



At Lostwood National Wildlife Refuge rotational grazing and prescribed burns are being used to mimic the natural prairie cycles of frequent wildfires and grazing by bison herds. Over time, the strategy has favored the restoration of native grassland vegetation.

Lessons from Lostwood

Taking a Wide View of Prairie Wildlife Management

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Managing a habitat resource is an enormous challenge, partly because it often takes decades for changes in plant and wildlife communities to be revealed. Historically, many wildlife managers focused their decisions on habitat needs for a specific wildlife species or group of species. Over the long term, however, this focus can result in degraded habitat for the very species managers are trying to enhance.

One example where management's focus on a specific suite of wildlife species for several decades led a unique resource astray is in northwestern North Dakota on the Lostwood National Wildlife Refuge, under U. S. Fish and Wildlife Service (USFWS) jurisdiction. This 27,000-acre refuge, purchased in the mid-1930s as a production and breeding ground for migratory birds and other wildlife, is within the prime waterfowl

breeding habitat of the Missouri Coteau. The Coteau is a terminal moraine dotted with thousands of wetlands from northern Iowa into southern prairie Canada, ending in eastern Alberta. The very hilly mixed-grass prairie of Lostwood Refuge is over 75 percent native prairie with the remaining uplands farmed prior to refuge establishment. Due to the refuge's rich wetland resources, and the management priority that the USFWS placed on waterfowl, waterfowl management initially was the primary focus for refuge management.

Management emphasis was on fall migratory waterfowl needs and duck nesting. Grain crops were planted annually on refuge farmland as fall foods for migrating waterfowl. But by the mid-1950s, it became apparent few fall migrant waterfowl used these grains. However, duck production was impres-

sive. Management focus shifted to providing attractive nesting cover for ducks. Biologists, responding to the "best science" available at the time, sought tall, dense nesting cover for most species of prairie ducks, but particularly mallards. Consequently, many of the scattered tracts of farmland were seeded to tall, perennial plants, primarily smooth brome and alfalfa.

To increase vegetation height on the native grasslands, it was believed best to reduce or eliminate cattle grazing on the refuge. Resting or idling areas was the preferred choice and several refuge areas were rested for decades. However, cattle grazing was the predominant use prior to refuge establishment and considered politically important to continue in some way. So it was minimized. Few areas were grazed, and those were grazed at very light stocking rates (5 to 100



Without prescribed burning and properly applied grazing, but with many years of rest or idle over a 70-year period (1915 to 1985), the habitat on Lostwood National Wildlife Refuge in northwestern North Dakota was transposed from a grassland to a shrubland, dominated by western snowberry.



When western snowberry stands became decadent and litter built to form a thick humus layer on the soil surface, smooth brome (shown here as a brighter green in the valley and slopes of the hills) invaded, dominating entire snowberry patches.



After three to four prescribed burns, grazing rotation applied, and fewer rest years, the northern mixed-grass prairie of Lostwood National Wildlife Refuge was returning.

acres per adult cow). Cattle, utilized this way, select the most palatable grasses and forbs, repeatedly grazing the same plants, while others go

for an invasive plant. The smooth brome that had been seeded in small fields scattered throughout the refuge became the seed source for

...grouse began abandoning some dancing grounds when dense shrubs and trees grew too near.

untouched. Without significant defoliation events similar to how the prairie evolved, upland native vegetation began degrading, affecting the whole prairie ecosystem: uplands, wetlands, soils, water, wildlife, and more.

So what actually happened over time? Initially, this type of grazing contributed to litter accumulation on the soil's surface and an increase in native woody plants. Accumulation of litter over many years shades the sun-loving growing points of native plants. Also, soil nutrient cycling is dramatically reduced. Under these conditions, native herbaceous plants were hindered, while Kentucky bluegrass, and a small native shrub, western snowberry, were enhanced. Snowberry became the refuge's dominant landscape feature by the late 1970s, initially producing a taller, denser duck nesting cover than the native herbaceous community.

Accumulation of litter over too many years built a rich humus layer on top of the topsoil under the native grass and snowberry. As this soil environment worsened for native herbaceous plants, it improved conditions

invasion into native sod. The brome began its persistent march about the mid 1970s within the decadent stands of snowberry. It was slow at first, but once brome was well-established it spread rapidly during the early 1990s. Other exotics finding the rich humus layer attractive were stinging nettle, Canada thistle, and leafy spurge.

Wetlands receive water during rain and snowmelt runoff events, and from ground waters. Less runoff was received by wetlands when topsoils were covered in matted litter and thick humus, because the litter and humus absorbed the runoff. When enough precipitation fell to saturate the litter and humus, it soaked into the soils, recharging ground waters. However, if the shallow, dense root mass of smooth brome and Kentucky bluegrass was present, even less moisture would reach the ground waters. By the 1990s, wetland water quality was recognized as being adversely affected by upland conditions as well.

Still another adverse affect to wetlands was the expansion of aspen. Aspen invasion began by growing around

wetlands edges. As groves increased in size, some grew into wetlands, totally absorbing all water from the basins. Gradually aspen groves increased enough to transpose Lostwood's wetlands into an early stage of aspen parkland.

By the late 1980s, expanding mats of Kentucky bluegrass and smooth brome, and abundant yet increasingly decadent stands of snowberry were no longer providing the tall, dense nesting cover desired. These factors, and decreasing abundance and quality of wetlands were creating contrary conditions for the priority species: ducks. Other grassland wildlife were adversely affected, too. There were abundant numbers of sharp-tailed grouse in the early 1980s with almost one dancing ground per section, averaging about 14 males per ground. However, grouse began abandoning some dancing grounds when dense shrub and trees grew too near. Studies conducted in Canada indicated that when grounds were abandoned because of increasing woody cover, eventually a threshold of woody cover would be reached, and the grouse population would crash. Unfortunately, other dependent grassland wildlife were reduced or gone from the refuge: upland nesting shorebirds (upland sandpipers, marbled godwits, and willets), and endemic grassland passerines (e.g., Baird's sparrow and Sprague's pipit). Managing for tall, dense nesting cover over the entire refuge was adversely affecting the ecosystem's native flora



Upland nesting shorebirds were common nesters on Lostwood, but by the late 1970s few nesters remained due to the expansion of woody plants. Fortunately with the use of prescribed fire and prescribed grazing, marbled godwits (shown here), upland sandpipers, and willets returned.

and fauna.

In the mid 1970s, managers recognized refuge resources were going astray, and realized a change in the management strategy was needed. Fire, a major defoliation event that historically helped maintain the northern mixed-grass prairie, seemed appropriate. In 1975, the first prescribed fire was applied on the refuge. Unfortunately, managers expected instantaneous results. Two years after one prescribed burn, the prairie returned to pre-burn conditions and managers were discouraged. They failed to appreciate that it took over 70 years to arrive at the degraded prairie conditions and that just one burn would not restore a healthy, native mixed-grass prairie. More intensive management strategies were needed.

Northern mixed-grass prairies evolved with frequent wildfires and grazing by mas-

sive herds of bison. Unfortunately by the late 1970s, grazing was not an option because there was insufficient forage for cattle under the dense, abundant stands of snowberry. Fire seemed the most appropriate tool under these circumstances, but what timing and frequencies were needed? Literature was reviewed on ways to weaken undesirable plant species and increase desirable plant species. Managers learned as much as they could about the phenology of each plant to appropriately time each fire event in order to set back invasives and favor native vegetation. Incorporating the available scientific knowledge about reducing snowberry and aspen with fire, an intensive prescribed burning program began. It was soon evident that reversing the progression of the undesirable plant community would require three to four summer or early fall burns over five or

six years.

Woody plants were being reduced, but managers needed more information about Lostwood's flora and fauna community when it was added to the National Wildlife Refuge system in the early 1900s. Refuge historical records were found at the Smithsonian Institute, and along with other, early records, proved it was a grassland community with few woody plants, abundant ducks, upland nesting shorebirds, sharp-tailed grouse, and grassland passerines. Armed with that knowledge, managers developed new goals and objectives that included all prairie resources.

Amazingly, grassland wildlife quickly responded to repeated prescribed burns. There were significant increases in grassland passerines and upland nesting shorebirds, although little

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A Northwoods Serenade *continued from page 37*

had intended. Our feet were frozen in place by the sound and our conversation stopped mid-sentence.

I looked at Slaton. His mouth was aghast and his eyes had expanded to silver dollar size.

He asked, "Is that what I think it is?"

"That's exactly what you think it is!" was my hasty reply.

"I have never heard them howling in the wild before," Slaton said.

"Well," I answered, "I have...but never at two in the afternoon!"

The howlers were close, too. Based on my knowledge of the cover, I estimated the wolves were 100 to 125 yards away. Their serenade lasted for about four minutes, so ranging them wasn't difficult. We weren't able to see them in the woods. Perhaps the tag on Bess' eye was effectively laying down blood scent with every pass she'd made through the cover. A rush of reality set in as we considered how close we may have come to losing a dog. There were enough little knobs in the area we'd hunted to conceal our pursuers until they wanted to be seen.

We'll never know the wolves' intentions, but the howling may have been a call to the other members of the pack declaring their find.

As we drove off, we talked about what could have happened had we encountered the wolves while we were hunting. For Slaton, hearing howling wolves at close range was an incomparable experience. It's nice to send visitors home with a memory they can cherish in years to come. Well, that mission was accomplished.

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change in grouse numbers. Ducks were still abundant and nesting with good success.

Monitoring the plant community revealed native warm and cool season grasses and forbs were increasing, however not as rapidly as smooth brome. To return a native grassland ecosystem, fire alone would not be enough. Using cattle as a substitute for native bison, managers looked for ways to apply grazing regimes that benefited the native herbaceous plants. As they learned more about prairie restoration, managers began using a two-week, twice-over grazing rotation on management areas with at least three burns. This cattle rotation system was used for three years, then burned in the fourth or fifth year, rested one year, then the graze-burn cycle repeated. The grassland ecosystem was beginning to reappear. Gradually, native warm and cool season grasses and forbs increased, and introduced plants decreased. Over a 20-year period, snowberry cover decreased from about 80 percent to 10 percent, height was reduced by 50 percent, and number of green stems were reduced by about 20 percent. Aspen groves almost disappeared.

The wildlife community was responding to prairie management, too, based upon long-term population monitoring

of passerines, waterfowl, birds of prey, grouse, and more. For example, aspen groves were so significantly reduced that by 2000 the refuge's annual nesting densities of red-tailed hawks and great-horned owls, species that need trees for nesting and hunting, declined by 35 to 50 percent. Prescribed fire and prescribed

grazing continues today, gradually bringing back the northern mixed-grass prairie ecosystem and its native flora and fauna. If this intensive management continues for another 30 years, native vegetation will be restored, although some exotics will remain.

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be required of them if the lesser prairie-chicken becomes listed as threatened or endangered under the ESA.

Candidate Conservation Agreements with Assurances are a relatively new tool for declining species conservation. The ESA is perceived to be all about regulations and what people "can't do." However, Section 10 of the 1973 act pertains to what parties "can do" to provide a net conservation benefit to listed species. In this case, the USFWS will issue a draft incidental take permit to TPWD that will become effective if and when the lesser prairie-chicken is listed as threatened or endangered. The permit will provide TPWD and participating landowners with authorization for incidental take, or unintentional damage to the birds or their habitat. The permit would authorize incidental take of lesser prairie-chickens resulting from otherwise lawful activities such as crop cultivation and harvesting,

livestock grazing, farm equipment operation, and recreation. Also, the USFWS provides TPWD and cooperating property owners with written assurance that no additional conservation measures or additional land, water, or resource use restrictions, beyond those voluntarily agreed to and described in the wildlife management plans, will be required for 20 years beyond the date of listing.

To make sure that the CCAA is working, participating landowners agree to allow TPWD access to the enrolled lands to monitor lesser prairie-chicken populations and habitat. The department will prepare an annual report for the USFWS to document the status and progress of the conservation efforts. TPWD's goal is to enroll 1.2 million acres under this CCAA by 2030. If it is successful, this CCAA may become a model for similar agreements for the LPC or other declining grouse species in other states.