

# IMPACT

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Extension

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## Fort Hall Extension develops program to reduce cattle deaths on rangeland

### AT A GLANCE

**This program has reduced the number of cattle deaths potentially related to selenium toxicity on Fort Hall Reservation rangeland.**

### The Situation

The Shoshone-Bannock Tribes have a history rich in agriculture with an emphasis on cattle ranching. Many tribal and nontribal members run beef cattle on approximately 345,000 acres of rangeland beginning in the spring through the summer and fall grazing months. These vast rangelands are divided into 15 range units. One range unit has experienced higher than average cattle deaths for several years. Approximately 1-2 percent of beef cattle die on rangeland every year for a variety of reasons. However, these particular cattle deaths were higher than average and were occurring in the vicinity of an abandoned phosphate mine. This mine encompasses nearly 8,500 acres and was used to produce phosphate ore from 1946-93. Due to concerns regarding potential contamination of the environment, the Tribes, the Environmental Protection Agency and mining companies began investigating the mine in 2010. The investigation is ongoing and will continue for several years. It includes well drilling to sample and monitor water. In addition, soils are sampled and range plants are identified, mapped, collected and analyzed. After data from these resources is collected and analyzed, a feasibility study will be conducted and a proposed plan and record of decision will be made to determine if clean-up of the mine site is warranted.

Phosphate is one of the most widely used industrial chemicals. It is used for fertilizer, weed inhibitors, metal coatings, plastic, shampoo, detergents, tooth-



David Creasey, Tribal member and cattle rancher, observes western aster infestations marked for spraying. Photo by D. Gunn.

paste, baking powder and many other commonly used products. Phosphate mining can bring minerals to the soil surface. One of these minerals is selenium. Selenium is naturally present in rock and soil. It is an essential nutrient at low levels for humans and animals and is necessary for immune system function and reproductive performance. However, high levels can be toxic. An excess of selenium can inhibit cell processes and damage cells. High enough levels of selenium can cause acute toxicity which can cause death within a few hours of toxicity signs. There is a narrow margin between selenium deficiency and toxicity. Less than 1 parts per million (ppm) in forages equals a deficiency. Greater than 5 ppm in forages equates to toxicity in cattle. In 1996, researchers discovered selenium was a problem in southeastern Idaho mines and was responsible for livestock deaths. Some of the Fort Hall Reservation cattle deaths are now thought to be related to accumulation of toxic levels of selenium in specified range plants referred

to as “accumulator plants.” “Accumulator plants” is a term used to refer to certain plants that have the ability to accumulate selenium and flourish in areas with high selenium content in the soil. One particular range plant, western aster, accumulates selenium at toxic levels which potentially contributed to cattle deaths near mine areas on the reservation.

There is no specific treatment for selenium toxicity or “selenosis.” The best management practice is to eliminate selenium accumulator plants or prevent access to these plants to reduce cattle exposure to forages containing toxic levels of selenium.

### **Our Response**

Danielle Gunn, the Fort Hall Agricultural Extension Educator, initiated research when cattle producers voiced concerns in 2016 regarding the higher than average number of cattle deaths in the abandoned mine area of their range unit. Gunn evaluated and sampled range plants and began cooperating with the USDA Poisonous Plant Research Laboratory (PPRL) to discover what was causing the cattle deaths. Zane Davis, from the PPRL, accompanied Gunn and affected producers to the mine site. While completing site evaluations, western aster was identified and sampled. Some samples tested were well over 4,000 ppm of selenium. A cow would only need to ingest 1-2 pounds of this vegetation (dry weight) to exhibit signs of acute toxicity and death. Normal levels of selenium in forages are 1-5 ppm. One deceased heifer was also found onsite and necropsied. Results indicated the heifer had high levels of selenium in the liver and in the rumen contents. However, liver selenium levels were not high enough to cause acute toxicity and death. Therefore, any more animals found deceased in the area need to be necropsied and studied to determine actual cause of death.

Gunn worked with several entities in developing a sampling protocol, project and educational program to reduce cattle deaths. Two educational meetings were conducted to present information and findings of plant sampling and the necropsy. A project was developed and initiated in 2017 to identify, map and spray accumulator plants. A protocol was also developed for producers and mine investigators to follow if dead cattle were found in the mine area. When a dead cow is found, Gunn is contacted to perform a site visit and assessment to determine if the cow is able to be necropsied and studied to determine the cause of death. If the cow has been dead less than an estimated 36 hours, liver, lung, spleen, kidney, cardiac, skeletal tissues and rumen contents are sampled and sent to the Utah State University Diagnostics Laboratory for analysis. If possible, information is collected regarding the animal species, age, sex, identification (brands, ear tags/ marks), location and vegetation species present. The spring of 2017, aster infestations were identified, mapped and treated

with herbicide to eliminate cattle exposure and grazing of this selenium accumulator plant. In addition, producers were educated about the project and how to identify western aster.

### **Program Outcomes**

As of Sept. 13, 2017, only one cow needed to be necropsied. The selenium levels tested normal in the liver. No more cattle deaths potentially attributed to selenium have occurred in the area since the western aster was sprayed. This keeps \$1,000/cow/year in addition to a live calf per cow in ranchers bank accounts. Producers have also learned how to identify western aster and report any infestations they find to the Fort Hall UI Extension office. This program has resulted in excellent collaboration, awareness, knowledge, understanding and combined actions to solve a problem.

### **The Future**

The Fort Hall UI Extension office will continue identifying western aster infestations in the mine area and coordinating spraying of this accumulator plant. Most importantly, we will be working with producers and other entities to ensure cattle deaths do not occur from selenium toxicity. The project will continue for several years to manage western aster populations.

### **Cooperators and Co-Sponsors**

- USDA Poisonous Plant Laboratory
- Unit III Fort Hall Stockmen
- Shoshone-Bannock Tribal Departments
- Local Mining Companies
- Environmental Protection Agency
- Golder and Associates

### **FOR MORE INFORMATION**

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