

# Nevada (University of Nevada Reno) Annual Report - FY2021

## Report Status: Approved as of 07/08/2022

### Contributing Organizations

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University of Nevada Reno

### Executive Summary

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#### Overview

The University of Nevada, Reno Cooperative Extension (herein referred to as “Extension”) and Agricultural Experiment Station (herein referred to as “Experiment Station”) are reporting against the 2022-2026 Plan of Work.

The rationale for these critical issues is as follows:

**Sustainable dryland agriculture** is the application of plant and animal production practices in dry areas of the world where lack of moisture limits crop production. Nevada is the driest state in the nation. Growing a strong agriculture economy in the driest state requires research and extension programs addressing topics such as pest management, efficient irrigation, sustainable range management, alternative crops for high-desert areas, agricultural entrepreneurship, business and financial management, and risk management for producers.

Issues that impact Nevada’s **natural and environmental resources** include drought, floods, watershed and riparian management, wildfires, invasive species, noxious weeds, and conservation wildlife and their associated habitats. Protection and management of these resources is necessary to the economic and ecological well-being of the state.

With respect to **horticulture and food systems**, there is a growing interest in locally grown food. As such, research and science-based education for growing in Nevada’s climate and soils is needed for successful backyard gardens and urban farms to grow produce locally and alleviate the impact of food deserts in Nevada. This will help improve food security and contribute to economic development.

Improving the **health** of all Nevadans and making available a safe and nutritious source of food are critical issues. A priority of the state is reducing the risks and behaviors that contribute to chronic disease with an emphasis on decreasing obesity through increased physical activity and the promotion of healthy diets. Contributing to this problem, over 12% of households in Nevada are food insecure, where access to healthy food is limited or uncertain.

Nevada is the seventh largest state in the country in terms of landmass and one of the least densely populated states. The culture and economics of rural Nevada are vastly different from that of the two metropolitan areas – Clark and Washoe counties. Clark County alone represents over 73 percent of the state’s total population and approximately 70 percent of total business licensees. As such, improving the **economic and community development** of rural areas as well as business development in urban areas are strategic priorities in Nevada.

Nevada ranks 46th among the 50 states for children’s well-being. Issues in the state affecting **children, youth, and families** include early literacy, science and math proficiency, college readiness, healthy child and adolescent development, and domestic violence. Children need safe environments for optimal social, emotional, physical, and cognitive development – inclusive of the family, child care facility, and school setting.

Nevada’s Extension programs directly impacted the lives of over 232,536 youth and adults. Indirect methods were designed to reach every Nevadan (2,000,000+). While Experiment Station researchers have published 156 peer-review journal articles, trained 137 graduate and 96 undergraduate students, gave 142 presentations, and filed for 2 patents.

#### Critical Issue: Children, Youth and Families

The following Extension programs are addressing children, youth and family issues in Nevada:

- Workforce Preparedness for Early Childhood improved workforce skills among professionals and center directors, provided certificate programs, successfully prepared graduates for the Child Development Associate credential, and improved the quality of care in Nevada's early child care settings.
- Partners in Parenting offers three programs addressing cognitive/physical/social/emotional wellbeing of children, child abuse, and teen suicide/pregnancy/violence to keep parents informed.
- Nevada 4-H Youth Development worked with over 100 different organizations/agencies to deliver high-quality youth development programs to over 10% of Nevada's youth. 4-H offered club-based, school-based, afterschool-based, camp-based, special interest-based, and video/web-based programming. Youth thrived and reported improved life skills development and academic achievement and motivation that support a successful transition to adulthood.
- Collectively, parenting programs, such as Let's Discover STEM, Little Books and Little Cooks and Family Storyteller, targeting preschool and early elementary school children and families equipped families with the confidence and skills to support early literacy, school readiness, and STEM education, as well as increased children's interest and emerging STEM skills, literacy, and school readiness.

#### **Critical Issue: Community and Economic Development**

The following Extension programs and Experiment Station research projects are addressing community and economic development in Nevada:

- Nevada Economic Assessment Project provided county, state, and federal agencies, and their partners, with quantitative and qualitative baseline data and analyses to better understand each county's demographic, social, economic, fiscal, and environmental characteristics. Data is used for land use and project planning, grant writing, and overall policy assessment.
- Business development classes taught small business owners about fundamental business concepts and helped small businesses develop strong relationships with resource partners and remain resilient during the pandemic.
- Maintaining the resilience of rural communities and their surrounding rangelands through focused economic development efforts to diversify the local economy and build out their industrial park.

#### **Critical Issue: Health, Nutrition and Food Safety**

The following Extension programs and Experiment Station research projects are addressing health, nutrition and food safety issues in Nevada:

- Nevada Radon Education increased knowledge and testing of radon – a cancer causing gas – among residential and commercial homeowners, residents, real estate agents, and builders, led to mitigation efforts, and increased the number of homes built radon resistant.
- Through the Healthy Kids, Healthy Start and Health Kids, Healthy Schools multi-level approaches preschool and elementary school children's knowledge about healthy eating improved, consumption of fruits and vegetables increased, and physical fitness and activity improved. Additionally, early childcare centers and schools adopted new or improved practices, professional's and educator's knowledge and skills improved, and the systems and policies supporting children's healthy behaviors for obesity prevention were positively affected.
- Healthy Living Sustainable Recovery is an evidence-based, gender-responsive health, nutrition and body image program designed to augment existing broad-based drug prevention and community education programs for women and girls under correctional supervision for amphetamine, opioid, and other illegal drug use.
- The investigation into the biochemical mechanisms by which mercury is sequestered in plants (e.g., rice, trees and annuals) because Nevada is located within a global belt of mercury geologic enrichment.
- Developing the tools to better fight mosquito-borne viruses like West Nile that pose a threat to both human and animal health.

#### **Critical Issue: Horticulture and Food Systems**

The following Extension programs and Experiment Station research projects are addressing horticulture and food system issues in Nevada:

- Consumer horticulture programs, such as Master Gardener and Grow Your Own Nevada, increased residents' knowledge and skills related to home horticulture throughout the state to produce more locally grown foods.
- Commercial Landscape Horticulture improved the knowledge and skills of entry level landscape workers, increased use of water efficient landscaping, and provided certification to nursery workers and landscapers.
- Integrated Pest Management increased awareness, understanding, and adoption of integrated pest management and pesticide safety principles by private citizens, Master Gardeners, and Green Industry professionals.

### **Critical Issue: Natural and Environmental Resources**

The following Extension programs and Experiment Station research projects are addressing natural resources and environmental issues in Nevada:

- Living with Fire helped residents prepare for wildfire and reduced wildfire threats to homes and communities.
- Collectively, Rangeland Resources: Historical Perspective, Virtual Fencing, and Noxious Weed Control improved rangeland and natural resource management, increased use of native plants for landscaping and in rangeland restoration projects, and developed effective sagebrush restoration tools, protocols, and recommendations.
- Wild Horse and Burro Management multi-state team is developing a habitat monitoring and gather prioritization tool using satellite imagery and Disturbance Response Groups to identify ecological thresholds for animal removal, range restoration, and species conservation.
- Impact of pinyon-juniper removal on curl-leaf mountain mahogany stands and potential mule deer habitat
- Quantifying early seedling traits in threatened high-elevation conifer species that confer success across climatic gradients to support ecological restoration
- Identification of migration corridors and movement patterns of American Pronghorn fostering full migration without overexertion or loss of body reserves necessary for winter survival.
- Monitoring and evaluating greater sage-grouse population dynamics by identifying the causes of population decline helping state agencies implement steps to reverse population decline and preventing additional federal regulations for land owners under the Endangered Species Act.
- Examining the impact of mercury on waterfowl populations and the implications for human health and water management in arid environments.
- Identification of climate-resilient traits and lineages for Pinyon Pine, one of the most important vegetation types occurring in the dryland ecosystems of the Intermountain West. This effort will help land managers to target efforts to prevent expansion into areas designated for sagebrush conservation, as well as to assist migration and restoration of pinyon pines into areas that are climatically suitable for long-term conservation of this species and the ecosystem that it is a key part of.
- Developing a better understanding of how Nevada's river ecosystems respond to increasing salinization and alkalization caused by nonpoint sources of pollution (e.g., fertilizer, herbicides, insecticides, urban runoff and energy production).

### **Critical Issue: Sustainable Dryland Agriculture**

The following Extension programs and Experiment Station research projects are addressing agricultural issues in Nevada:

- Nevada Risk Management Education increased ranchers' and farmers' knowledge about agricultural risks, profitability and sustainability, and access to available insurance programs.
- American Indian regional and national programs to increase the profitability and sustainability of farming and ranching operations that accompany geographic isolation.
- Exploring virtual fencing as an option for increased livestock management flexibility on Nevada rangelands by reducing reliance on static, conventional fencing boundaries.
- Investigating phthalates (chemicals used to make plastics more durable) in the feed and drinking water of dairy cattle and the unexpected consequence of agriculture intensification.
- The development of a more productive and drought-tolerant Teff that will bolster food security in an ever warmer/drier environment.
- Improvement of Sorghum production for use in arid regions of the world that is considered a high-value crop that can fill profitable specialty markets for non-GMO, gluten-free food, snacks, and craft brewing and distilling.
- Advancing precision agricultural production methods for grain sorghum yield and quality using variable-rate irrigation in conjunction with several remote sensing methods (i.e., drones and satellite imagery).

### **Merit and Scientific Peer Review Processes**

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Updates

None

## Stakeholder Input

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Actions to seek stakeholder input that encouraged their participation with a brief explanation

None

Methods to identify individuals and groups and brief explanation

None

Methods for collecting stakeholder input and brief explanation

None

A statement of how the input will be considered and brief explanation of what you learned from your stakeholders

None

## Highlighted Results by Project or Program

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Critical Issue

### Children, Youth and Families

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#### Little Books and Little Cooks

Project Director

YaeBin Kim

Organization

University of Nevada Reno

Accession Number

7002533



#### Little Books & Little Cooks

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**In 2-3 sentences, briefly describe the issue or problem that your project addresses.**

There are studies showing that reading children's books with healthy eating messages encourages children to try new foods and make healthy choices. When children learn healthy eating habits at an early age, they will continue to use these habits throughout their lives. Especially children enjoy learning with parents. Cooking is one of a few activities that can help to increase children's abilities in math, science, social studies, reading, language, motor development, art, music and social skills in a meaningful and appealing way, and help parents to learn healthy eating information and their own feeding style, which help them to raise nutritionally healthy children. Children are more likely to get excited about healthful eating when they are part of the process and when they are reading books about healthy eating.

**Briefly describe in non-technical terms how your major activities helped you achieve, or make significant progress toward, the goals and objectives described in your non-technical summary.**

Since SNAP-ED is not supporting direct education and there is always a waiting list for this program, the team secured additional funding from the Agassi Foundation to provide this program to more families in the community.

In 2021, 20 foundation and county-funded LBLC program series (120 individual classes: 20 x 6 weeks) and one SNAP-Ed funded LBLC program series (7 individual classes: 1 program series x 7 weeks) were taught for 189 adults and 201 children (7 virtual and 13 in-person).

Since our SNAP-ED LBLC team is now a part of the SNAP-ED Healthy Kids Early Start project, our staff focused on implementing PSE implantation strategies through five early childhood centers.

- Our staff worked with the Healthy Kids Early Start team on recruiting preschools for training, direct education programs and wellness committees to further our SNAP PSE activities

- Collected three NAPSACC and developed action plans with each site.
- With active schools, provided CATCH train the trainer and supported center staff to implement it; put together physical activity sets; formed and met with schools' wellness committees; hosted parent engagement meetings and attended other school events; provided four trainings to early care and education teachers; conducted 13 pre/post assessments for sites; participated in stencils at 2 sites; Participated in Healthy Kids Festival and other community events
- The team has developed the Family Engagement Train-the-Trainer series based on LBLC curriculum (8 lessons). Phase 1 began in August and consisted of 6 hours of initial training with 42 early childhood teachers.
- The CATCH train-the-trainer program was implemented in 7 early childhood programs, consisting of 25 separate classrooms. Across all classrooms, we reached 279 children (154 boys, 125 girls; 45% Hispanic/Latinx) and 64 teachers/aides.

The new Book of the Month program consists of a featured children's book on nutrition or physical activity, along with suggested activities for teachers to use in the classroom to extend the message in the book. Each month we give teachers a different book to read to the children, with a classroom activity specifically for each book. Once the team selected 12 books, the team designed classroom activities specific to each book that teachers can use to extend the theme in the book. Initial feedback on the Book of the Month pilot is that teachers have found the program useful and that the children enjoyed the books and extender activities.

Direct family education. The direct family education component uses the SNAP-Ed approved Little Books and Little Cooks curriculum, a seven-week series of parent-child workshops designed to improve children's healthy eating habits, including increased fruit and vegetable consumption and physical activity, through cooking with children. During family workshops, children and parents learn about healthy eating and nutrition, gain positive parent-child interaction skills, and practice reading children's books about healthy eating/nutrition, following recipes, and cooking together every week. Due to COVID restrictions, we had to shift the family workshops to virtual delivery rather than in-person. This entailed shortening the length of sessions to between 45-60 minutes, simplifying the parent-child cooking information and activities done during the sessions, hand delivering the ingredients to families before each session, redesigning recruitment materials, and streamlining evaluation procedures. A particular challenge was that the workshops have parents and children prepare simple meals together and we needed to deliver fresh ingredients to the families before each session.

**Briefly describe how your target audience benefited from your project's activities.**

Parents reported that they cook more often with their children after attending the program.

Parents reported that they read more books about healthy eating and nutrition with their children and they now have more books about healthy eating and nutrition at home.

Parents reported that children's school readiness skills had improved in trying new things or activities; beginning to share with others; looking at pictures and then tell stories; speaking understandably; and beginning to handle frustration or control oneself

Post-program evaluation (after completing the program):

- 96% of parents reported the highest satisfaction with the program
- 98 of parents reported that their children help them prepare food more often
- 93% of parents reported that their children try new and unfamiliar foods at home more often
- 90% of parents reported that they feel more confident in interacting with their child during mealtime

- 88% of parents reported that they feel more confident in playing or doing activities with their child
- 97% of parents reported that their child feels more confident about using cooking equipment during cooking
- 66% of parents reported that they have purchased more fruits and vegetables in the past 2 months
- 100% of parents reported that they are likely to continue using what they learned in the Little Books and Little Cooks program in the future
- 100% of parents would recommend this program to their friends and family.

Parents also gave written comments about what they liked best about the program. A sampling of comments included:

- “That it is very important that children get involved in cooking, because it is interesting and fun for them”
- “Children learn new things they never know like types of foods, reading, etc.”
- “Cooking with my 2 kids and watching them learn new techniques”
- “I enjoyed watching my daughter learn about food & kitchen safety”
- “My child learned to try new foods!”
- “Everything, but most that my children were active and waited for Fridays for class”
- “I enjoyed learning the MyPlate and the types of feeding parenting styles”
- “I learned how to help my children eat vegetables, cause they don’t like it, and they love to eat food that look fun”
- “That children learned to help in the kitchen with my supervision”
- “The variety of food that we can prepare using the 5 food groups”

**Briefly describe how the broader public benefited from your project's activities.**

Children gained critical school readiness skills by engaging in real-life, meaningful activities. Cooking with their parents is one educational activity that is helping increase children’s abilities in math, science, reading, language, motor development and social skills that is both meaningful and appealing.

**Partners in Parenting**

Project Director

YaeBin Kim



**In 2-3 sentences, briefly describe the issue or problem that your project addresses.**

The first five years of life have a significant effect on children's development and learning and parents play the most important role during this time. Parenting education and support are key to raising successful children, creating confident parents and building strong families and communities. Recent research shows that parents of young children who received a parent training program or attended parenting workshops improved their parenting skills.

Partners in Parenting offers many educational programs, workshops and resources primarily for parents with young children (0-5 years of age) to support healthy child development, school readiness skills and positive parent-child interaction.

**Briefly describe in non-technical terms how your major activities helped you achieve, or make significant progress toward, the goals and objectives described in your non-technical summary.**

**Fun to Play for Preschoolers**

In 2021, 10 Fun to Play for Preschoolers program series (10 program series x 8 weeks: 6 in-person and 4 virtual) were taught for 89 adults and 98 children.

Fun to Play for Preschoolers program series was taught at community sites including libraries and CCSD Title I family engagement centers across the Las Vegas Valley.

**Exploring Safety**

In 2021, four Exploring Safety program series (2 in-person and 2 virtual: 22 individual classes) were taught for 40 adults and 41 children in a group setting. Exploring Safety series was taught at CCSD Title I family engagement centers and Family to Family.

**Positive Connections for Parents and Teenagers**

In 2021, eight Positive Connections for Parents and Teenage program series (8 program series x 4 weeks: 3 in-person and 5 virtual) were provided to 26 female adults, 8 male adults, 15 female teens and 17 male teens in a group setting

**One-Time Workshops**

Twenty-two Family Storyteller Interactive Literacy workshops (3 in-person and 19 virtual) were provided to 124 adults and 129 children across the valley.

Four Screen Time Smarts workshops (one-time workshop) were taught for 18 adults and 19 children (3 virtual and 1 in-person) at four CCSD schools.

**Kickoff to Kindergarten School Readiness Fair**

Planned and organized to host the 6th annual Kickoff to Kindergarten School Readiness Fair and it was held at the East Las Vegas Library in collaboration with 57 people from 22 local agencies/organizations and 10 Extension staff from three Extension programs. We had 22 teen volunteers and 7 adult volunteers helping out at the event, with 241 participants from 34 zip codes.

**Community events**

PIP staff attended 17 community events (STEAM Carnival, FACES Super Saturday, LVCCCLD-Summer Reading Challenge Kickoff, Back to School at four different sites, Healthy Kids Festival, Vegas PBS Be My Neighbor Day, National Night Out at two different sites, Bunker ES family resource fair, Trunk or Treat resource fair at Rainbow Library, Table of Treats at Clark County Library, Fall Festival at Coronado Prep, Holiday Book Sale at Sahara West Library and Commissioner Kirkpatrick's Affordable Christmas at Manch ES) and reached 11,042 families.

**Briefly describe how your target audience benefited from your project's activities.**

## Fun to Play for Preschoolers

- After completing the program, 92% of parents thought the program was very helpful
- 100% of parents reported they would recommend this program to their friends and family

## Exploring Safety

- Parents' abilities to manage their own anger; use positive guidance skills and properly respond to children's questions about body safety were all significantly improved
- Parent knowledge on the following topics was all statistically significantly improved:
  - What happens to a baby when it is shaken
  - How to manage my own anger
  - Ability to use positive guidance skills
  - Ability to properly respond to children's questions about body safety
  - How to manage my own anger when parenting
  - Types of child abuse and how to prevent child abuse
  - How to positively discipline my child
  - How to name correct private body parts
  - How to teach children to say no to unwanted touches
- Families who attended this program would 100% recommend it

## Additional comments on the program

- I learned that when my son has a tantrum I need to talk to him and explain correctly so he can understand
- Learned how to teach our children to say no when someone wants to touch them
- Learned how to be honest when explaining things to your children



o Learned to name private body parts by the correct name  
Positive Connections for Parents and Teenagers

- o After completing the program,
- o 100% of parents reported that the program's suggested activities helped create more positive parent-child interactions in the program's class and at home
- o 94% of parents thought that a positive guidance lesson was most helpful to them
- o 71% of teens thought that a positive guidance lesson was most helpful to them
- o What parents/caregivers like about the program: opportunities to interact with other parents; the quality of the materials provided; lesson topics learned; opportunities to interact with their children
- o 50-80% of parents/caregivers rated excellent on their knowledge gains: understanding their child's development; communicating with their child; internet safety, social media and cyberbullying; managing their stress; helping their child manage stress; resolving conflict with their child; using positive guidance
- o After attending the program, 97% of the parents/caregivers felt that their relationship with their child was improved
- o 100% of the parents/caregivers would recommend this program to other parents

**Briefly describe how the broader public benefited from your project's activities.**

In total, this program and associated one-time workshops and events provided direct parenting education to 5,846 adults and youth. Through increasing parent's knowledge and skills these efforts are helping to prepare the next generation to be healthy, happy thriving people who make a positive difference in their communities.

**Workforce Preparedness for Early Childhood Professionals**

Project Director  
Teresa Byington  
Organization  
University of Nevada Reno  
Accession Number  
7002542



**Workforce Preparedness for Early Childhood Professionals**

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**In 2-3 sentences, briefly describe the issue or problem that your project addresses.**

Well-trained early childhood educators can help young children's development in so many ways. This program is designed for people interested in conducting specialized training sessions for early childhood educators. The workshop has been designed primarily with child care providers in mind, though others may benefit from the training.

**Briefly describe in non-technical terms how your major activities helped you achieve, or make significant progress toward, the goals and objectives described in your non-technical summary.**

### **CDA (Child Development Associate)/Coaching Program for Infant and Toddler teachers:**

Infant toddler teachers were selected to participate in the program and the infant-toddler teachers completed 120 hours of educational coursework required for obtaining the CDA credential. The participants received bi-monthly coaching and infant/toddler teachers were assessed pre and post using the CLASS (Classroom Assessment Scoring System) observation tool.

The Classroom Assessment Scoring System (CLASS), Infant and CLASS, Toddler evaluates the effectiveness of teacher-child interactions and engaged support for learning. The specific effects of positive interactions between young children and caregivers has been shown to have a positive impact on later school readiness skills and social-emotional outcomes. Three infant toddler trainer/coaches (Two in southern Nevada and one in northern Nevada) taught the CDA coursework (120 hours) and provided bi-monthly coaching to 76 infant and toddler teachers. Seventy-three of these infant-toddler teachers have received their CDA credentials from the National Council for Professional Recognition.

### **Nevada READY! Professional Development Program:**

Funding was received to develop and provide professional development for teachers from 20 community Pre-Kindergarten classrooms participating in the Nevada READY! Program. Twenty-two training were taught and focused on evidence-based practices from the Pyramid Model for Social-Emotional Development. Two Nevada READY! coaches coached teachers on the implementation of their action plans in-between training sessions. The Teaching Pyramid Observation Tool (TPOT) for preschool classrooms - social-emotional development assessment tool was used to assess the classrooms. The TPOT assessment evaluates 114 indicators under 14 key teaching practices such as how teachers promote children's engagement and teach children social skills and emotional competencies.

### **Briefly describe how your target audience benefited from your project's activities.**

#### **Infant Toddler CDA/Coaching Program**

**Knowledge Assessment:** Seventy-three participants completed a pre and post knowledge assessment. Pre-post paired testing showed a significant increase in knowledge gained. Participants gained a greater understanding of child development and effective strategies for caring for infants and toddlers.

**Teacher Post Questionnaire:** Participants were asked to indicate which of the five main practice areas had changed the most during Infant Toddler coaching. Twenty-eight percent indicated Regard for Child Perspectives, 23% Teacher Sensitivity, 19% Facilitation of Learning and Development, 15% Behavior Guidance and 15% Positive Climate.

**Coaching Strategies:** Participants reported that the most effective coaching strategies they received during coaching were feedback during conferences, coaches' noticing teachers' moments of effectiveness and having coaches model best practices. Secondary coaching strategies included sharing resources and creating action plans.

The teachers were asked to share feedback on their experience with the CDA/Coaching program. The following are quotes from participants of the program:

- *"The Infant Toddler CDA program helped me learn to become a better teacher and how to be a professional."*
- *"This program has completely changed me, I understand the meaning of play and how children need it."*
- *"This program definitely changed me for the better. I take the children's perspectives much more into consideration."*
- *"I have really learned how to listen and understand the needs of the children."*
- *"This program has helped me become more sensitive and understanding of children's needs." "I am more positive in the way I talk to children. I understand how important my job is to teaching of the children and communicating with parents."*

**Infant Toddler Coach Feedback:** Coaches observed the teachers in the classroom, modeled desired behaviors and then meet with the teachers for a coaching conference to discuss the observation and develop action plans. The coaches reported the biggest changes they saw in the infant toddler teacher's classrooms over the course of the program included:

- Increase of teachers getting down on children's level and engaging with them in play activities.
- Teachers using more descriptive language and mix of closed and open-ended questioning.
- Teachers incorporating loose parts materials and other "do-it-yourself" open-ended materials.
- Increase of teacher sensitivity and regard for children perspectives during interactions with children.
- Increase use of positive phrasing of desired behaviors.
- Classroom environment transformations (Interest areas created).

**Impact on Teacher's Employment and Leadership Opportunities:** Seventy-six teachers completed the program and 73 applied and received their CDA credentials. Additionally, eight of these teachers were promoted from assistant teacher to lead teacher due to participation in the program. Eleven teachers received significant pay raises. Four teachers were promoted to Infant Toddler Director or Child Care Director at their child care center. Additionally, 6 teachers made a change in their employment which resulted in increased employee benefits.

### **Nevada READY! Professional Development Program**

At pre-assessment, the teachers in the 20 classrooms were implementing an overall average of 40% of the key practices. At post-assessment, 8 months later, the teachers were implementing an average of 63% of the key practices. Additionally, 8 of the 20 classrooms were implementing 70% or more of the key practices.

**Improvements in Early Childhood Classrooms:** The coaches noticed some marked changes in many of the classrooms. Here are some examples:

- In one classroom, the lead teacher implemented two new classroom jobs for the children - the peacemaker and the greeter job. These jobs gave children an opportunity to actively participate in building social and emotional skills and promoted an increase in positive interactions within the classroom community.
- In another classroom, the environment was rearranged to create more engaging, warm and inviting spaces for learning. The new environment arrangement encouraged children to participate in learning activities with their friends. This built friendships and gave children opportunities to practice friendship skills.
- In a third classroom, the lead teacher used a feelings chart as part of the morning arrival routine. The children placed their photograph in the column under the picture of a feeling face indicating how they were feeling when they came to school. They could change the feeling face throughout the day if their feelings changed. This helped children build empathy for other children's feelings and a self-awareness of their own feelings.
- In two different programs the lead teachers in the Nevada READY! Pre-K classroom were encouraged and given opportunities to share what they had learned in Nevada READY! training with their colleagues at staff meetings. Both programs plan to incorporate a training series next year for all of their staff based on practices that the Nevada READY! Pre-K teachers have been implementing.

Participants completed an evaluation on the effectiveness of the training. The following are the results from the survey using scale from 1= not at all to 5= to a great extent.

Participants indicated that the training matched their needs (Mean= 4.60) and provided opportunities for interactions (Mean= 4.78) and reflections (Mean= 4.82). Trainers experience and expertise enhanced the quality of the training (Mean= 4.76), trainers efficiently managed time and pacing (4.64) and modeled effective teaching strategies (Mean= 4.69). Participants stated that the training series add to their knowledge of early childhood subject matter content (Mean= 4.71) and attending the training series improved their teaching skills (Mean= 4.80). Participants stated they had used the knowledge and skills in their classrooms (Mean= 4.78) and they would continue to use the knowledge and skills from the training series in their classrooms (Mean= 4.89).

**Briefly describe how the broader public benefited from your project's activities.**

As a result of this comprehensive program, it is expected that the quality of child care in Nevada is improved leading to healthy growth and development.

Critical Issue

## Community and Economic Development

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### Small Business Education

Project Director

Buddy Borden

Organization

University of Nevada Reno

Accession Number

7002499



### Small Business Education

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**In 2-3 sentences, briefly describe the issue or problem that your project addresses.**

The current landscape of business education and counseling programs in Las Vegas, Nevada and statewide are fragmented. Only a handful of organizations provide consistent education and counseling to the business community. Small business programs are being created and operated in silos, resulting in content duplication and overall program ineffectiveness. Extension is the only organization that focuses only on classroom style, in-person, and virtual education, while all other agencies target one-on-one, small business counseling.

**Briefly describe in non-technical terms how your major activities helped you achieve, or make significant progress toward, the goals and objectives described in your non-technical summary.**

- Developed and successfully launched a new interactive website.
- Offer all teachings in both English and Spanish; in-person and virtual.
- Successfully offered formal classes covering five primary small business topics/pillars including Finance, Marketing, Operation, Management, and Start-Ups.
- Developed and published 136 video teachings (English and Spanish) that are available through Small Business Education Program (SBEP) virtual classroom.

- Worked with statewide extension communications department developing and distributing weekly news releases announcing weekly classes.
- Developed and delivered customized teachings for Cannabis Equity and Inclusion Community (CEIC). Taught classes on business concepts and operations for new entrepreneurs.

**Briefly describe how your target audience benefited from your project's activities.**

Over 30 stakeholders have agreed to use and promote SBEP virtual classroom content with the small business community. At the end of 2021, all municipal business license departments in Clark County are displaying and distributing program postcards to small businesses.

The Moapa Valley Revitalization Project applied for four grants of which, three were successful. They received \$15,000 that they used toward the lease of a small building for a visitor center to increase tourism to the area. They also received two tourism grants totaling \$19,000 that went toward the publication and distribution of rack cards to increase Moapa Valley's visibility as a tourist destination.

Stakeholder Quotes:

- Noe Gonzalez, Senior Business Advisor, Outreach Liaison, Prestomos CDFI, LLC: *"The classes provided by UNR Extension in both English and Spanish in the subjects of Taxes, Accounting, Google Business, Marketing, Sales, and Social Media for Small Business, just to mention a few, have positively impacted the community that we also serve. Those educational resources are and have been vital to the small business owners to pivot and re-design their business models in order to weather the economic storm generated by the COVID-19 pandemic. We have been part of those classes and we want to say thank you for the opportunity to collaborate with UNR Extension."*
- *"This program is very relevant for the Hispanic business community because most entrepreneurs come from other countries. They are the first generation in America, and they do not have the knowledge or experience of the system in America."*
- Rick Obringer, Business Owner & Class Participant:*"The last 2 classes I have attended have been very informative and helpful in my business. Both of you do a great job teaching information in a practical relatable way! Thank you very much."*
- Saul Ramos, Deputy District Director, Nevada Small Business Administration: *"Available 24/7, the Spanish and English videos are a great addition to support, empower, and educate Nevada's small business ecosystem."*

**Briefly describe how the broader public benefited from your project's activities.**

This program helped small businesses develop strong relationships with resource partners and remain resilient during the pandemic.

**Nevada Economic Assessment Project (NEAP)**

Project Director

Buddy Borden

Organization

University of Nevada Reno

Accession Number

7000076



**In 2-3 sentences, briefly describe the issue or problem that your project addresses.**

The goal of this program is to develop a comprehensive data repository of each county's quantitative and qualitative baseline data to be used to assess local planning and economic development initiatives. The program also provides individual counties with economic impact assessment models to analyze industries and activities associated with policy decisions.

**Briefly describe in non-technical terms how your major activities helped you achieve, or make significant progress toward, the goals and objectives described in your non-technical summary.**

The NEAP website at <https://extesnion.unr.edu/NEAP> was developed and activated, which shares the live updates of the NEAP status in each county, has all 17 counties active. Presented the NEAP statewide to over 150 community leaders at Nevada Association of Counties annual conference. Held nearly 50 meetings between NEAP personnel, current partners, and stakeholders. Completed largest Hunting Expenditure survey in over 30 years in Nevada. Prepared and submitted a three-year formal proposal to Nevada American Rescue Plan Act (ARPA) for \$1,050,000 to support and expand NEAP statewide programming.

**Briefly describe how your target audience benefited from your project's activities.**

The results of these sessions, and engaging the primary business Nevada Lithium, Humboldt county is working with housing developers to add additional inventory. Nevada Lithium has agreed to contribute up to \$20 million for a new or upgrade to school facilities. The essential infrastructure capacity and demands are being closely monitored to ensure the county can meet the needs of the business and citizens. The NEAP baseline data and analytical tools have helped guide the county through this process.

Pershing County was successful in attracting a new industry that will change the county's demographic, social, and economic base. The new company "West Coast Salmon", has agreed to build a 1.2 million-square-foot facility that will grow salmon that can be used to supply commercial and retail establishments. NEAP has been used to help assess housing and infrastructure needs to support this new industry. Extension facilitation and quantitative analyses continue to help with strategic planning and decision-making.

NAEP was instrumental in providing information to the Lincoln County Commissioners on the economic benefits of allowing a vineyard and wine-making operation in Lincoln County, swaying the commissioners to support such an industry in this county for the very first time in the history of Lincoln County.

**Stakeholder Quotes:**

- Jan Morrison, Economic Development Officer for the Northeastern Nevada Regional Development Authority: *"My expectations of the NEAP program were mixed...I was blown away and I was thrilled with the process and depth of the analytical tools that I use every day. This is one of the best programs that I have experienced and has helped the county and region better understand our current baseline and how it will be impacted with the addition of Nevada Lithium to our county."*
- Jeff Fontaine, Executive Director for the Lincoln County Regional Development Authority: *"We are really impressed that the data and analytical tools are county-specific. The availability of the baseline data is needed to determine impacts, and how to quantify them."*
- Dagny Stapleton, Former Executive Director of the Nevada Association of Counties: *"The data that NEAP is providing will be a valuable tool for our counties. Our decision-makers need reliable, researched information presented in an understandable way."*
- Curtis Moore, Natural Resource Director for Elko County: *"I was most excited about having some centralized place where I access data where I could use when I am trying to write letters and develop some policy positions for the county."*
- Jeremy Drew, Project Manager/Senior Resource Specialist for Resource Concepts, Inc. *"To have something that you can cite and really document the social context goes a long way to try and drive home your point on some of the impacts of*

**Briefly describe how the broader public benefited from your project's activities.**

The NEAP reached over 1,000 adults through direct extension methods such as demonstrations, educational classes, and workshops. As a result, counties are able to use data and economic models for assessment, decision making and planning; thereby, supporting the economic growth and development of Nevada's industries.

Closing Out (end date 09/07/2023)

**Maintaining Resilient Sagebrush & Rural Communities**

Project Director

Thomas Harris

Organization

University of Nevada Reno

Accession Number

1019976



**Community Business Matching Economic Model**

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**In 2-3 sentences, briefly describe the issue or problem that your project addresses.**

The area in and around Anaconda, Montana has been under a long economic downturn given it is an EPA superfund site. Because of Community Business Match economic model (CBM) activities, a four-county group has been organized to focus on economic development opportunities. This is the first time a multi-county organization has been made in Montana. As for Laughlin, Nevada and Bullhead City, Arizona, the Mohave Power Plant closed because of air pollution problems in the Grand Canyon. This has reduced economic activity in the area. The CBM model was used to focus economic development efforts to diversify the local economy and build out their industrial park.

**Briefly describe in non-technical terms how your major activities helped you achieve, or make significant progress toward, the goals and objectives described in your non-technical summary.**

The CBM model has been applied to Montana and Nevada. The model will be further applied to the four-county region of Montana and original areas with an expanded business database.

Research reports and presentations have been made on the CBM process. Development of grants from EDA for application in additional areas has been initiated. Also workbook is currently underway. A presentation of the CBM process was made at the University Economic Development Association meeting and was awarded second place nationally in the area of Economic Development Research.

**Briefly describe how your target audience benefited from your project's activities.**

Anaconda, Montana has used the model to focus on the construction industry and has focused industry location to its industrial park. The CBM has also enabled a four-county economic development agency to be developed in Montana. As for Nevada, CBM results have helped both Bullhead City, Arizona and Laughlin, Nevada in the successful location of industries to their industrial park and to develop economic diversification plans to address economic impacts from the shutdown of the Mohave Power Plant. The state of Utah is using the CBM model to develop economic development strategies throughout the state of Utah.

**Briefly describe how the broader public benefited from your project's activities.**

This project helps cities and counties across the west focus on the construction industry and industry location, as well as, help to develop economic diversification plans and strategies.

## Healthy Kids, Healthy Schools

Project Director

Aurora Buffington

Organization

University of Nevada Reno

Accession Number

7002524



## Healthy Kids, Healthy Schools

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**In 2-3 sentences, briefly describe the issue or problem that your project addresses.**

**Produce Pick of the Month** is a series of nine monthly 45-minute nutrition education lessons given to 2,239 third-grade students in 132 classrooms at 26 Clark County schools, totaling 1,188 classes. Statewide, Produce Pick of the Month lessons were given to 3,486 students in 49 schools across four counties, including Washoe (848 students), Pershing (62 students), Lyon (337 students), and Clark (2,239 students).

**Kids Cook Cooking Classes** is a series of 4 synchronous one-hour virtual cooking classes that were given to 198 third-fifth grade students at 7 Clark County elementary schools, for a total of 792 direct contacts.

**Student Nutrition Advisory Council** convened a 4-H Club called a Student Nutrition Advisory Council consisting of 5th graders at Rex Bell Elementary School as a collaboration among the 21st Century Community Learning Center program, the 4-H program, and Extension's Health & Nutrition tea. This 4-H Club met virtually and reached 12 unduplicated students with 45 biweekly 45-minute nutrition and physical activity lessons and food demonstrations to build their skill set so they may advocate for student wellness at their school. Total direct contacts were 156.

**Chef Suzy Nutrition** demonstrations were given virtually. These chef demos feature a simple snack recipe created with the featured fruit or vegetable of the month, giving students and their families a simple snack idea to make and eat together. A QR code to Chef Suzy's monthly Produce Pick of the Month YouTube videos were included in the family newsletters, garnering 509 additional views outside the classroom lessons. Chef Suzy also read an educational book about healthy food to 81 students in 5 classrooms at two schools during Nevada Reading Week. She provided a virtual chef demo for three afterschool SNAC club meetings for 11 students. Besides being seen over 20,000 times in Produce Pick of the Month lessons, Chef Suzy's nutrition promotion made 92 direct and 509 indirect contacts.

**Professional Development for Clark County School Teachers** were four 30-minute educational sessions (Enhancing Fruit and Vegetable Tastings in the Classroom) to 64 teachers who participated in Green Our Planet Teacher Trainings workshops. HKHS gave a 1-hour virtual chef demonstration titled Healthy Snacks for Self-Care to 63 early childhood teachers as an educational session during their Southern Nevada Chapter NevAEYC conference.

**Briefly describe in non-technical terms how your major activities helped you achieve, or make significant progress toward, the goals and objectives described in your non-technical summary.**

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**Briefly describe how your target audience benefited from your project's activities.**

**Cups of fruit and vegetables consumed per day** - More than one-third of students, 34.2% reported an increase in the cups of fruit they eat each day, and 33.4% of students reported an increase in the cups of vegetables they eat each day from pre-post-test. The results also showed a significant increase in eating healthy items (such as salad, fruits, vegetables, and milk) besides a significant decrease in consuming unhealthy items such as (cookies, burgers, and candies).

**Drinking fewer sugar-sweetened beverages** - 35.5% of students reported increasing daily water consumption. Students also reported a shift from drinking unhealthy sugar-sweetened beverages (such as soda and sports drinks) compared to flavored milk and 100% juice from pre to post.

**Knowledge/Recognition** - The results also showed an overall significant increase in the students' knowledge regarding several fruits and vegetables that they were introduced to at school (Cantaloupe, Kale, Cauliflower, Jicama, Garbanzo beans, Bell peppers, Oranges, Asparagus, and Blueberries). The increase in knowledge and recognition was also associated with liking the fruits and vegetables and the desire to consume them.

**Liaise for the Chefs for Kids Foundation** - The team's lead instructor acts as a liaison between CCSD administrators and the Chefs for Kids Foundation, facilitated the receipt of a \$40,000 gift to support my programming and distribution of sixty-five \$50 grocery store gift cards to purchase Christmas meals for students' families with the greatest needs at 13 schools (valued at \$3,250).

**Teacher Knowledge about School Wellness Policy:** The 64 teachers reported a significant increase in their self-reported knowledge about school wellness policy.

**Teacher Confidence Levels:** 63 of 64 (98%) teachers reported feeling moderately to very confident they could pair nutrition education with fruits and vegetables offered to students, as compared to 1 teacher (2%) rated as not confident).

**Teacher Intention to Use Extension Resources:** teachers reported how likely they were to use fruit and veggie cards and scorecards with their students if they were made available. Of 64 responses: 44% (28) very likely, 42% (27) somewhat likely, 11% (7) not sure; there were two responses for very unlikely.

**Briefly describe how the broader public benefited from your project's activities.**

Through this multi-level approach, 2,667 unique people were reached through direct extension methods for a total of 204 direct adult and 21,871 youth contacts. Indirect extension methods reached 1,245 youth and 21,275 adults. Overall the Healthy Kids, Healthy Schools program improved health-promoting dietary and physical activity behaviors, especially fruit and/or vegetable intake, in the school setting, and supported the implementation of the School Wellness Policy. This effort has the potential to reduce obesity rates and associated chronic diseases by establishing healthy habits early.

**Healthy Kids, Healthy Start**

Project Director

Anne Lindsay

Organization

University of Nevada Reno

Accession Number

**In 2-3 sentences, briefly describe the issue or problem that your project addresses.**

Nevada Legislative Code NRS 432A.1771 requires each licensee that operates a childcare facility, other than an accommodation facility or a child care institution, to provide a program of physical activity. While few educational resources are available for preschool teachers to conduct physical activity and nutrition programming, it is necessary to provide easy, inexpensive, effective tools and opportunities for Clark County teachers and preschool children as well as their families to make healthy choices.

**Briefly describe in non-technical terms how your major activities helped you achieve, or make significant progress toward, the goals and objectives described in your non-technical summary.**

The All 4 Kids & CATCH direct education in the classroom was conducted using a train-the-trainer, professional development delivery model. A total of 16 series of HKES direct education (including 15 All 4 Kids series@ 21-lessons each and 1 CATCH series) were delivered across 5 sites reaching 212 preschool children (no parents were reported as they were not permitted into the school for activities due to the pandemic).

Center Development- Policy, System and Environmental Change (PSE) efforts reached 20 centers to improve access and appeal for nutrition and physical activity including 5 new sites in year 1 of their action plans, 3 sites currently in year 2, and 2 sites currently in year 3.

Wellness committees – Efforts were made to improve training and emphasis on the formation of wellness committees at each site as well as establishing meaningful relationships between Extension staff and Educational Credential Evaluators (ECE) site staff prior to PSE implementation. 5 Wellness Committees spearheaded PSE efforts with support from the HKES team.

Environmental scans - NAPSACC self-assessment tools were implemented in 9 licensed childcare facilities to assess physical activity and nutrition needs and areas of improvement and develop strategies to improve programming in early childhood settings.

ECE Nutrition-Gardens - 1 new garden was installed reaching 56 children. Garden-nutrition educational activities are conducted at 5 pre-K gardens (1 new, 4 existing) by the HKES team.

The “I Am a Seed” nutrition-garden curriculum was developed as a comprehensive nutrition-garden education curriculum for early childhood settings that features on-site food gardens for growing fruits and vegetables, outdoor kitchen areas, nutrition education, food systems and physical activity that highlights Native Americans and plant “yoga-like” techniques to assist children with relaxation activities that teach them emotional self-regulation.

The 9th Healthy Kids Festival held in Las Vegas was a tremendous success despite uncertainty around COVID safety. The annual event had a record high attendance of 1,586 attendees. A seed-to-table educational experience continues to drive the event which helps young children to learn how to:

1. Plant, grow and harvest fruits and vegetables (using ready-to-harvest, pre-planted box gardens)
2. Experience buying fruits/vegetables in a market setting (using plastic coins)
3. Taste-testing produce in a healthy salad made by local casino chefs
4. Nutrition education (teaching MyPlate, reduced sugary-beverage consumption)
5. Physical literacy (physical activity and fundamental movement skills)

**Briefly describe how your target audience benefited from your project's activities.**

Adult Program Evaluation

- 29.4% of parents reported an increase in days their child ate more than one kind of fruit/day
- 43.1% of parents reported an increase in days their child ate more than one kind of veg/day
- 21.6% of parents reported a decrease in the days child drank sugary sweetened beverages
- 29.4% of parents reported an increase in cups of fruit their child ate
- 3.92% of parents reported an increase in cups of vegetables their child ate
- 41.7% of parents reported purchasing “more” fruits and vegetables over the past 2 months
- 37.2% of parents reported an increase in the days they're active with their child

Preschool Snack Selection

- 72.2% of preschoolers were able to improve their ability to correctly identify food items
- 54.9% of preschoolers improved their option to choose healthy snacks over unhealthy snacks when given a choice between the two
- 45.1% of preschoolers improved their ability to distinguish between healthy snacks and unhealthy snacks

Preschool Movement Assessment

- 50.0% increased their total composite scores from pre to post
- 38.8% of preschoolers who didn't demonstrate competency at Pre- showed statistically significant improved ability to cross the midline at post-test on the first attempt
- 44.4% of children improved in balance pre- to post-
- 52.4% of preschoolers who could not balance on one foot for 5 seconds [Nevada Pre-K standard] at pre-test improved the length of time they could balance on one foot at post
- 19.0% of preschoolers who could not balance on one foot for 5 seconds [Nevada Pre-K standard] at pre-test reached the 5-second standard at post test.

**Briefly describe how the broader public benefited from your project's activities.**

Through these and other efforts, Extension reached 1,805 individuals through direct education methods (1,451 youth contacts; 354 adult contacts) and 1,356 youth and 26,694 adults indirectly. This program will decrease the number of young children in Nevada (rural and urban) who are at risk for obesity reducing the financial burden of the overall health care system (including Medicaid).

**Nevada Radon Education Program**

Project Director

Christine Kelly

Organization

University of Nevada Reno

Accession Number

7002520



**Radon Education Program**

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**In 2-3 sentences, briefly describe the issue or problem that your project addresses.**

Radon is classified as a Group A carcinogen, a substance known to cause cancer in humans. Next to smoking, scientists believe that radon is associated with more lung cancer deaths than any other carcinogen. More than 20,000 Americans die of radon-related lung cancer each year, making it the leading cause of lung cancer in nonsmokers. Not everyone exposed to radon will get lung cancer, but the greater the radon level and the longer the exposure, the greater the risk of developing lung cancer.

The Nevada Radon Education Program educate Nevadans about the health risk posed by elevated levels of radon in the dwelling, so citizens can make informed decisions to lower their risk.

**Briefly describe in non-technical terms how your major activities helped you achieve, or make significant progress toward, the goals and objectives described in your non-technical summary.**

The Nevada Radon Education Program's efforts reached 18,257 youth and adults through direct contact, along with 91 real estate professionals trained. The total number of kits distributed was 2,133. Through newspaper articles, distributed publications, exhibits, TV reports, PSAs, websites, and social media, 44,889 youth and adults were exposed to the threads of radon.

**Briefly describe how your target audience benefited from your project's activities.**

Behavior changes are reflected in the number of test kits used, along with the number of homes mitigated, tested during real estate transactions, and built radon resistant.

- o 75.4% of test kits distributed were used (1,610 homes).
  
- o The number of reported homes mitigated was 281.
  
- o The total number of reported homes tested for radon in a real estate transaction was 984.
  
- o The total number of reported homes built with Radon-Resistant New Construction (RRNC) technique was 27.
  
- o Number of additional homes with operating mitigation systems is 2,004.

In April 2020, the Reno/Sparks Association of Realtors and the Sierra Nevada Realtors revised their Residential Offer and Acceptance Agreement form, including, for the first time, Radon Inspection as a physical inspection choice. The implications that this choice brings is that the buyer will now be prompted to ask, What is Radon?, or it will remind the buyer to include radon testing based on what they've learned, heard, or even experienced in past home sales experiences. Realtors must also seek information about radon to know how to advise their clients. In 2021 many brokers have refused to write offers without a radon inspection. In 2021 we have followed up by offering CE courses to realtors and educating formally through the courses and non-CE courses. We have also offered many classes through zoom.

**Briefly describe how the broader public benefited from your project's activities.**

The Nevada Radon Education Program is improving the health of Nevada citizens by providing information that they can make informed decisions. The ultimate value of the program is that it's saving lives by reducing health risks due to radon causing lung cancer, which improves the overall life expectancy and reduces costs to society.

**Antiviral Responses of Culex Mosquitoes – Generating Capacity for Research on Mosquito Vectors in Temperate Regions**

Project Director

Claudia Rueckert

Organization

University of Nevada Reno

Accession Number

1021416



**Antiviral Responses of Culex Mosquitoes**

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**In 2-3 sentences, briefly describe the issue or problem that your project addresses.**

The main mosquito vectors for West Nile virus are mosquito species of the genus Culex. These mosquito species often breed on agricultural land (e.g. irrigation systems) posing an increased risk to agricultural workers. Even though Culex spp. mosquitoes transmit West Nile virus and numerous other viruses, they are significantly understudied compared to mosquito species such as Anopheles and Aedes species. Due to the risk that West Nile virus and other emerging mosquito-borne viruses pose to both human and animal health in the state of Nevada, an effort to further understand virus-mosquito interactions, with a focus on Culex mosquitoes, is in the interest of public health.

**Briefly describe in non-technical terms how your major activities helped you achieve, or make significant progress toward, the goals and objectives described in your non-technical summary.**

The team determined that our Culex cells cannot be infected with Sindbis virus. They generated clonal Culex cell lines with genetically identical background. They established methods to stain viral RNA and co-stain for the protein Piwi2 found to be involved in cell division. Finally, the team generated a CRISPR/Cas9 knockout plasmid with promoters optimized for use in Culex cells.

**Briefly describe how your target audience benefited from your project's activities.**

The research team identified a new antiviral protein in Culex cells. They also have established a high skill set around working with Culex mosquitoes and Culex cell lines in our lab. Public protocols for determining optimal conditions for a variety of experiments (infection, transfection, gene silencing) were assembled. New molecular tools for work with Culex cells/mosquitoes (new cells, plasmids) have been made available to the research community. Multiple students are now proficient in the use of these mosquito cells and new methods such as cloning and virus infection experiments.

**Briefly describe how the broader public benefited from your project's activities.**

This project establishes capacity, builds expertise and answers fundamental questions in the biology and antiviral response of mosquito vectors that are currently largely neglected among virologists. This research will have a big impact on the state of Nevada as these neglected vectors are currently responsible for nearly all arbovirus transmission in the US, including in Nevada.

### [Study Of The Biochemical Mechanisms By Which Mercury Is Sequestered In Plants](#)

Project Director

Won-Gyu Choi

Organization

University of Nevada Reno

Accession Number

1019942



### **Understanding the biochemical mechanisms involved in the transport of mercury in plants.**

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#### **In 2-3 sentences, briefly describe the issue or problem that your project addresses.**

Mercury (Hg) is a toxic heavy metal that bio-accumulates in food webs and threatens human health and wildlife ecosystems. Exposure of humans to organic mercury or inorganic Hg can result in multiple health problems, including neurodegenerative conditions, kidney and respiratory failure, and death. In plants, Hg accumulation can impair photosynthesis and seed production.

#### **Briefly describe in non-technical terms how your major activities helped you achieve, or make significant progress toward, the goals and objectives described in your non-technical summary.**

Developed an optimized protocol for tree leaf cell fractionation. Discovered new findings that are mercury accumulation and movement within plant tissues that are highly plant species dependent. For example, after bio-absorption, mercury movement within plant tissues was found in aspen trees and rice but not in Arabidopsis. Discovered previously unknown information on mercury movement within plant tissues might be related to stress-triggered reactive oxygen species accumulation within the tissues.

#### **Briefly describe how your target audience benefited from your project's activities.**

Both agronomist and environmental scientist can use this information for developing improved strategies to monitor Hg pollution, as well as methods for bioengineering plants that will reduce Hg accumulation in food components consumed by humans and wildlife.

#### **Briefly describe how the broader public benefited from your project's activities.**

This knowledge is needed for developing improved strategies to monitor mercury pollution, as well as methods for bioengineering plants that will reduce Hg accumulation in food components consumed by humans, domestic livestock, and wildlife. In addition, the information gained may be helpful for developing strategies for the use of plants to extract and remove mercury or lower the bioavailability of mercury contaminated soils.

Critical Issue

## **Horticulture and Food Systems**

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### [Integrated Pest Management](#)

Project Director

Heidi Kratsch

Organization

University of Nevada Reno

Accession Number



**In 2-3 sentences, briefly describe the issue or problem that your project addresses.**

Water quality is an important issue in Nevada because pesticide inputs into our river systems directly impact water quality in our urban areas. Water quality studies conducted in 2008 by the U.S. Geological Survey, in collaboration with the Nevada Department of Agriculture, found detectable levels of pesticide residues in waterways located in urban sites. These pesticides included weed killers frequently used for nonagricultural purposes in urban areas.

Landscape professionals, pesticide applicators, and others responsible for controlling pests in urban areas require education about safe, effective, and economical ways to manage weeds and other pests to reduce pesticide contamination of waterways. Nevada is currently experiencing dramatic increases in population, especially in urban areas (U.S. Census, 2020). This means more homeowners, more managed landscapes, and an even greater need for education about safe and effective pest management practices to reduce pesticide contamination of water resources.

**Briefly describe in non-technical terms how your major activities helped you achieve, or make significant progress toward, the goals and objectives described in your non-technical summary.**

All verbal and written communication provided during these workshops is truly bilingual, provided in both English and Spanish at the same event and on our teaching materials. Our philosophy is that bilingual materials not only provide needed information in the participants' first language, but also gradually teach the English language to Spanish speakers, and the Spanish language to English speakers. This has the secondary benefit of helping workers communicate better with their supervisors, facilitating a better IPM outcome.

Extension activity methods varied from direct education, including multi-state activities, to sharing information through social media. Some of the activities included:

- Home Horticulture/Master Gardener IPM training consisted of eight, 3-hour classes (24 hours of instruction).
- General public IPM instruction consisted of the Bartley Ranch Gardening in Nevada Series (Washoe County only) and the Grow Your Own, Nevada! program (statewide). The Bartley Ranch Series offered five classes; the Grow Your Own, Nevada! program offered 16, 1.5-hour classes (24 hours of instruction).
- The Noxious Weed Field Guide have been distributed throughout the state to Extension offices for distribution within their counties and Eastern Nevada Landscape Coalition and Nevada Department of Transportation for distribution through their channels.
- Pesticide Applicator Continuing Education Credits were offered through Eastern Landscape Coalition, Green Industry Training, Green Industry Continuing Education Series, Nevada Landscape Association annual conference, and two statewide Pesticide Safety Education Program workshops. A total of 32 Continuing Education Units were offered.
- Four regional webinars were offered through a joint collaboration among UNR, Utah State University, and Idaho State University. UNR provided two webinars with a national reach of 266 participants.
- The online Nevada Certified Pesticide Applicator Safety Training Course, housed on the eXtension Campus website at <https://campus.extension.org/course/view.php?id=1586>, was accessed by over 200 unique individuals.
- The online Nevada Integrated Pest Management Continuing Education Unit course, also housed on the eXtension Campus website at <https://campus.extension.org/course/view.php?id=1586>, was accessed by 36 people to obtain CEUs.

- o Faculty participated in the multistate project meeting for WERA 1017: Coordination of Integrated Pest Management Research and Extension/Educational Programs for the Western States and Pacific Basin Territories and presented the results of our IPM activities.
- o Faculty attended the national IPM and Pesticide Safety Education Program (PSEP) Stakeholder Workgroup meetings.
- o Hosted and presented a four-hour pesticide CEU training session, for Pershing County, Nevada pesticide applicators. Also, an additional 8 hours of CEU training was offered by statewide training through interactive video.
- o Faculty represent Nevada on IR-4 and share information on pesticide needs or request new projects/the pesticide needs of Nevada's stakeholders.
- o The UNR Extension IPM website, manageNVpests.info, was accessed by over 5,000 total visitors.
- o The PSEP website, nevadapesticideeducation.info, was accessed by over 3,000 total visitors.
- o Over 1,511 television PSA were purchased on major local networks and targeted cable channels during the spring, with free spots donated by the vendor. Total impressions or views for the television PSAs were 1.2 million.

**Briefly describe how your target audience benefited from your project's activities.**

In total, through this program, 1,215,286 people were reached through indirect (1,210,440) and direct (4,846) Extension methods. Results indicate that there is greater awareness and understanding of IPM and Pesticide Safety principles by private citizens, and greater adoption of such strategies by Master Gardeners and industry professionals.

When Pershing County farmers/ranchers were asked how much profit per acre could be realized from attending this program, their responses ranged from \$1.00 - \$15.00 per acre (participants represented a total of 65,600 acres). These responses equated to a possible increase in profitability of \$7,600 to \$30,000 total.

Hispanic Landscaper Training survey, A pre- and post-test for our 2021 programs indicated a statistically significant increase in knowledge gained (Pre: 3.68 Post: 4.60 ).

**Briefly describe how the broader public benefited from your project's activities.**

Through communication with our clientele, identification of emerging pest problems, and continuous evaluation of our IPM program, we are constantly adapting and refining our Extension efforts to meet the pest management needs of the citizens of the state of Nevada. We aim to provide management strategies that are cost-effective, minimize risks to public health, and minimize environmental impacts.

**Master Gardeners of Nevada**

Project Director

Katelyn Brinkerhoff

Organization

University of Nevada Reno

Accession Number

7002543





**In 2-3 sentences, briefly describe the issue or problem that your project addresses.**

The Master Gardener Program is an educational and volunteer program designed to teach volunteers how to garden in our unique climates throughout Nevada. In return, volunteers give back to the program by volunteering their time to help the program reach more people and enrich the horticultural life of their community. Master Gardeners contribute volunteer hours every year through a variety of projects, including but not limited to: answering telephone and email inquiries, staffing booths at fairs and home shows, conducting educational presentations in the community and consulting at school and community gardens.

**Briefly describe in non-technical terms how your major activities helped you achieve, or make significant progress toward, the goals and objectives described in your non-technical summary.**

Extension has 302 certified master gardeners. Master Gardener trainings are offered annually. Each Master Gardener completes a 50-hour course (or 80 hours, depending on the county), passes a comprehensive final, and contributes at least 35 hours annually on approved volunteer activities. Each Master Gardener must complete at least 15 hours of continuing education annually.

Certified Master Gardeners teach classes; answer consumer questions through email, over the phone, and in person; support youth horticulture, community gardens and horticultural events; conduct workshops, lead demonstrations at demonstration gardens and orchards; and act as docents at public parks, among other activities. Some noteworthy activities included:

- Master Gardeners assisted 2,112 Nevadans with horticulture questions through their county help desks
  
- In Washoe County, Master Gardeners worked on beautifying the Northern Nevada State Veteran's Home (NNSVH) grounds, as well as establishing a gardening group with the residents where they provide gardening classes. Master Gardener volunteers involved in this project have additional requirements through NNSVH in order to volunteer, such as a full fingerprint background check, tuberculosis (TB) and COVID-19 vaccines, and an onsite COVID-19 test 24 hours before volunteering.
  
- In Washoe County, the Home Horticulture Certificate program (pre-requisite to the Master Gardener program) provided eight virtual 3-hour classes, including Plants of the Northern Nevada Landscape, Native Plants, Water Efficiency in the Landscape, Turf and Landscape Grasses, Gardening in Nevada Soils, Potting Media and Container Gardening, Critters and Nuisance Pests, and Integrated Pest Management and Lower Risk Pest Control. Between 49 and 53 people attended each class. 34 community members completed and earned their Home Horticulture Certificate (first step toward becoming a certified Master Gardener). 34 Master Gardeners and Extension professionals audited the course to get a refresher in the education. 15 Home Horticulture Certificate awardees went on to complete the Master Gardener training.
  
- In Nye County, Master Gardeners continued to host the local Pahrump Farmers' Market (open every Saturday weather permitting) where they distribute research-based Fact Sheets & Special Publications, and answer Horticulture questions.
  
- In Nye County, Master Gardeners worked to repair their Vegetable Demonstration Garden after sustaining flood damage on their grounds. The gardens have continued to produce a variety of vegetables such as tomatoes, green beans, eggplant, tomatillos, and more. The produce grown is donated to local Food Banks through a partnership with the Nye Communities Coalition "Gleaning" Program.
  
- In Clark County, Gardening on the Surface of the Sun stayed virtual for 2021. This program was open to the public and was a pre-requisite for the Master Gardener training. This program included eight 3-hour lectures covering topics like Botany, Native Plants, Soils, Soil Amendments, Integrated Pest Management, Desert Bio-scape, Propagation, and Fertilizers/Plant Nutrition.

- o The statewide University of Nevada, Reno Extension Master Gardener Facebook page has grown with 6,891 page likes, 7,252 followers, and reaching over 22,000 people.

**Briefly describe how your target audience benefited from your project's activities.**

In total Master Gardeners reported 29,557 hours of volunteer time, which translates to a value of \$843,556.78 (value obtained from Independent sector.org). Extension has a sustained program of diverse committed volunteers that provide accurate, university-based scientific horticulture information to the gardening public. The long-term impact is improved horticulture practices statewide, more locally grown foods, and reduced food deserts and food insecurity in Nevada.

**Briefly describe how the broader public benefited from your project's activities.**

The program is enhancing local, sustainable, healthy food systems for families, neighborhoods and communities. The volunteers are increasing gardening and science literacy through quality education and outreach. The program as a whole has been shown to support healthy plants with sustainable landscaping practices, water conservation, water quality, green waste reduction, wildlife enhancement, and the detection and management of invasive and endemic species.

**Commercial Landscape Horticulture**

Project Director

Heidi Kratsch

Organization

University of Nevada Reno

Accession Number

7000075



**Professional Horticultural Management Program**

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**In 2-3 sentences, briefly describe the issue or problem that your project addresses.**

The program is the overarching program consisting of several classes and conferences targeting adult learners in the green industry of southern Nevada. The ultimate goal of these programs is to provide research-based information, focusing on improving the knowledge and skills of those already in the Green industry as well as to provide a foundation for those looking to enter the industry. Participants already in possession of professional certifications in a variety of green industry professions are provided the opportunity to earn certificates, professional development units and certified educational units upon completion of applicable programs.

**Briefly describe in non-technical terms how your major activities helped you achieve, or make significant progress toward, the goals and objectives described in your non-technical summary.**

Training consisted of 24 two-hour classes held in person and online via Zoom. A two-hour class was held twice weekly for 12 weeks. Quizzes were administered before and after each class. A comprehensive final exam was administered following the last class. A two-class, in-person, 8-hour bilingual training in both English and Spanish was delivered by the team.

52 people attended the online tree conference. 22 people completed the online quizzes with an average score of 89%.

**Briefly describe how your target audience benefited from your project's activities.**

Upon completion, 22 participants each received 8 Certified Arborist continuing education units (CEU's) for a total of 176 cumulative CEU's being awarded.

A passing score of 70% or better was required on the final exam in order for the participant to be considered "Nurseryman Certified". All students passed and received their Certified Nurseryman pin.

72 people registered for the Hispanic Landscape Training in-person classes via Eventbrite. 15 people attended each class and received certificates of completion. 30 certificates in total were awarded.

## Briefly describe how the broader public benefited from your project's activities.

Over 250 people attended this two-day in-person conference. 89 Certified Arborists received 12 each continuing education units (CEU's) for a cumulative total of 1068 ISA Certified Arborist CEU's being earned. 102 Certified Pesticide Safety professionals each received a total of 12 CEU's, for a cumulative total of 1224 CEU's being earned.

Critical Issue

## Natural and Environmental Resources

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### Living With Fire

Project Director

Christina Restaino

Organization

University of Nevada Reno

Accession Number

7002558



### Living with Fire

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#### **In 2-3 sentences, briefly describe the issue or problem that your project addresses.**

LWF provides resources to homeowners, educators, community groups and firefighting professionals to improve defensible space, ensure homes have proper building materials, manage native and non-native vegetation and prepare for evacuation.

#### **Briefly describe in non-technical terms how your major activities helped you achieve, or make significant progress toward, the goals and objectives described in your non-technical summary.**

The team focused on creating new innovative programming and implementing evaluation techniques across program areas.

Nevada Wildfire Awareness Campaign: lead a wildfire awareness campaign that is a joint effort among local, state and federal firefighting agencies created to increase awareness of and preparedness for wildfire. This year LWF transitioned away from a one-month long to a six-month long campaign to maintain persistent wildfire messaging through the entire wildfire season (May-October). LWF also collaborated with agencies in the Lake Tahoe Basin to tailor materials from NWAC to serve better for the Lake Tahoe Wildfire Awareness Campaign.

Fire Education in K-12 Schools: LWF began the development of a high school wildfire science curriculum. The curriculum follows Next Generation Science Standards and is developed as units to fit into Biology, Earth Studies, Agricultural Science, and AP Environmental Science.

LWF's Nevada Wildfire Awareness Campaign activities reached 7,179 direct contacts and 6,152 indirect contacts. LWF collaborated with 43 partner agencies and 15 Nevada counties participated. This year, LWF reached Nevada counties that we have not been able to reach in the past with our campaigns, including Clark, Elko, Eureka, Humboldt, Lyon, Pershing, and Storey.

LWF launched the new Living With Fire podcast (9 episodes). The podcast reached 1,906 direct contacts.

LWF staff created the common message and graphic for the campaign through collaborative stakeholder engagement with 43 partner agencies. The theme was "Is Your Home Ignition Resistant." 73 banners were distributed across the state of Nevada.

LWF, with the help of partner agencies, obtained 12 county proclamations and 1 state resolution from local and state governing bodies.

LWF created 10 unique radio ads for KUNR public radio station with a total of 224 spots.

To better assess and refine the Fire Education in K-12 curriculum, LWF has been and will continue to pilot the curriculum with a full launch expected in Fall 2022.

### **Briefly describe how your target audience benefited from your project's activities.**

Long-term goals of this program are to change human behavior regarding defensible space, improvements on homes, more wildfire resilience, and wildfire preparedness that will result in less destruction for individuals, families, and communities.

The data shows that public understanding of the following all increased after using LWF programming: defensible space (80%), evacuation planning (58%), fire-adapted communities (53%), and wildfire risk (58%). Professional respondents (i.e. fire professionals and educators) stated that LWF positively influenced their communication about the following wildfire preparedness topics "A great deal" – home retrofit (30%), defensible space (53%), evacuation planning (30%), fire-adapted communities (43%), community preparedness (32%), wildfire risk (23%), and prescribed fire (22%). Defensible space was the only category where more respondents chose "A great deal" over a "A moderate amount."

In the LWF virtual series, we asked all participants to participate in surveys that evaluated the individual webinars but also tracked data about changed behavior after using LWF materials. Data shows that after interacting with LWF 35% implemented defensible space, 18% organized a community meeting, and 16% retrofitted their homes. These percentages were calculated as a mean across all nine surveys.

### **Briefly describe how the broader public benefited from your project's activities.**

Nevada Wildfire Awareness Campaign activities reached 7,179 direct contacts and 6,152 indirect contacts. We collaborated with 43 partner agencies and 15 Nevada counties participated.

Data shows that after interacting with LWF programming:

- 35% implemented defensible space
- 18% organized a community meeting, and
- 16% retrofitted their homes.

When asked, if participants implemented any learned recommendations after attending the workshops and 73% responded yes.

Example responses included:

- *"Changed landscaping around the perimeter of our house,"*
- *"Cleaned around the outside of the house and stocked a to-go bag,"*
- *"I installed ember barrier screens under my porches. The screens also keep leaf litter from accumulating under the porch,"*
- *"Used the information to inform clients and coworkers about best practices,"*
- *"Enclosed soffits and made Firewise changes to landscaping."*

**Fire Education for K-12 Students:** When asked what was one thing students learned from lessons that they did not know before students shared the following:

- "That wildfires can also increase populations while decreasing others because it takes away competition and allows for more resources."

- o "One thing I learned about wildfire that I did not know before these lessons is that smaller fire can be burned in order to remove the fuel for larger more dangerous and destructive fires."

- o "I had no idea that there were different types of firefighters. Learning about the wildland firefighters was very interesting."

We also conducted a survey before and after the lessons. When asked to respond to the statement "I can do things to protect where I live from wildfire" students moved from 15% to 48% "Strongly Agree" and 24% to 56% "Somewhat Agree."

## [Rangeland Resources and Range Management Program](#)

Project Director

Brad Schultz

Organization

University of Nevada Reno

Accession Number

7002514



## **Rangeland Management: Historical Perspectives**

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### **In 2-3 sentences, briefly describe the issue or problem that your project addresses.**

Many who manage or use Nevada's rangelands have incomplete knowledge about how plants grow and respond to grazing; the forage utilization concept; the processes of vegetation change and management; managing vegetation to reduce the risk of catastrophic fire; habitat elements important for managing sage-grouse or other wildlife; monitoring management outcomes, and the structure and function of riparian areas. Often they know even less about larger-scale processes that affect system structure and function. Incomplete knowledge about these process and management tools results in substantial conflict amongst the general public, interest groups, and land users and land managers for how to use, allocate and manage rangeland resources. (e.g., wilderness, mining, grazing, wildlife, etc.). Rangeland resources education program continues to shift away from targeted presentations and events to a greater emphasis on collaborative planning and management processes that address one or usually several of the aforementioned management issues.

Rangeland systems differ greatly within and between geographic locations, including adjacent landforms. Research results in one system, or even in one soil type, often are not directly transferable to another. Yet, this often occurs. Providing clear explanations about these complex interactions helps properly understand the actual influences of past and current management with respect to livestock grazing, fuels management, and vegetation and habitat management efforts.

This permits stakeholders to disentangle current management actions and practices from legacies of the past. Disentangling these intricacies is critical for implementing appropriate management actions going forward, and to not penalizing current producers and land users for resource conditions they did not cause, and for which a change in grazing or other management alone cannot cure.

### **Briefly describe in non-technical terms how your major activities helped you achieve, or make significant progress toward, the goals and objectives described in your non-technical summary.**

The Extension team reviewed dozens of papers about the physiology of grazed plants, the short and long-term effects of forage utilization at different growth stages and intensities of use, and provided written input to the draft documents being assembled by the US Forest Service for the grazing management project.

For the repeat photography study, the team made substantial headway in retaking historic photos on the Santa Rosa Ranger District, obtaining new images to pair with over 100 historic photos, before a continuous layer of smoke covered the area for over 1.5 months. Original photos dated as far back as 1920, with most from the 1950s to early 1980s. Over the last five years, the team has assembled approximately 150 repeat photos, with at least 100 or so more to consider retaking.

To help the US Farm Service Agency implement its Non-insured Disaster Assistance Program, the team completed a statewide Forage Production/Loss Assessment. Reviewed the precipitation data from approximately 70 NOAA affiliated sites and 26 SNOTEL locations to determine data adequacy. The team inserted these data into published forage production equations for areas with less than and more than 19 inches of annual precipitation, respectively, and calculated predicted forage yields by location and county, or subareas of a county when the data had identifiable gradients. The team finally integrated additional data from all USGS stream gages and acres burned by wildfire during the current and previous years also help formulate the assessment.

**Briefly describe how your target audience benefited from your project's activities.**

The Natural Resource Specialist with the US Forest Service, Santa Rosa Ranger District stated that the literature and associated writeups the team provided him about riparian area hydrology, fluvial processes and other factors that influence vegetation composition, and plant responses to season, duration and intensity of use have been invaluable for helping him write his reports that support the NEPA document written by the Idaho team. In his own words, it “pointed me in the right direction.” Language and citations Nevada’s team provided were incorporated into numerous sections of the NEPA document, as well as the supporting vegetation management report.

Photos from the repeat photography study were incorporated into the vegetation management report. These photos are the District’s best documentation for vegetation change in aspen, meadows, mountain brush and sagebrush plant communities, including recovery from historic abusive use, and disturbances (e.g., catastrophic floods and fire), due to the lack of long-term monitoring sites across the District. It is improving the USFS’s knowledge for vegetation and landscape changes that have occurred on the SRRD the past 120 years, which affects future management.

**Briefly describe how the broader public benefited from your project's activities.**

The Farm Services Agency uses the forage loss assessment to determine eligibility for insurance payments, which have ranged from none to 1 million dollars or more per year. Many areas in Nevada suffered forage losses of 35 to almost 70%, and only two locations had a predicted forage production of above average. Past years with similar forage production losses have seen state-wide payments in excess of one million dollars.

**[Development Of The First Common Garden Experiment For Singleleaf Pinyon Pine : Identification Of Climate-Resilient Traits And Lineages For A Keystone Tree Of The Great Basin](#)**

Project Director

Peter Weisberg

Organization

University of Nevada Reno

Accession Number

1019902



**[Identification Of Climate-Resilient Traits And Lineages For A Keystone Tree Species Of The Great Basin](#)**

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**In 2-3 sentences, briefly describe the issue or problem that your project addresses.**

Woodlands in this region are projected to exhibit areas of both contraction and expansion in response to climate change, and recent outbreaks of tree mortality due to drought and insect damage suggest a trajectory of change that highlights the potential for large-scale woodland decline. Future restoration of singleleaf pinyon pine will be challenging because its seedlings typically require a ‘nurse shrub’ to establish under, and because the areas with suitable environments for regeneration are expected to shift along elevational and latitudinal gradients with climate change. By identifying those characteristics of plants that are associated with successful regeneration under favorable vs. unfavorable conditions, considering characteristics of the parent plants, the seeds, and the seedlings that emerge from the seeds. The resulting information will help land managers to target efforts to prevent expansion into areas designated for sagebrush conservation, as well as to assist migration and restoration of pinyon pines into areas that are climatically suitable for long-term conservation of this species and the ecosystem that it is a key part of.

**Briefly describe in non-technical terms how your major activities helped you achieve, or make significant progress toward, the goals and objectives described in your non-technical summary.**

The assessed geographical patterns of intraspecific trait variation across range-wide environmental gradients, improved our understanding of the potential climate change response of Pinyon Pine at the level of individuals and populations. Results have allowed us to identify particular source populations, and associated reproductive and foliar traits, that can be expected to perform better (establish more reliably from seed or planted seedlings) given differing conditions of water availability and seasonality (for example, given climate change-driven drought events).

**Briefly describe how your target audience benefited from your project's activities.**

We developed new methodology for propagating pinyon pine seedlings with high success. Our protocols have been adopted by the Washoe Tribe of Nevada & California.

In collaboration with US Forest Service's Rocky Mountain Research Station (RMRS), the project continued to donate seeds and seedlings from our greenhouse trials to the Washoe Tribe, who have planted them in burned areas for restoration purposes.

Collaborations between RMRS and Nevada Ag Experiment Station have expanded to the Humboldt-Toiyabe National Forest as well as Tribal entities. The team has developed and submitted proposals that have the potential to lead to new or refined approaches for the management of pinyon-juniper woodland in the region.

**Briefly describe how the broader public benefited from your project's activities.**

Pinyon-juniper woodlands occupy over 100 million acres of the western United States and are among the most important vegetation types occurring in the dryland ecosystems of the Intermountain West. This study will lead to the development of important practical knowledge for increasing the future resilience of Great Basin pinyon-juniper woodlands to disturbance and climate change.

Critical Issue

## Sustainable Dryland Agriculture

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### Nevada Risk Management Education

Project Director

Staci Emm

Organization

University of Nevada Reno

Accession Number

7002503



### Risk Management Education

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**In 2-3 sentences, briefly describe the issue or problem that your project addresses.**

The "Nevada Risk Management Project" will help producers understand existing and emerging federal crop/livestock insurance products and the opportunities available while mitigating the financial risk during COVID-19.

**Briefly describe in non-technical terms how your major activities helped you achieve, or make significant progress toward, the goals and objectives described in your non-technical summary.**

There were 850 producers reached through the Nevada Risk Management Education program. An additional 2,000 adults were reached through indirect extension methods. Notable activities include:

- o The Cattlemen's Update provided current research-based information about important management practices and issues in the Great Basin region that may affect the efficiency, productivity, profitability, and sustainability of the state's cattle production businesses. The five-day event was held at seven different locations across Nevada. The sessions focused on animal health, livestock processing and slaughter, economic overview of agriculture in Nevada, and rangelands and rangeland management. 117 livestock producers attended either virtually or in person.

- o The Nevada Agricultural Outlook program brings agriculture producers, USDA agencies (FSA and NRCS), county and city officials, Small Business Administration, and the Nevada Governor's Office of Economic Development together to discuss the Nevada economy, agriculture economics, unemployment, and a subgroup to work on specific agriculture issues in Nevada. The team produced an editorial column in the Progressive Rancher reaching producers across the West called, "Let's Talk Ag," which focused on managing risk during COVID-19.
- o Small Farm and Ranch – Beekeeping program, a northern Nevada Bee and Pollinator Club had 20 family memberships that met monthly either at local apiaries or at an Extension office for both foundational classroom education and for hands-on learning at the apiary. In southern Nevada, working directly with military veterans with PTSD Extension began training for entry into a beekeeping business.

**Briefly describe how your target audience benefited from your project's activities.**

Overall, from this program, it is expected that informed decisions regarding markets, pricing and production based on strong financial analysis will lead to sustainable agricultural practices and enhanced quality of life for farmers and their surrounding communities.

- o Overall, 46% of producers attending Cattlemen's Update reported that they will make changes or take action in their work based on the increase in knowledge they received at the update.
- o Evaluation of the Ag Outlook program resulted in 60% strongly agreeing and 30% agreeing that the program has increased their understanding of Nevada's economic and agriculture issues. 11% of participants believed the update was worth \$900 or more. 30% of attendees made changes or took specific actions in their job-related work because of the updates, with another 60% considering making changes.
- o 86% of the Small Farm and Ranch participants expressed strongly that they have learned how to set up an apiary, 93% could identify the different types of bees, 96% felt confident in inspecting their hives, checking for mites, and how to treat mite outbreaks. When asked what the most useful thing they learned was, participants said: "Everything! We would have really struggled without joining the club. Thank you for imparting your knowledge to us novices. I have developed a new respect for bees." What participants liked best about the workshop the behaviors and life cycles of bees; learning how to care for bees, and an eye opener on all there is to learn about successful beekeeping.

**Briefly describe how the broader public benefited from your project's activities.**

Risk Management involves choosing among various risk management strategies and tools designed to reduce the financial effects of the uncertainties of weather, yields, prices, government policies, global economies, human factors, and other conditions that can cause dramatic fluctuations in farm income. Risk Management Education provides training that improves the ability of agricultural producers and their families to effectively manage risk.

**[Virtual Fencing for Increased Livestock Management Flexibility on Nevada Rangelands](#)**

Project Director

Paul Meiman

Organization

University of Nevada Reno

Accession Number

1022929



**Rangeland Management - Virtual Fencing**

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**In 2-3 sentences, briefly describe the issue or problem that your project addresses.**



At least 80% of the land area in Nevada is rangeland. Most of the plants and plant communities are native, but even when occupied by introduced plants, these lands are subject to extensive management approaches involving very large and complex land areas and relatively low levels of management input on a per/acre basis; an approach that contrasts with the intensive management of cultivated cropland. Multiple land uses take place on rangelands and this sometimes leads to natural resource concerns, conflict and the need for management changes to address issues and take advantage of opportunities. The ongoing need for information and educational efforts to support land management changes has been expressed many times in many different places.

The four goals established by the ROGER group (Results Oriented Grazing for Ecological Resilience) do a good job communicating the need for educational efforts that support improved rangeland management for desired outcomes and addressing cooperative permittee monitoring, riparian area management/assessment, collaborative rangeland management, virtual fencing and the management of exotic, invasive annual grasses.

**Briefly describe in non-technical terms how your major activities helped you achieve, or make significant progress toward, the goals and objectives described in your non-technical summary.**

Approximately 205 individuals were reached through 9 informal presentations, 6 field tours/demonstrations and 7 formal presentations on the usage of virtual fencing. Informal presentations included opportunities to share experiences and results with interested ranchers and individuals from the USDA Forest Service, Cooperative Extension and USDI Bureau of Land Management in Colorado and Oregon in addition to Nevada.

**Briefly describe how your target audience benefited from your project's activities.**

Several Nevada ranches have piloted the use of virtual fence systems, and a third received equipment in 2021 with the intent of deploying the system in 2022. Ranchers and federal agency managers from Colorado, Oregon and Idaho have contacted the Nevada team with sincere expressions of interest and intent to initiate virtual fence projects.

Back in Nevada, the USDA Forest Service is giving serious consideration to granting experimental status to the permit held by one of the ranches using virtual fencing. This designation would allow the permittee increased flexibility with how they manage livestock grazing on the forest and is expected to improve their ability to better meet natural resource and livestock production objectives.

**Briefly describe how the broader public benefited from your project's activities.**

In the future, we fully expect that the increased management flexibility afforded to interested land and livestock managers through the use of virtual fencing will improve their abilities to maintain riparian habitats already in good condition or make management changes to improve riparian conditions where needed. This will maintain or improve conditions for livestock and wildlife; notably special-status species including sage-grouse and Lahontan cutthroat trout.

Type

Projects / Programs

**Projects / Programs without a Critical Issue**

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Not Provided