



# Wyoming Agricultural Experiment Station 2014 SELECTED RESEARCH IMPACTS



## Development of a "Payment for Ecosystem Services" Market in the Wyoming Green River Basin

Payment for Ecosystem Services (PES) is a way to provide financial incentives or compensation to private landholders for engaging in socially or environmentally beneficial activities that might not otherwise be undertaken or continued. An initial feasibility analysis has successfully identified locations and specific ecosystem services within the Green River Basin that are suitable candidates for a PES program. Specifically, significant potential and downstream interest exists for conservation exchange activity related to water resources and riparian function.

Contact: Kristi Hansen, [kristi.hansen@uwyo.edu](mailto:kristi.hansen@uwyo.edu)



## Evaluation of Sage-Grouse Population Response to Oil and Gas Development in Wyoming

Sixty-four percent of sage-grouse in the eastern portion of their range live in Wyoming. Our research suggests a maximum development density of one well-pad within 1.25 miles of leks to avoid measurable impacts within one year, and less than six well-pads within 6.2 miles of leks to avoid delayed impacts. These findings are critical in providing information to better harmonize energy development and conservation of sage-grouse populations.

Contact: Jeffrey L. Beck, [jlbeck@uwyo.edu](mailto:jlbeck@uwyo.edu)



## Elder Financial Exploitation via Power of Attorney Abuse

The MetLife Mature Market Institute estimated \$2.6 billion dollars are lost by victims of elder financial abuse. The purpose of this research is to increase understanding of risk factors in families leading to elder financial exploitation when a power of attorney document has been used by another family member to manage an elderly relative's finances. Understanding risk factors is essential for preventing exploitation and reducing costs and consequences in the family system.

Contact: Virginia Vincenti, [vincenti@uwyo.edu](mailto:vincenti@uwyo.edu)



## Rangeland Reclamation from the Ground Up: Restoring Topsoil Following Natural Gas Well Development

Typical disturbances during energy development activities drastically disrupt the soil system and stimulate decomposition and loss of soil organic matter. Our research results suggest that use of cattle confined on well pads and/or incorporating woodchips, compost, or straw were effective reclamation strategies to improve soil condition and establishment of native plants.

Contact: Jay Norton, [jnorton4@uwyo.edu](mailto:jnorton4@uwyo.edu)



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### Wyoming's Native Plants as Potential Pharmaceutical Crops

Accessions of Rocky Mountain juniper and creeping juniper growing in the Big Horn Mountains contain relatively high concentrations of podophyllotoxin. Podophyllotoxin is a chemical used in the production of anti-cancer drugs utilized in treating lung cancer, testicular cancer, neuroblastoma, hepatoma, and other tumors. Identification of Wyoming native plants with potential pharmaceutical uses could benefit the Wyoming economy and producers through crop diversification.

Contact: Valtcho Jeliaskov, [vjeliask@uwyo.edu](mailto:vjeliask@uwyo.edu)



### Farm Level Impacts of Regulating Glyphosate Resistant Sugarbeet

Farmers need to be aware of the potential impacts if glyphosate resistant sugarbeets become regulated. An economic evaluation suggested that growing glyphosate resistant sugarbeets was on average \$95.65/acre to \$223.73/acre more profitable than growing conventional sugarbeets. A ban on glyphosate resistant sugarbeets could reduce potential profits of Wyoming farms by 4.7 percent.

Contact: John Ritten, [jritten@uwyo.edu](mailto:jritten@uwyo.edu)



### Wolf Predation Impacts on Livestock Production

Producers are often compensated for cattle lost by wolf predation. To account for subtle, unverifiable losses, compensation programs in the U.S. use a compensation ratio of 7:1—for each animal predated by wolves, producers are compensated seven times the market value. Our research demonstrates that compensation ratios necessary to fully offset the financial impacts of wolves should be two or three times greater than the current 7:1 compensation ratio.

Contact: Ben Rashford, [brashfor@uwyo.edu](mailto:brashfor@uwyo.edu)



### Transitioning from Cow-Calf-Yearlings to Stockers Only as a Strategy to Mitigate the Consequences of Brucellosis Infection

Producers in the Greater Yellowstone area could eliminate the risk of a brucellosis-related quarantine by switching from current cow-calf-yearling operations to purely non-reproductive, stocker operations. Our research indicated profitability would be cut nearly in half, and variability or risk in income would be three times greater, by switching from cow-calf yearling production to stocker operations.

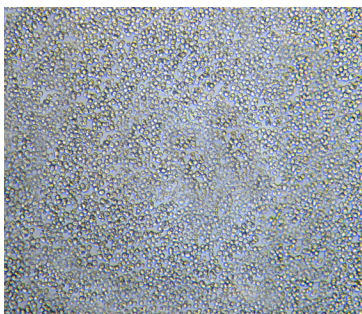
Contact: Dannele Peck or Chris Bastian, [dpeck@uwyo.edu](mailto:dpeck@uwyo.edu) or [bastian@uwyo.edu](mailto:bastian@uwyo.edu)



### Modeling Impacts of Gas Development on Hydrologic Response

A watershed modeling toolkit was established to support assessment of potential environmental impacts due to natural resource exploration development. The toolkit allows managers to better assess potential changes in the hydrologic cycle, erosion, and areas of greater or lesser environmental impact. As a result, managers can more accurately form management, mitigation and monitoring plans.

Contact: Scott Miller, [snmiller@uwyo.edu](mailto:snmiller@uwyo.edu)



### Enhanced Efficiency of Fermentation in Industrial Settings through Directed Improvements in Yeast Metabolism

This research has identified genetic changes in yeast that allows rapid and robust yeast cell growth while maintaining enhanced fermentative outcomes. This technology has the potential to enhance the efficiency of commercial fermentations used for biofuel. Enhanced production of fermentation products could increase the use of bio-based materials by making production economically competitive with traditional petroleum production processes.

Contact: Peter Thorsness, [thorsnes@uwyo.edu](mailto:thorsnes@uwyo.edu)