Activities (Hatch) | % | Multistate Extension Activities (Smith-Lever) | % | Integrated Activities (Smith-Lever) | % |
|--|--|----|--|----|--|---|
| <u><i>This FY Allocation (from 1088)</i></u> | | 25 | \$1,368,043 | 25 | \$1,368,043 | |
| <u><i>This FY Target Amount</i></u> | | | \$ 342,010.75 | | \$ 342,010.75 | |
| <u>Title of Planned Program Activity</u> | | | | | | |
| 4-H USDA Military Program | | | \$21,197.47 | | \$5,708.05 | |
| 4-H Youth Development Programs | | | \$0.00 | | \$5,708.05 | |
| Adolescent Suicide Risk & Peer Related Violent Behaviors | | | \$27,102.64 | | \$18,068.43 | |
| An Ounce of Prevention: a program to help people reduce their risk of diabetes | | | \$0.00 | | \$21,503.88 | |
| Animal/Premise ID Education for Western States Cattle Producers | | | \$3,397.83 | | \$0.00 | |
| Applied Reproductive Strategies of Beef Cows | | | \$33,713.37 | | \$30,315.54 | |
| Bee Population Management | | | \$0.00 | | \$18,123.65 | |
| Capacity Building for Cooperative Weed Management Areas | | | \$0.00 | | \$3,134.05 | |
| Carson River Watershed Education Program, 05 | | | \$0.00 | | \$5,005.68 | |
| Carson Valley Land Management Education Program, 05 | | | \$0.00 | | \$5,005.68 | |
| Certification and Labeling Considerations for Western Agricultural Producers | | | \$3,397.83 | | \$0.00 | |
| Child Care Nevada: In-service Education Workshops | | | \$0.00 | | \$5,708.05 | |
| Child Care: In-Service Education workshop on Physical Development | | | \$0.00 | | \$5,708.05 | |
| Child Caregiver Training - Western Area | | | \$0.00 | | \$5,708.05 | |
| Childhood Obesity Prevention in Nevada (COPIN) | | | \$0.00 | | \$23,815.10 | |
| Citizens Changing Communities | | | \$0.00 | | \$1,249.94 | |
| Civic Learning And Community Engagement | | | \$0.00 | | \$1,249.94 | |
| COIN | | | \$17,711.38 | | \$0.00 | |
| Collaborative Resource Stewardship (formerly Resource Conflict Resolution) | | | \$0.00 | | \$6,747.81 | |
| Commercial Water Conservation Training Program (Desert Green) | | | \$10,259.57 | | \$0.00 | |
| Community Business Matching Model | | | \$9,052.56 | | \$0.00 | |
| Community Economic Development | | | \$0.00 | | \$2,882.28 | |
| Community Readiness Network | | | \$3,570.00 | | \$1,785.00 | |
| Dairy Program | | | \$4,772.84 | | \$0.00 | |
| Desert Bioscape | | | \$10,259.57 | | \$10,259.57 | |

| | | | |
|---|--|-------------|-------------|
| Eastern Nevada Landscape Coalition | | \$6,599.23 | \$6,599.23 |
| Engaged Leadership Program | | \$0.00 | \$1,249.94 |
| Family Resource Management | | \$3,843.04 | \$2,882.28 |
| Family Storyteller original | | \$11,638.68 | \$19,305.26 |
| Great Basin Initiative - Extension | | \$7,086.64 | \$0.00 |
| Home Horticulture | | \$0.00 | \$2,882.28 |
| Improving Water Quality Through Wetlands and Irrigation Drainage Management, SBC, NV. | | \$0.00 | \$3,134.05 |
| Integrated Pest Management | | \$5,962.69 | \$5,001.93 |
| Just in Time Parenting | | \$11,638.68 | \$0.00 |
| Lake Tahoe Environmental Education Coalition (LTEEC), 05 | | \$13,348.48 | \$10,011.36 |
| Lake Tahoe Report Media Campaign, 05 | | \$6,674.24 | \$5,005.68 |
| Laughlin, Nevada Community Economic Development Educational Program | | \$25,085.05 | \$0.00 |
| Living on the Land: Stewardship for Small Acreages | | \$9,402.16 | \$3,134.05 |
| Living With Fire | | \$4,626.69 | \$0.00 |
| MAGIC | | \$27,913.10 | \$29,130.54 |
| Market Needs for Nevada Agricultural Producers | | \$0.00 | \$3,397.83 |
| Marketing and Price Risk Management for Cool Season Hay Products in Nevada | | \$0.00 | \$5,916.21 |
| Master Gardener Program Northern Nevada | | \$0.00 | \$3,134.05 |
| NEMO Nevada - Nonpoint Education for Municipal Officials | | \$0.00 | \$3,134.05 |
| Nevada 4-H: Continuous Quality Improvement and Action | | \$0.00 | \$29,130.54 |
| Nevada Fire Safe Council | | \$4,626.69 | \$0.00 |
| Nevada Range Management School | | \$28,116.70 | \$0.00 |
| Nevada Range Monitoring Handbook | | \$0.00 | \$16,209.57 |
| North Lake Tahoe Demonstration Garden, 05 | | \$0.00 | \$5,005.68 |
| Noxious Weed Control (Using Livestock as a Tool in Noxious Weed Control in Nine Western States) | | \$27,756.23 | \$0.00 |
| Nutrition Education Programming | | \$0.00 | \$18,123.65 |
| Operation Military Kids | | \$0.00 | \$1,785.00 |
| Parasol Community Collaboration Environment Team, 05 | | \$6,674.24 | \$5,005.68 |
| Parenting From Prison | | \$0.00 | \$5,708.05 |
| Pesticide Safety Education Program | | \$2,119.65 | \$2,119.65 |
| Potential Revegetation Practices for Disturbed Arid Lands | | \$0.00 | \$50,867.02 |
| Rangelands West | | \$6,599.23 | \$6,599.23 |
| Restoring Rangeland Health | | \$0.00 | \$6,747.81 |
| Riparian Proper Functioning Condition Assessment | | \$22,642.91 | \$13,347.04 |
| Risk Management Education for Sustainable Agriculture in Nevada 2004-2005 | | \$0.00 | \$5,916.21 |
| Rural Health Works | | \$9,052.56 | \$15,127.35 |
| Sage Grouse Conservation Planning Team | | \$6,559.23 | \$6,599.23 |
| Sustainable Biodiversity/Multiple Use of Rangelands | | \$16,043.68 | \$6,747.81 |
| Tahoe Basin Weed Coordinating Group | | \$9,402.16 | \$3,134.05 |
| Truckee Meadows Weed Coordinating Group | | \$0.00 | \$3,134.05 |
| Understanding Native American Populations | | \$3,978.00 | \$0.00 |
| Value-Added Toolbox for Small Agricultural Producers | | \$5,916.21 | \$0.00 |
| Vegetation Management | | \$6,599.23 | \$13,198.46 |
| WaterWatch | | \$0.00 | \$3,134.05 |
| Weed Warriors Invasive Weed Training | | \$0.00 | \$3,134.05 |

| | | | |
|---|--|---------------------|---------------------|
| Western Beef Resource Committee (Cow/Calf Handbook) | | \$17,071.91 | \$0.00 |
| Western Nevada Flood Education Program, 05 | | \$6,674.24 | \$5,005.68 |
| Western Region Program Leadership Committee | | \$10,942.98 | \$0.00 |
| Total | | \$469,029.59 | \$507,385.40 |
| Carryover | | | |

Certification: I certify to the best of my knowledge and belief that this report is correct and complete and that all outlays represented here accurately reflect allowable expenditures of Federal funds only in satisfying AREERA requirements.

Director

Date

Appendix B
U.S. Department of Agriculture
Cooperative State Research, Education, and Extension Service
Supplement to the Annual Report of Accomplishments and Results
Actual Expenditures of Federal Funding for Multistate Extension and Integrated Activities
(Attach Brief Summaries)
Fiscal Year: 2005

Select One: **Interim** **Final**
University of Nevada Reno
Nevada Agricultural
Institution: Experiment Station Only

State: Nevada

| | Integrated Activities (Hatch) | | Multistate Extension Activities (Smith-Lever) | | Integrated Activities (Smith-Lever) | |
|--|--|---|--|---|--|---|
| <i>Established Target %</i> | 25 | % | | % | | % |
| <i>This FY Allocation (from 1088)</i> | 1,148,318 | | | | | |
| <i>This FY Target Amount</i> | 287,079.50 | | | | | |
| Title of Planned Program Activity | | | | | | |
| Strategic development of a competitive grape industry in Nevada | \$104,712 | | | | | |
| Adolescent Suicide risk & peer related violent behaviors | \$26,619 | | | | | |
| Genetic Architecture of Grazing Efficiency of Sheep on Nevada's Rangelands | \$13,770 | | | | | |
| Working with Teens: A Study of Youth Worker Characteristics and Promotion of Youth Development | \$10 | | | | | |
| Freeze Damage Effects of Drought on Wine Quality of Various Vitis Vinifera Grapes Varieties in Nevada | \$33,610 | | | | | |
| Marketing and Price Risk Management for Cool Season Hay Products in Nevada | \$30,440 | | | | | |
| Molecular and Phenotypic Genetic Parameters of Performance in the Rafter 7 Merino Sheep Flock | \$44,300 | | | | | |
| Nevada Beef Cattle: The Genetic Basis of Heterosis for Adaptability in the Herford X Angus | \$37,765 | | | | | |
| Rural communities & public lands in the West: Impacts & alternatives | \$41,971 | | | | | |
| Statewide survey of elementary school employees | \$17,009 | | | | | |
| Benefits and Costs of Natural Resources Policies Affecting Public and Private Lands: Quantifying the Impact of Grazing on the Recreational Value of Riparian Eco-Systems | \$11,946 | | | | | |
| Nevada beef cattle: Marker assisted selection | \$65,032 | | | | | |

| | | | |
|---|----------|--|--|
| The Influence of Home and Child Care Environments on Toddler's Language and Literacy Skills | \$28,737 | | |
| Total | 455,921 | | |
| Carryover | | | |

Certification: I certify to the best of my knowledge and belief that this report is correct and complete and that all outlays represented here accurately reflect allowable expenditures of Federal funds only in satisfying AREERA requirements.

Director

Date