Pesticides on the Prairie

Dead Eagles and Quarantined Buffalo: *The Impacts of Illegal Rodenticide Application on the Standing Rock Indian Reservation*

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ABSTRACT

This case study examines a variety issues arising from illegal pesticide application by a non-Native landowner intended to kill black-tailed prairie dogs (Cynomys ludovicianus) within the external borders of Standing Rock Reservation in 2016. The land was privately owned, as a result of the Dawes General Allotment Act of 1887. Rozol, an anticoagulant rodenticide, was applied to thousands of acres of buffalo pasture with little regard for the strict protocols required for application, clean up, and surveillance of the poison. The result of the application was widespread damage to wildlife species and the potential for transmission of the toxin to humans through buffalo meat. Rozol has had a short and turbulent history as a controlled poison for rodents, with concerns severe enough to result in its cancellation for approved use for prairie dogs in 2001. The case explores the responsibilities and actions of the landowners, local residents, U.S. Fish and Wildlife Service, Standing Rock Sioux Tribe, and Environmental Protection Agency.

INTRODUCTION

March 2016 had been warmer and drier than the average, a welcomed respite for the people of the Northern Plains where winter weather can lock down as early as October and stay well into the following May. The warmer weather made long-distance daily commutes, which are the norm for many of the residents of the Standing Rock Sioux Tribe reservation, a little easier and a great deal safer. Perhaps the moderate weather also allowed drivers to be little more observant of the scenic grasslands passing by outside the windows than if the roads would have been snow-packed. For some of those drivers on the highway between McLaughlin, South Dakota and Ft. Yates, North Dakota, disturbing events were unfolding before their eyes. The old Wilder Ranch, a private land holding within the reservation borders as a result of the Dawes General Allotment Act of 1887, was a site that was both famous for its buffalo herd and infamous for mismanagement of that same herd. Near locations that would soon become the focus of worldwide media coverage for protection of natural resources, a rancher knowingly spread poison bait indiscriminately and illegally across thousands of acres, killing wildlife and poisoning soil. Reports of dead eagles observed by commuters led to investigations and a troubling story of blatant disregard for even basic safety precautions was unearthed. A confounding and disheartening tale was brought to light, reflecting the realities of EPA control

of agricultural pesticides and life on western Indian reservations among a patchwork of landownership.

Over the course of several blustery days during the week of March 27, 2016 neighbors and community members spotted what appeared to be dead bald eagles on the property. It was discovered that the rodenticide known as **Rozol** had been improperly spread across the surface of several thousands of acres at both the Wilder Ranch and the Cannonball Ranch (50 miles north) in attempts to kill off black-tailed prairie dogs. The poisoned, dead, and dying prairie dogs were consumed by a range of predators and scavengers, while free ranging bison at the site likely fed on grasses dusted with the poison. The Meyer Rozol Incident was about to become well-known in the region for its scale and disregard for safety protocols and call into question the use of the poison as approved by the EPA.

The reservation of the Standing Rock Sioux Tribe sits astride the border of North Dakota and South Dakota. The land area within the external borders of the reservation is approximately 2.3 million acres, but due to the Dawes Act, more than a million of those acres is not owned or managed by the tribe. The reservation contains abundant native mixed grass prairie, badlands escarpments, wooded draws of green ash and bur oak, and riparian areas along the Missouri River and several tributary streams such as the Cannonball River (ND) and the Grand River (SD). It is a place of a vast and very public history, which continues to be made today. Although most of the soil conditions and water regimes found there are not conducive to row-crop farming, the land readily supports large grazing operations of livestock, horses, and bison. Streams and deep draws, known as *coulees*, hold enough moisture for trees to penetrate the vast prairie, providing shade from the summer sun and relief from the winter wind. Much of the land is relatively undisturbed, with some of the largest bastions of native intact prairie, in comparison to farmland and heavily grazed ranchland that is characteristic of the broader Northern Plains.

It is in this setting that a single person, determined to reduce black-tailed prairie dog (*Cynomys ludovicianus*) populations on his newly acquired property, decided to spread poison broadly across the landscape. Prairie dogs are often a concern for some ranchers, who view the expansion of prairie dogs on their property as being in direct conflict with the bottom line of their operation. This happens when (1) natural predators such as coyote, foxes, hawks, and black-footed ferrets are removed from the landscape and (2) pastures are overgrazed providing ideal grass conditions for prairie dogs. The "expansion" of prairie dogs is mislabeled as there were immense colonies prior to European settlement of the grasslands and the range of prairie dogs continues to constrict. Humans sometimes have a short memory, that and they may not recognize the historical range of the species.

Figure 1. Rozol packaging.

Poison has become the management tool of choice for prairie dogs as other techniques have limited ability to reduce populations (USFWS 2012a). Rozol, the poison selected by this rancher, is one of dubious history and resulted in a particularly gruesome incident when misused.

BACKGROUND

Prairie Dogs

Prairie Dogs are a keystone species, meaning that without a single species, the ecosystem is changed as many other parts rely on it. In *Prairie Dog Empire: A Sage of the Shortgrass Prairie*, Paul Johnsgard (2005), perhaps the greatest grassland naturalist of our time, provides a fascinating description of the prairie dog's place in the prairie ecosystem. The list of species that rely on prairie dogs, their burrows, and the towns that are so unique to the species is impressive. Prairie dogs create an entire ecosystem.

"In many ways, by the late 1900s the black-tailed prairie dog was providing a reprise of the sad history of the North American bison, whose genocidal destruction during the late 1800s spelled the end of the American frontier… If prairie dogs are not to be saved, we have little hope of preserving some of the other [animals] either, to say nothing of affecting the dozens of additional animals that are also part of and variously dependent on the prairie dog–bison–buffalo grass ecosystem of the American plains." *(Johnsgard 2005)*

"Although significantly reduced, these colonies still create unique patches of habitat in extensive grasslands. These patches are used by an abundance of wild creatures, such as burrowing owls, ferruginous hawks, mountain plovers, and horned larks. Over 200 species of wildlife have been associated with prairie dogs towns." *(Hygnstrom and Vantassel 2011).*

For the Lakota people, black-tailed prairie dogs (known as *Pispiza*) are revered for their knowledge of plant medicines and as healers of the land. "*Pispiza* aerated and tilled the soil compacted by *Tatanka* {bison}" (Spaur 2008).

> "*Prairie dogs were known as 'little farmers,' for they cleared the ground about their dwelling places and soon after there began to grow a plant upon which they lived. Whether they had a system of planting or not we never found out, but it was noticeable that wherever these little animals took up their abode their food plants soon took the place of weeds. Neither did we ever see a prairie-dog 'town' in the process of changing location though it was done quite often…The deserted towns of the prairie-dog seemed to be re-fertilized, no doubt on account of the air and water that got into the soil, for they soon were covered with a grass that afforded an excellent feed for our stock*." - Oglala Lakota Chief Luther Standing Bear (1933).

Pesticides

The Benefits of Poisons—Pesticides come in many forms, shapes, and mechanisms of action (i.e. how they kill). Pesticides have saved thousands of lives and enable us to produce more food per acre than ever thought imaginable. If you have ever used bug spray to keep insects off of you or sprayed weeds in your garden or sidewalk, then you have benefited from the chemistry used to produce these products. In some regions, insect-borne diseases such as malaria kill thousands of people each year and pesticides used to control mosquitoes helps reduce the

spread of the disease. Some pesticides prevent fungus from spreading over fruits and vegetables. Other poisons are used to keep disease-spreading animals from urinating and defecating in food storage facilities. There are obvious benefits for using pesticides! Pesticides are a very large group of chemicals. This case will focus on agricultural pesticides (rather than industrial or residential pesticides) and, specifically, chemical pesticides (rather than mechanical – such as traps). Chemical agricultural pesticides still represent a very large range of chemicals that have various types of actions on the organism. Generally, the pesticide effects on humans are stronger if the target species is more human-like. For example, poisons designed to kill rats (a mammal) are typically much more damaging to human systems than herbicides (chemicals designed to kill plants) or insecticides (used to kill insects). The term ***pesticide*** refers to a broad group of products designed to kill pests and includes those substances used to kill weeds (herbicides), insects (insecticides), fungus (fungicides) and rodents (rodenticides).

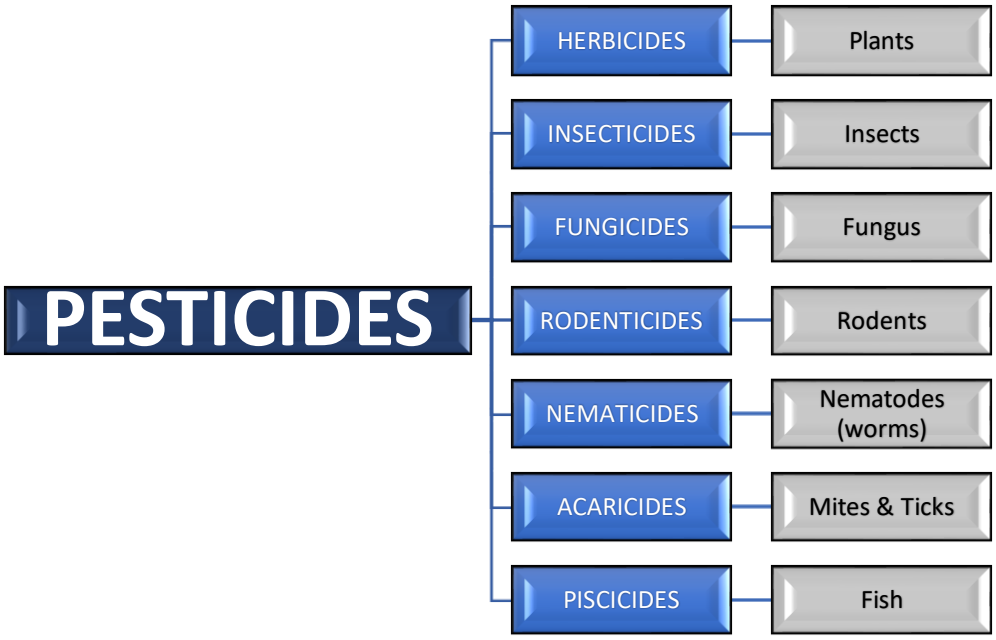

Figure 2. Pesticide categories: class of pesticide and target organisms that they kill.

Rodenticides target rodents such as mice, rats, gophers, ground squirrels, prairie dogs, beavers, muskrats, and porcupines, which may cause damage to property and/or cause major reductions to food supplies and resources. Rodenticides are typically fast and effective means of reducing rodent problems and, generally, their application requires little technical knowledge. The incident at the Wilder Ranch site involved a particularly problematic rodenticide.

RODENTICIDES AND ROZOL

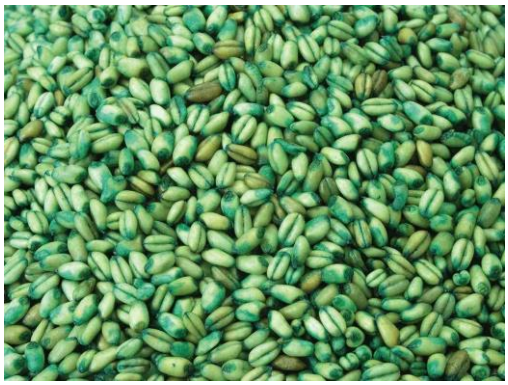

Figure 3. Commercial form of Rozol in pellet form (Liphatech website).

Rodenticides can have either anticoagulant (which blocks blood-clotting in target animals) or non-anticoagulant actions on an organism. Globally, the agricultural rodenticide industry is worth $187 million, with anticoagulants accounting for more than 78% of the rodenticide market share in 2016 (Grand View Research 2018). Anticoagulants reduce the blood-clotting capacity of the organism, resulting in death by *exsanguination*, or severe loss of blood. Anticoagulants work by blocking an enzyme that recycles Vitamin K that bodies need to make blood clotting agents. If Vitamin K is blocked, blood clots are not formed at normal levels. Exposure to anticoagulant rodenticides can lead to uncontrolled bleeding in any part of the body, which may cause difficulty breathing, weakness, vomiting, stools marked with blackened and tarry blood, paleness, bleeding from the gums, seizures, bruising, shaking, abdominal distention and pain, and death.

Anticoagulant rodenticides are classified as first generation or second generation. First-generation, or multiple dose, anticoagulants (such as warfarin, chlorophacinone, and diphacinone) require that an animal eat multiple doses of the bait over several days. Warfarin, a widely prescribed pharmaceutical, was the first anticoagulant rodenticide (registered in 1950) and was used widely until many rodent populations were found to be resistant. **Chlorophacinone** is the active ingredient in Rozol. Second generation, or single dose, anticoagulants (brodifacoum, bromadiolone, and difethialone) are more toxic because they bind more tightly to the enzyme that makes blood-clotting agents (NPIC 2019). Ecologically, there are advantages and disadvantages for the use of both types of anticoagulants including toxicity at low doses, length of time that the chemical takes to kill the target animal, and potential impacts on non-target species. However, make no mistake, the job of the pesticide is to kill (the suffix -cide = “kill”) and both types adequately accomplish the task.

Anticoagulant rodenticides are strictly regulated in an attempt to prevent harm to non-target wildlife, livestock, pets, and people. In the U.S., all chemical rodenticides must be registered with the EPA and are regulated under the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA). Control measures for chlorophacinone (Rozol) include that the product must be placed inside the burrow, that no bait may be exposed on the soil, and that the applicator must return to the site multiple times and conduct transect searches for dead or dying prairie dogs. The safety precautions in the box below are from the Rozol package label. The requirements for safety are quite detailed and clear so as to minimize danger to other ecosystem components near poison bait sites (the full label is provided in Appendix I).

These regulations were not always in place; they were developed through research and legal challenges to the use of the poison over several decades. While application of the chemical without precisely following the label is illegal, the question remains whether pesticide applicators or landowners fully follow the label directions.

Rozol Label (January 2019) (See Appendix I).
Application: Apply 1/4 cup (53 grams or nearly 2 ounces) of bait at least 6 inches down active prairie dog burrows. Make sure no bait is left on the soil surface at the time of application. Applicator must retrieve and dispose of any bait that is spilled above ground or placed less than 6 inches down the burrow entrance.

Follow-up: Prairie dogs that have eaten this bait will begin to die off 4 to 5 days after they eat a lethal amount. The applicator must return to the site within 4 days after bait application, and at 1 to 2 day intervals, to collect and properly dispose of any bait or dead or dying prairie dogs found on the surface. Carcass searches must be performed using a line-transect method that completely covers the baited area. Transect center lines must be not more than 200 feet (about 60 meters) apart, and should be considerably less if searches are conducted in more densely vegetated sites. Transect lines may be traveled on foot or by vehicle at a rate not to exceed 4 mph. All carcasses found above ground must be collected and disposed of properly. Continue to collect and dispose of dead or dying prairie dogs and search for non-target animals for at least two weeks, but longer if carcasses are still being found at that time. Carcass collection should occur in late afternoon, near sundown, to reduce the potential of nocturnal animals finding carcasses and dying animals. Bury carcasses on site in holes dug at least 18 inches deep or in inactive burrows (no longer being used by prairie dogs or other species) to avoid non-target animal scavenging. Burial includes covering and packing the hole or burrow with soil. If burial is not practical (due to frozen ground, etc.) and other disposal methods are allowed by state and local authorities, collected carcasses may be disposed of by other methods to insure that the carcasses are inaccessible to scavengers.

Figure 4. Rozol packaging (Liphatech website).

History of Rozol Use and Concerns
Rozol's active ingredient, Chlorophacinone, was invented in 1960 by Liphatech, a pesticide company headquartered in Wisconsin. It was first sold as a general rodenticide in the U.S in 1973. Rozol has caused many issues dating back to 1991 when research was first started on chlorophacinone (USFWS 2012b).

In 2008, the Western Association of Fish and Wildlife Agencies asked the EPA to rescind the Special Local Needs Registration for Rozol for prairie dog control in Nebraska because of the impacts on non-target species. Their greatest concern was a lack of consultation and inadequate label restrictions to protect grassland species from secondary poisoning. Instead of

rescinding the poison, in May 2009, the EPA registered Rozol for use as a poison for black-tailed prairie dogs in 10 western states including North Dakota and South Dakota.

Secondary poisoning is a primary concern when using Rozol (Ruder et al. 2011). Rozol typically causes secondary poisoning to non-target wildlife when the target animal (prairie dogs in this case) is eaten or scavenged by another animal. According to the EPA (2006), there are considerable risks to birds, non-target mammals, and reptiles. Rozol may take several days or even weeks to kill a prairie dog. This leaves staggering prairie dogs as easy prey for common prairie predators such as eagles, coyotes, badgers, and foxes or scavengers such as turkey vultures and raccoons. The poison in the carcasses then passes to the predator or scavenger. Herring et al. (2017) found that golden eagles are susceptible to pesticides such as Rozol because they commonly consume agricultural pests. Even feces of infected animals are considered to be a biohazardous material (Lanka 2009) and must be tilled deep into the soil. More than 70 avian species use black tailed prairie dogs towns for nesting and foraging throughout the year (Vyas et al. 2013). The risk of secondary exposure to chlorophacinone in prairie dogs is up to 27 days post-application (Witmer et al. 2016). Vyas et al. (2013) found that songbirds who came into contact with the bait 24-26 days post-application faced increased mortality and had chlorophacinone in their liver. The study concluded that this type of rodenticide should not be used because of the high secondary mortalities.

In 2010, a separate incident on Standing Rock Reservation demonstrated that applicators of the poison did not always abide by the requirements to return, pick up, and dispose of prairie dog carcasses as directed in the EPA protocols. Four years after this particular incident, Liphatech was fined by the EPA for more than 2,100 violations of FIFRA advertising rules, costing them $738,000, a record fine for breaching FIFRA regulations (Beer 2014).

A review provided by the U.S. District Court District of Columbia provides insight into concerns and actions taken by the U.S. Fish & Wildlife Service (FWS) before it was registered:

> *The FWS repeatedly expressed concerns about Rozol's effect on endangered and threatened species and sent a letter to the Nebraska Department of Agriculture asking it not to "issue the 24(c) SLN registration for Rozol to control [prairie dogs] in Nebraska." After Nebraska approved the registration, the FWS wrote to the Agency expressing "concerns regarding the use of Rozol" and "recommend[ing] that EPA disapprove the Rozol special local needs registration for Nebraska until important data gaps can be addressed." – Defenders of Wildlife v EPA. US District Court District of Columbia Case 1:09-cv-01814-ESH Document 49 Filed 06/14/11*

In 2009, The Defenders of Wildlife and Audubon of Kansas sued the Environmental Protection Agency for registering Rozol in the 10 states, because it killed not only prairie dogs, but it also had effects on other animals such as black-footed ferrets, swift foxes and ferruginous hawks

which are endangered in some states (Navarro and Klataske 2009; Defenders of Wildlife 2009a; Schyler and Cheater 2010). The case was tried in U.S. District Court for the District of Columbia in July 2011 and showed that the EPA had violated the Endangered Species Act when it approved the use of Rozol Prairie Dog Bait without first consulting with the U.S. Fish & Wildlife Service. While the court ruled against the EPA on this account, it did not issue an injunction to stop the use of Rozol, as it was concerned about the unknown impacts on agricultural producers. However, the EPA withdrew registration in four states pending completion of an endangered species review by the U.S. Fish & Wildlife Service (Defenders of Wildlife 2009b). In August 2011, the EPA cancelled Rozol Prairie Dog Bait for sale or use in South Dakota, North Dakota, Montana, and New Mexico until further review by the U.S. Fish & Wildlife Service could be completed.

In April, 2012, the US FWS stated in their Final Biological Opinion that the pesticide label was inadequate to protect wildlife species, citing the Migratory Bird Treaty Act and Bald and Golden Eagle Protection Act. In August 2012, the EPA approved Liphatech's revised labeling requirements and by October 2012, Rozol was again approved for use in poisoning prairie dogs.

INCIDENT AND INVESTIGATION

Wilder Ranch, Cannonball Ranch, and David Meyer

In 2016, David Meyer began operations on the properties of both the former Wilder Ranch, in South Dakota and the Cannonball Ranch in North Dakota. With the long history of mismanagement of bison on the Wilder Ranch (Appendix II), this site was under heavy scrutiny by community members, making the incidents perpetrated by Meyer even more confounding.

Initial reports of dead animals at the Wilder Ranch site (now Meyer's Ranch) came in to the Standing Rock Sioux Tribe Game & Fish Department the week of March 27, 2016. The Standing Rock Game & Fish Department, U.S. Fish and Wildlife Service, and a Pesticide Inspector with

ROZOL TIMELINE

- 1960 – Invented by Liphatech
- 1973 – Sold as general rodenticide.
- 2006 – EPA states there is considerable potential for secondary poisoning.
- 2008 – EPA is asked by wildlife groups to rescind registration in NE.
- May 2009 – EPA registers Rozol in 10 western states.
- 2010 – Rozol incident on Standing Rock Reservation shows that label instructions are not always followed.
- July 27, 2011 – Defenders of Wildlife sues Liphatech and wins case.
- Aug 8, 2011 – EPA cancels registrations until USFWS review.
- April 9, 2012 – USFWS submits Final Biological Opinion criticizing label.
- Aug. 24, 2012 – New Rozol label approved by EPA.
- October 1, 2012 – Rozol approved for use with new label.
- 2014 – Liphatech fined $738,000 for FIFRA violations related to Rozol marketing.
- March 27, 2016 – Dead eagles reported at Wilder Ranch Site.
- April 6/7, 2016 – EPA investigation determines Rozol was cause of death.
- April 2016 – 900 Bison are quarantined due to exposure to Rozol.
- January 1, 2017 – Yearling bison released from quarantine.
- January 2019 – U.S. District Court Case against Meyer is still pending.

the Standing Rock Sioux Tribe conducted a thorough investigation. On April 6 and 7, 2016, an EPA On-Scene Coordinator conducted a second investigation and determined that Rozol was the cause of death of the bald eagles that were initially observed. Many other mammals and birds were said to have been reported later by the inspection team and many additional eagles were likely to have succumbed as they were reported at the site several days later. Among those animals were six bald eagles, buffalo, prairie dogs, and a pronghorn antelope (Donovan 2017). Bald eagles, although delisted from the Endangered Species Act of 1973, remain protected under the Bald and Golden Eagle Protection Act of 1940 and the Migratory Bird Treaty Act of 1918. The Bald and Golden Eagle Protection Act penalties were increased in the 1972 amendment. "The 1972 amendments increased civil penalties for violating the Act to a maximum fine of $5,000 or one-year imprisonment with $10,000 or not more than two years in prison for a second conviction. Felony convictions carry a maximum fine of $250,000 or two years of imprisonment" (USFWS 2018).

After initially denying any wrongdoing, Meyer eventually admitted to applying Rozol in an inappropriate manner across thousands of acres on both the former Wilder Ranch and the Cannonball Ranch properties. He was advised to hire an environmental contractor to develop a remediation plan for the property. A revised work plan was provided by April 10, 2016.

Misapplication of Poison

According to the EPA: *"From March 3 to March 14, 2016, Respondent {Meyer} or people working for Respondent applied approximately twenty-two (22) 1,800-pound bags {totaling 39,600 lbs.} of Rozol to approximately 5,408 acres of pastureland at the Meyer Ranch, using 5-gallon buckets with spoons, resulting in significant, broadly dispersed surface application" (EPA RCRA-8-2016-0003).*

Surface application of Rozol is prohibited by the federal regulations and Rozol labeling instructions, Meyer was not even certified to apply pesticides, and the application of the poison was outside of the legal application dates of between October 1st and March 15th. Additionally, there was no evidence that any of the required follow-up procedures were followed. Rozol labeling requires that the applicator return to the site within four days and at 1-2 day intervals to collect and dispose of any bait or dead/dying prairie dogs on the surface and that formal carcass searches must be performed.

NoDAPL TIMELINE

- April 2016 – First camp established; it would later become knowns as Sacered Stone Camp.
- May 2016 – Construction on the pipeline begins.
- August 2016 – Hundreds join the camps.
- Sept. 3, 2016 – Clash with private security.
- Sept 23, 2016 – Meyer sells Cannonball Ranch property to Dakota Access LLC.
- October 27, 2016 – Police raid camp; 140 are arrested.
- Nov. 20, 2016 – Backwater bridge is site of major confrontation.
- Dec. 4, 2016 – Army Corps denies easement in order to launch new environmental assessment.
- February 8, 2017 – New Trump Administration directives result in Army Corps granting easement to proceed.
- February 15, 2017 – ND Governor issues evacuation order of the site for February 22.
- March 22, 2017 – Oil enters pipeline.
- June 1, 2017 – Pipeline is fully operational.
- June 14, 2017 – Judge orders Army Corps to reconsider the Tribe's hunting and fishing rights in environmental assessments.

WATER PROTECTORS AND THE "DAPL COUGH"

Around this time (March-May 2016), the first of the water protectors began to mobilize in the fight against the Dakota Access Pipeline (DAPL) near the northern border of Standing Rock Reservation – at or near the same Cannonball Ranch site where Meyer had spread Rozol on about 80 acres of his northern property. While nearly all of the Rozol in this incident was spread on the former Wilder Ranch site in South Dakota, some was also applied at the Cannonball Ranch site. Meyer signed easements with Dakota Access LLC in February 2015 allowing a 50'-wide pipeline easement and 100' wide construction easement. It would be several months before conflicts with Energy Transfer Partners' contractors and law enforcement would occur, but when knowledge of Rozol pollution became known, there was widespread concern for the safety of the people in the camps.

The DAPL Cough?

The gathered protesters became rightfully known as "water protectors" and focused many of their efforts in and around the Cannonball Ranch area. As the season changed and colder weather settled into the region, widespread respiratory illnesses among some campers became prevalent. The illness became known as the "DAPL cough" because so many people staying at the camps were impacted. In some cases, the cough became severe and people suffered. While there are many obvious reasons why people camping on the ground in North Dakota during this time of year might develop severe coughs, there were also more insidious ideas circulating through camp. Reports of nighttime aircraft misting campers with unknown substances, elevated tactics by law enforcement, and then the Meyer Rozol incident became known amongst the camps. The result was that people suggested a link between Rozol and the cough. Although there are statements posted online that some campers have had

medical tests that showed Rozol exposure or analyses of their tents that showed Rozol residue, those test results have not been confirmed or are not reliably available, and so the true nature of the illness is still not clear. The North Dakota Department of Health issued a statement suggesting that symptoms of the DAPL cough were not consistent with Rozol exposure. Many people have chalked it up to the high density of people from many different parts of the country staying in less than ideal conditions, perhaps sleeping on the ground, use of fire and woodstoves, or at least being underprepared for the harsh weather conditions. Now several years removed from the incident, it is unlikely that any new information will become available on this condition.

EPA ACTION AND CLEAN-UP

After the investigation, Meyer had an approved work-plan in hand to deal with the exposed Rozol at the sites. Although Meyer supplied the work-plan to the EPA on April 10, an EPA Administrative Order filed on April 22 (EPA 2016) noted that a substantial amount of Rozol was still present on the surface and posed a continuing danger to wildlife, livestock, and humans. The order required tilling of the soil to make sure that no Rozol remained on the surface and continued surveillance for dead animals. Weekly progress reports were then required and a completion report was mandated.

Buffalo present on the ranch were likely exposed to Rozol, although it is unclear from records if the buffalo were directly exposed to the sites during the days that Rozol was present on the surface. Regardless, the bison present were quarantined to reduce potential human health effects from eating the meat. Yearlings were released from quarantine on January 1, but the older animals remained under the restrictions until September 2017. Local bison sales were impacted. At a sale of 400-head near Selfridge, ND, on January 7, 2017, Gregg Ryken, the auctioneer, said he "believes none of the animals belong to Meyer, though one potential buyer said he held back from bidding because he couldn't be sure." (Donovan 2017).

Another layer to this story arose around the camps near the Cannonball Ranch. It was reported that 14 buffalo were either dead or missing in the area. Some claimed that people from the camps had entered pastures and butchered the buffalo for food. Others claimed that the bison were dying because of exposure to Rozol. Still others claimed that the story was completely fabricated. The ND Stockman's Association (NDSA 2009) believed that the butchered buffalo remains were found in the Cannonball Ranch pastures west of Hwy 1806. If the campers did, indeed, eat these buffalo, then there could have been cause for concern, as there was potential for the buffalo to have been exposed to Rozol a few months earlier.

FALL OUT AND RESOLUTION

As NoDAPL activities really began heating up, Meyer found his way out of the situation. On September 23, 2016, Meyer sold the property to Dakota Access, LLC. The company bought 20 parcels of land totaling more than 6,000 acres just north of where protesters camped on

federal property and where Standing Rock Sioux Tribe claimed recently identified sacred sites had been disturbed. This property included segments of the pipeline route west of Hwy 1806, where a violent clash occurred on Sept. 3 and included part of the historic Cannonball Ranch. Meyer told KX News of Bismarck that he sold the land due to liability reasons: that there were too many people on his property all the time and that he just wanted out.

Dakota Access, LLC was now responsible for any Rozol follow-up monitoring required by the EPA. Of course, Meyer remains responsible for his actions prior to the sale. On January 30, 2020, he pleaded guilty in U.S. District Court in South Dakota to the deaths of six bald eagles due to misapplication of Rozol. Sentencing will take place on April 2, 2020.

Meyer Back in the Chemical Business

David Meyer wanted out of the spotlight when protesters showed up at his gate, but that did not keep him out of sight when there was money to be made. In May 2018, Meyer was in the newspaper headlines again. His company, Pure Dakota LLC, was one of only two companies that were granted a North Dakota Department of Health license to grow medical marijuana for the State's new medical marijuana program (Horn and Humes 2018; Hagen 2018). Although the reviews were "blind", meaning that the selection team did not know the names of the applicant, the Department failed to do a thorough review of the applicants and permitted a person with a known history of ignoring chemical restrictions and regulations to obtain a permit to supply a medicinal product.

Continued Fight Against Rozol

This is not the end of the story for Rozol registration as a prairie dog poison. According to its Rozol website, Liphatech states that the prairie dog rodenticide is registered and "approved for use by certified pesticide applicators in CO, KS, MT, ND, NE, NM, OK, SD, TX, & WY" as of February 2019. https://liphatech.com/ag-field-orchard/products/rozol-prairie-dog-bait/. But, there continues to be many opponents to its use for a number of reasons. Even granting approval only with the strict safety requirements that reduce non-target poisoning listed on its label is being questioned as an effective protection measure. According to Vyas et al. (2013): **Recent evidence indicates that the pesticide users consider the mitigation measures onerous and unrealistic; therefore, in practice, risk reduction is unlikely to be achieved.** The requirement for multiple visits to the site to pick up carcasses using transects to search for dead animals is not often followed and researchers do not even know how effective these efforts are because they have not been tested. Vyas' criticism continues: "Novel, untested, mandatory mitigation requirements that are considered key for reducing risks need to be confirmed for their practicality and effectiveness to ensure label compliance and minimize eco-logical hazards."

Landowners and pesticide applicators "…considered the multiple follow-up visits and the carcass disposal requirements on the then-active 2009 label to be already laborious and unrealistic, and that the attendees {at a meeting} said they did not have the time, resources, or interest to conduct the follow-up visits. Since the attendees admitted to non-compliance with

the less stringent follow-up requirements on the 2009 label (as few as two required follow-up visits over a three-week period), they appeared indifferent to the more demanding multiple follow-up visits requirements of the new 2010 Rozol label (eleven follow-up visits over the three-week period)."

The basic concept that Vyas put forward is that the EPA approves hazardous pesticides based on a label that requires activities that landowners and pesticide applicators generally ignore. Furthermore, there are no studies that can point to whether follow up visits, if conducted as recommended, actually reduce non-target species poisoning. No one knows how many poisoned prairie dogs are consumed by predators and scavengers between follow-up visits, for example. Therefore, he argues, the pesticide should not be approved because it has not been shown to be safe to non-target species.

SUMMARY

Chemical pesticide use has increased dramatically in the agricultural industry since the 1970s. Some crops have been designed specifically to be resistant to herbicides such as Round-Up so that more herbicide could be used. These "Round-Up Ready" crops grow well when Round-Up herbicide is applied across the field, killing off the crops' competitors. Increases in crop production has followed and helped to feed the world, but this means more herbicides are applied across the landscape (Fig 5). Because pesticides are ubiquitous in our environment and found in our food and homes, we are exposed, and we do not know how that exposure impacts our bodies. Scientists are helping to find new ways to reduce our use of pesticides while increasing crop production. Crops are being developed that reduce the need for pesticides. "Bt Corn" is a crop that expresses genes that act as insecticides against corn pests. Fields with Bt Corn use significantly fewer insecticides than traditional corn fields (Fig. 6). However, genetically-modified organisms are not an acceptable solution for everyone.

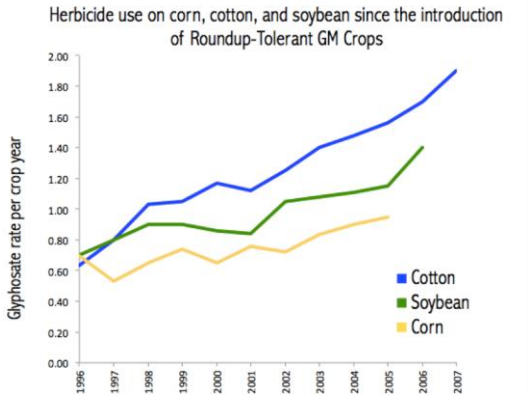

Figure 5. Herbicide use on corn, cotton, and soybean fields since the introduction of Round-Up Ready crops (1996-2007). Source: sitn.hms.harvard.edu/flash/2015/gmos-and-pesticides/

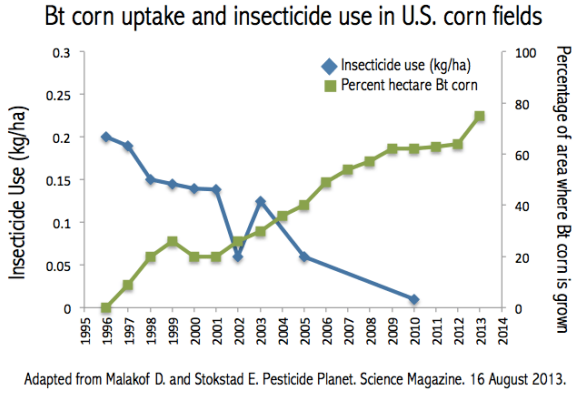

Figure 6. Decrease in insecticide use on corn fields in relation to the acres of Bt Corn planted (1995-2014). Source: sitn.hms.harvard.edu/flash/2015/gmos-and-pesticides/

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APPENDIX 1: ROZOL LABEL DIRECTIONS FOR USE

Source: https://liphatech.com/wp-content/uploads/2018/11/ENG_RZ_PrairieDogBait_Label-1.pdf

DIRECTIONS FOR USE

It is a violation of Federal law to use this product in a manner inconsistent with its labeling. **READ THIS LABEL** and follow all use directions and precautions. Only use for sites, pests, and application methods specified on this label. **IMPORTANT:** Do not expose children, pets, or other nontarget animals to rodenticides. To help prevent accidents: 1. Store product not in use in a location out of reach of children and pets.
2. Dispose of product container, unused, spoiled and unconsumed bait as specified on this label.

Use restrictions: This product may only be used as follows:
1. Sites/Pests: Black-Tailed Prairie Dogs (Cynomys ludovicianus) on rangeland and adjacent noncrop areas.

2. States: Colorado, Kansas, Montana, Nebraska, New Mexico, North Dakota, Oklahoma, South Dakota, Texas and Wyoming. **Do not apply this product within the exterior boundaries of the Crow Reservation or the Blackfeet Reservation in Montana.**

3. Application Method: Apply bait by hand scoop or a mechanical bait application machine that is designed, constructed and operated in a manner that ensures that bait is properly placed at least 6 inches down the prairie dog burrows. This product may only be used in underground applications. Do not apply bait on or above ground level. Treat only active burrows.

4. Treatment Period: Apply between October 1 and March 15 of the following year, when animals will most readily take the grain bait.

5. Non-Applicators: Do not allow children, pets, domestic animals or persons not involved in the application to be in the area where the product is being applied.

6. Grazing Restriction: Do not allow livestock to graze in treated areas for 14 days after treatment and when no bait is found above ground.

7. Do not use any other rodenticides containing anticoagulants (diphacinone) in prairie dog towns during the treatment period allowed on this label.

Endangered Species: It is a Federal offense to use any pesticide in a manner that results in the death of an endangered species. Use of this product may pose a hazard to endangered or threatened species. When using this product, you must follow the measures contained in the Endangered Species Protection Bulletin for the area in which you are applying the product. To obtain Bulletins, no more than six months before using this product, consult http://www.epa.gov/espp/ or call 844-447-3813. You must use the
Bulletin valid for the month in which you will apply the product.

Site Assessment: Before applying this product, identify active prairie dog burrows by visual observation. The openings of active burrows will generally be free of leaves, seeds, other debris or spider webs, and will show freshly turned earth, and have prairie dog feces nearby.

Application: Apply 1/4 cup (53 grams or nearly 2 ounces) of bait at least 6 inches down active prairie dog burrows. Make sure no bait is left on the soil surface at the time of application. Applicator must retrieve and dispose of any bait that is spilled above ground or placed less than 6 inches down the burrow entrance.

Follow-up: Prairie dogs that have eaten this bait will begin to die off 4 to 5 days after they eat a lethal amount. The applicator must return to the site within 4 days after bait application, and at 1 to 2 day intervals, to collect and properly dispose of any bait or dead or dying prairie dogs found on the surface. Carcass searches must be performed using a line-transect method that completely covers the baited area. Transect center lines must be not more than 200 feet (about 60 meters) apart, and should be considerably less if searches are conducted in more densely vegetated sites. Transect lines may be traveled on foot or by vehicle at a rate not to exceed 4 mph. All carcasses found above ground must be collected and disposed of properly. Continue to collect and dispose of dead or dying prairie dogs and search for non-target animals for at least two weeks, but longer if carcasses are still being found at that time. Carcass collection should occur in late afternoon, near sundown, to reduce the potential of nocturnal animals finding carcasses and dying animals. Bury carcasses on site in holes dug at least 18 inches deep or in inactive burrows (no longer being used by prairie dogs or other species) to avoid non-target animal scavenging. Burial includes covering and packing the hole or burrow with soil. If burial is not practical (due to frozen ground, etc.) and other disposal methods are allowed by state and local authorities, collected carcasses may be disposed of by other methods to insure that the carcasses are inaccessible to scavengers.

All dead or dying non-target animals must be reported to the National Pesticide Information Center 1-800-858-7378 as soon as possible. Any apparently injured or sick Federally listed species must also be immediately reported by calling 303-236-7540 (if located in Kansas, Nebraska, the Dakotas, Montana, Colorado or Wyoming) or 505-248-7889 (if located in Texas, New Mexico or Oklahoma).

The Black-footed Ferret Coordinator must also be contacted if ferrets are found during Rozol Prairie Dog Bait applications or carcass searches at 970-897-2730 x224. If live black footed ferrets are found outside reintroduction sites, before, during or after Rozol Prairie Dog Bait application, the Black-footed Ferret Coordinator must be contacted immediately and sufficient time must be allowed for the FWS to capture and relocate the black-footed ferret(s) before Rozol Prairie Dog Bait application.

APPENDIX II: HISTORY OF EXPLOITATION AT THE RANCHES

The Wilder Ranch

In the early 2000s, the approximately 20,000-acre Wilder Ranch, located in the heart of Standing Rock Reservation, was home to thousands of bison. Maurice Wilder, a wealthy real estate investor from Florida bought the property in 1994 (Tampa Times 2016). The land included acreage in Sioux County, North Dakota (approximately 5,880 acres, known as the historic Cannonball Ranch) and Corson, County, South Dakota (approximately $16,200 acres, known as Wilder Buffalo Ranch). The Wilder Ranch proper is the property in Corson County, just north of the town of McLaughlin.

Figure 1. Buffalo at Wilder Ranch site.

Outside interests, especially outside millionaires, owning large tracts of property is never particular easy to swallow for hometown landowners in the Dakotas, so there was bound to be conflicts. But this land also held buffalo, a particularly important species that the Lakota and Dakota people of Standing Rock consider a relative. When conditions on the ranch began to deteriorate, it did not go unnoticed. In 2009, charges of animal neglect were made by North Dakota officials, but were dropped after Wilder paid eight neighboring ranches for damages caused by the bison that had escaped the pastures. Problems continued and consistent reports of the poor condition of the buffalo and the pasture eventually resulted in severe penalties. The herd was placed under the care of the Corson County (SD) Sheriff's Office in February 2011 (Bismarck Tribune 2011) due to offenses related to lost, malnourished, and dead animals during heavy winters of 2009-2011 and ongoing complaints of severe overgrazing (Bismarck Tribune 2011a).

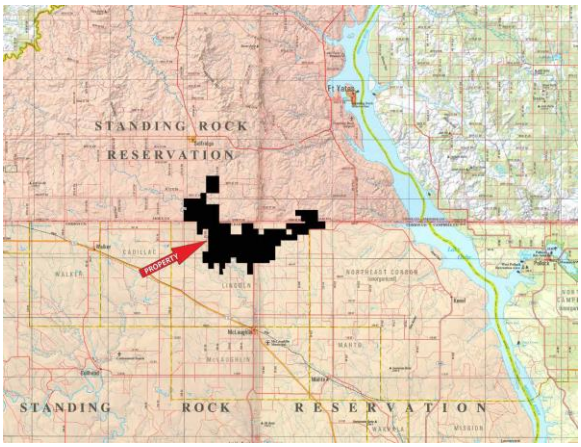

Figure 2. Location of Wilder Ranch site astride the North/South Dakota border.

South Dakota authorities impounded 4,000-5,000 bison in 2011, 850 of which were sold at an auction that some referred to as a rescue sale due to the poor condition of the animals (Donovan 2011a and 2011b). Due to the conflicts with local citizens and state authorities and a stated inability to find the proper "help" in the region, Wilder decided to sell the property (Stephen 2015).

Figure 3. Auction flier for the sale of the Wilder Ranch site in 2015.

A land auction in October of 2015 brought a bid of more than $17 million for the property, but Wilder initially refused the amount, holding out for a higher sum. Although the final details are not clear, one of the original bidders, David Meyer, of Flasher, ND was reported as owner of at least part of the Wilder Ranch sites in late 2016. According to county records, Wilder was still listed as owner of some of the property although he died on June 12, 2016 at the age of 83 (Tampa Bay Times 2016). A lag-time in paperwork is likely the cause as Meyer is listed as the responsible party in the incident that occurred on the property and is discussed in this case.

The Cannonball Ranch

The Cannonball River forms the northern boundary of Standing Rock Reservation. Along the north shore of the river where it enters the Missouri River is the property known as the Cannonball Ranch. In 1999, the property became the first ranch to be inducted into the North Dakota Cowboy Hall of Fame, ahead of even Theodore Roosevelt's famous Elk Horn Ranch. Originally established in 1883, the Cannonball Ranch's approximate 7,400 acres were originally owned by Henry and Alma Parker. Alma was descended from Lakota Chiefs Two Lance and Iron Hill (Rapid City Journal 2006). Although the Wilder Ranch site is much larger and had more significant Rozol impacts, the Cannonball Ranch site would soon become famous for housing the "largest, most diverse tribal action in at least a century" (Healy 2016). The Cannonball Ranch property also found its way into David Meyer's hands in 2016.

Questions