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# The Role of Working Lands in Providing Public Conservation Benefits

## PART I: A COLLECTION OF CASE STUDIES

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# INTRODUCTION

“Conservation means harmony between men and land,” Aldo Leopold noted in a 1939 address, *The Farmer as a Conservationist*. “When land does well for its owner, and the owner does well by his land; when both end up better by reason of their partnership, we have conservation. When one or the other grows poorer, we do not.” As Leopold described, it is in the best interest of owners of working lands to care for the land because they rely upon it for their livelihoods. Landowners’ bottom lines are tied to stewardship practices that balance land sustainability and economic viability. Their conservation efforts, therefore, benefit both the environment and their operations.

Privately owned farms, ranches, and forests, collectively known as working lands, are the cornerstones on which our nation was built. These lands not only produce much-needed food and fiber while sustaining rural economies, they provide many conservation benefits as well, including clean water, wildlife habitat, and ecological diversity. These benefits often extend beyond property lines, serving the interests of both landowners and the public. Working lands are able to provide these benefits because environmental stewardship often goes hand-in-hand with crop, livestock, and timber production.

Part I of this two-part collection on private conservation on working lands celebrates examples of ranchers, farmers, and timber producers managing their properties with a conviction for conservation. Their private efforts result in public benefits such as conserving endangered species, improving water quality and quantity, and stopping the spread of invasive species, among others, demonstrating how working lands play a crucial role in wider conservation goals.

While these case studies show conservation on working lands is possible, well-intentioned government policies can instead make it very difficult to landowners to engage in stewardship practices. Part II, *Policy Challenges to Conservation*, will explore several policies that counterproductively discourage environmental conservation on working lands. It will also pose potential reforms that would make it easier for more landowners to engage in conservation efforts similar to those discussed in these case studies.

## Contents:

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- Cheney Lake watershed improves water quality in Kansas (*Page 4*)
- Vermont Audubon Society fosters bird-friendly maple production (*Page 6*)
- Turkey Creek Ranch protects endangered species in Colorado (*Page 8*)
- South San Joaquin Irrigation District conserves water in California (*Page 10*)
- Controlled burning cultivates longleaf pine savannas in Louisiana (*Page 12*)



# CHENEY LAKE WATERSHED

## Local organization farms water quality in Kansas

Agriculture has been big business for farmers in South Central Kansas for decades. Today, thanks to an innovative partnership, farmers in the region are now producing another valuable output: clean water.

In the 1960s, the Cheney Lake Reservoir was constructed as part of a project to provide flood control, recreational opportunities, and fish and wildlife habitat, as well as supply drinking water to the city of Wichita over the coming century. The surrounding watershed is a fertile and agriculturally diverse region, supporting everything from small-scale dairies to commercial-scale croplands. It also provides 60 to 70 percent of the city's daily water needs.<sup>1</sup>

In the early 1990s, a problem emerged: Algae began to bloom in the reservoir, and Wichita's drinking water developed a strange taste. Excessive runoff of phosphorus and other nutrients applied to crops created the algal blooms, and erosion from farms and stream banks increased sediment buildup and reduced the reservoir's storage capacity. Residents, farmers, and the City of Wichita began to recognize that the region's water quality could no longer be taken for granted.

The environmental and economic costs of poor water quality were far reaching. Dirtier water increased water-treatment costs for the City of Wichita and also compromised the environmental quality of the watershed, harming local fish and wildlife habitat and limiting opportunities for recreationists.

In 1994, the Reno County Conservation District formed the Citizen Management Committee, a farmer-led organization tasked with implementing

a watershed plan to reduce sediment loading and phosphorus runoff by 40 to 45 percent.<sup>2</sup> The goal was to double the life of the reservoir. Five years later, the committee established the nonprofit Cheney Lake Watershed to provide education and assistance to landowners interested in improving water quality. The nonprofit works with farmers to inform and assist in the voluntary implementation of best management practices that can be incorporated into farming activities to protect water quality and prevent erosion. The aim is to improve water quality while preserving agricultural production.

Officials in Wichita understood that the city's water quality would improve and its water treatment costs would fall as more farmers implemented the best management practices, which include planting native grasses, creating waterway systems for livestock other than natural creeks, and wetlands development. To encourage the farmers to get on board, the city worked with the Cheney Lake Watershed to reimburse 30 to 40 percent of farmers' costs for the management projects. The city also funded up to 50 percent of the costs for landowners to install perimeter fencing to maintain grasslands established under the federal Conservation Reserve Program.<sup>3</sup>

The cost-share program took off. In the nearly two decades since the Cheney Lake Watershed was established, local farmers have implemented more than 2,000 management projects across 80,000 acres of the watershed.<sup>4</sup> The types of projects implemented on a given farm vary depending on the specific features and management of it, but many farmers are currently planting cover crops and converting to no-till farming practices to reduce erosion and phosphorous-laden runoff. The program continues to thrive today, completing



Prior to the partnership between the City of Wichita and area farmers, algae blooms often threatened the city's water supply (top left). Farmers in the Cheney Lake Watershed District manage their farmlands to produce clean water through an arrangement with the City of Wichita (top right). Cheney Lake Reservoir supplies much of the City of Wichita's drinking water (bottom).

50 to 75 projects each year with Wichita's financial assistance.<sup>5</sup> Though the success of these practices varies depending on rainfall patterns and weather events, the arrangement has been largely successful.

The City of Wichita reports fewer algal blooms in its water, and the Department of Health and Environment reports lower phosphorous levels in the reservoir.<sup>6</sup> The Cheney Lake Watershed also says its work is creating a culture of conservation among farmers by encouraging them to consider water quality in their operational decisions.

Not only has the cost-share arrangement between Wichita and farmers been good for the environment, it has also benefited both parties. Farmers improve their land-use practices and potentially increase their economic returns, while the city reduces water treatment costs and extends the lifespan of the reservoir. Through an innovative contracting arrangement, those who demand and supply water have collaborated to solve the problem of algal blooms in Cheney Lake and provide the City of Wichita with clean drinking water.



# VERMONT AUDUBON SOCIETY

## Group fosters bird-friendly maple production in Vermont

Maple syrup: It's no longer just for dowsing waffles. In recent years, culinary innovators have found more and more uses for the syrup in food products as diverse as candy, whiskey, and salad dressing. Vermont leads the way when it comes to satisfying America's syrup tooth—the state's \$330-million industry produces nearly half of the country's maple syrup.<sup>7</sup>

In response to the boom, maple farms in the Northeast, known colloquially as sugarbushes, have converted much of the region's native hardwood forests into monoculture stands of maple. While this transformation may have once been more efficient for maple producers, the lack of forest diversity makes life difficult for the more than 40 species of migratory birds that rely on Vermont's forests for habitat. Many of the state's birds depend on biologically and structurally diverse forests to provide forage, cover, and a place to raise their young, but maple-specific forests support relatively low numbers of birds and few bird species.

In an effort to promote bird habitat, the Audubon Society of Vermont initiated the Bird-Friendly Maple Project in 2014, whereby maple producers who diversify their sugarbushes and restore bird habitat can label and market their products under an Audubon bird-friendly label. According to the Audubon Society, diversifying just a quarter of trees in a sugarbush can provide safer and more sheltered homes for the dozens of species of migratory birds that visit the state's forests.

Wildlife-friendly programs are not a new concept in agriculture. For years, bird-friendly coffee and wildlife-friendly ranching labels have encouraged consumers to consider how animals are affected by the production of these products. As a conservationist

and manager of Audubon's own sugarbush, Steve Hagenbuch thought a similar labeling approach could be successful in managing sugarbushes for the vitality of birds, including the wood thrush and black-throated blue warbler, both of which are considered priority birds by the Audubon Society because of increasing threats to their habitat.<sup>8</sup>

The bird-friendly label is not easy to obtain. The Audubon Society assesses the state of a maple producer's sugarbush and its future bird habitat potential. Hagenbuch conducts field work, takes stock of existing forestry tactics, and recommends steps a producer can take to improve bird habitat. If a producer is willing to comply with the recommendations, he or she is given free advertising on the Audubon website and "Bird-Friendly Maple" labels to put on his or her products.

Currently, there are 18 sugarbushes designated as "bird friendly."<sup>9</sup> With the initiative in its infancy, the Audubon Society is still determining the best process to ensure farmers fulfill its recommendations, but the organization plans to reassess sugarbushes every five years. Through it all, Hagenbuch hopes that the bird-friendly program achieves proactive conservation—preserving and improving the homes of birds before they come under serious threat.

Though the program is only two years old, maple producers who have diversified their forests say that it is making a difference for birds. Matt Davis of Little Hogback Farm reports an increased awareness of birds on his 800-tap property.<sup>10</sup> Another producer, Steve Wheeler of Jed's Maple, led a bird walk on his property to raise awareness for birds and what it means to be a bird-friendly maple producer.



Bird-friendly maple producers can label their products with a special logo from the Vermont Audubon Society (top left). Black-throated blue warblers are among the birds protected by the Bird Friendly Maple Project (top right). Vermont maple producers are now spacing their trees less densely and collecting sap in a bird-friendly manner (bottom).

In addition to protecting birds, the project may be helping to protect maple trees by slowing the spread of an invasive beetle. The Asian longhorned beetle is a pest that kills many hardwood trees, including maple. Because the beetle spreads from tree to tree, planting softwood and non-maple trees throughout stands, as encouraged by the bird-friendly program, makes it more difficult for the beetle to move between the maples it targets, minimizing damage.

Maple producers may also stand to benefit from participating in the program. As bird-friendly, fair-trade, and organic labels have shown for products like coffee and chocolate, a segment of consumers are willing to purchase products at a premium if they are produced in ways that are sensitive to the

environment. The approach seems to be working for maple producers. Davis says he has received interest and inquiries about the program when customers see the bird-friendly label on his products.

Alas, new trees cannot grow overnight, and Hagenbuch is aware that progress is likely to be slow in making sugarbushes more bird friendly. However, he anticipates that the allure of doing good for the birds while doing well as a maple company will get more producers involved. With market-based solutions that improve the futures of both birds and maple producers in Vermont, the Bird-Friendly Maple Project has the potential to continue to win over economically savvy, environmentally conscious syrup producers.

# TURKEY CREEK RANCH

## Ranch helps protect endangered ferrets in Colorado

“**E**at well and prosper,” Gary Walker told a group of black-footed ferrets as he and federal and state wildlife officials turned them loose on his Colorado ranch. Plagued by an out-of-control prairie dog population eating the grass out from under his cattle, Walker turned to one of the prairie dogs’ few natural predators: the black-footed ferret. In 2013, under a Safe Harbor Agreement with the U.S. Fish and Wildlife Service, the ferrets were introduced on Turkey Creek Ranch, which provided valuable habitat for the endangered animals as they simultaneously began to rein in the destructive rodents.

Tucked between Colorado’s growing urban community of Pueblo West and the U.S. Army’s 137,000-acre Fort Carson, Turkey Creek Ranch is an oasis of intact natural landscapes, native wildlife, and open space. The ranch is a family operation devoted to raising cattle and preserving the natural resources in its care. Thanks to the efforts of the Walkers, Turkey Creek is now home to one of the largest black-footed ferret populations in the United States.

Walker’s father originally purchased the first portion of the ranch in 1963. Since then, the family has continued to consolidate neighboring ranches and protect them from the encroaching asphalt. The Walkers’ efforts have more than doubled the size of their landholdings since the 1990s, and the ranch now encompasses 65,000 acres—a sizable tract of open land in an area of increasing development.<sup>11</sup>

The Walkers have long worked to be good stewards of the land. In the 1990s, they discovered rare, indigenous plants—which are listed as endangered—growing in riparian areas of the ranch. They have since built 120 stock ponds and installed 12 solar-powered water pumps to keep cattle away

from the natural waterways where the endangered plant species are found.<sup>12</sup>

Turkey Creek Ranch is also home to many native animals, most noticeably the prairie dog. The rodents occupy more than 10,000 acres of the ranch, and even though prairie dogs are a natural part of the landscape, they can be destructive to pasture lands. “The grass grows back where my cattle graze,” said Gary Walker. “But where prairie dogs live the grass is completely destroyed, and it takes a long time to restore that land.”<sup>13</sup> Whereas cattle leave about an inch of grass in the ground when they graze, prairie dogs strip grass to bare dirt.

Walker estimated that by 2013, 10,000 acres of his ranch were unsuitable for cattle grazing because of damage wreaked by prairie dogs.<sup>14</sup> In response, the Walkers opened their ranch to the black-footed ferrets. A single black-footed ferret is capable of eating more than 100 prairie dogs per year, helping to limit the rodents’ population.

Black-footed ferrets were once thought to be extinct, until a ranch dog in Wyoming brought home a dead ferret in 1981. Wyoming wildlife authorities surveyed the area and found a small population of ferrets. The Wyoming Game and Fish Department and the U.S. Fish and Wildlife Service began a captive breeding program in 1985, helping restore the black-footed ferret population to nearly 800 across North America.<sup>15</sup> Wildlife officials are now working with landowners such as Walker to reintroduce the species to its native grassland habitat.

Because the ferrets are listed under the Endangered Species Act, the Walkers faced a challenge in introducing them to Turkey Creek Ranch. Under the act, the federal government can impose strict





Gary Walker releases a black-footed ferret onto his ranch in Colorado (left). Black-footed ferrets face the threat of extinction, but they're finding new homes on private lands (right).

mandates when an endangered species is found on private property, and landowners can be held liable for any harm that comes to the species—a potential problem for the Walkers, whose livelihood relies on running livestock on the same ground where the ferrets would live.

To reduce their risk of having their ranching operations curtailed in the name of protecting the ferrets, the Walkers established a Safe Harbor Agreement with the Fish and Wildlife Service. Under the arrangement, the Walkers would be liable if they purposely killed ferrets, but the family is protected if ferrets are accidentally killed in the general use of their land.

In 2013, Turkey Creek Ranch became the first active black-footed ferret relocation site in Colorado. Fifty-five ferrets, each microchipped to allow scientists to monitor the progress of the colony, were released over a 4,000-acre area to ensure that each breeding pair had enough room to roam.<sup>16</sup>

Successful ferret reintroduction is notoriously difficult. Once the multi-year process of creating a Safe Harbor Agreement is completed and the animals are actually reintroduced, two-thirds of all males and half of all females released in reintroduction

efforts die within the first year, and disease and drought also affect a population over the longer term. Today, 15 ferrets remain on Turkey Creek, and the Fish and Wildlife Service considers the reintroduction a success. It plans to release more ferrets to help boost the population to a more sustainable level of 30 ferrets.<sup>17</sup>

In an area threatened by expanding development, the Walkers have preserved their ranch as a home for both cattle and endangered species. The introduction of the endangered black-footed ferret on Turkey Creek Ranch demonstrates that wildlife and ranching can be mutually beneficial. Through a creative solution to the overabundance of prairie dogs, both the ferrets and cattle now have plenty to eat.

# SOUTH SAN JOAQUIN IRRIGATION DISTRICT

## Irrigation district conserves water in California

As much of California's Central Valley shriveled from the recent drought, one irrigation district remained green with almond trees and grapevines. Five years ago, the South San Joaquin Irrigation District switched from water-intensive canal delivery and field flooding to a pressurized irrigation system that conserves water while allowing farmers greater control over their water usage. The result: While other farmers' fields turn to dust, this community is producing 30 percent more crops with 30 percent less water.<sup>18</sup>

Historically, the district used an open canal system built in 1909. Gravity delivered surface water from nearby hills into a district reservoir and then to farmers. The irrigation district would forewarn farmers when it turned on the system, and gravity would send water down open-air canals to flood their fields. Because farmers had little control over when they had access to water, they would frequently overwater when they had the chance to irrigate. The water that was not absorbed during the flooding would run off into other waterways, often taking fertilizer chemicals with it.

Farmers disliked that they had little control over when they could irrigate, so many of them instead relied on diesel generators to pump groundwater up from private wells. But this was an imperfect solution—the groundwater was of poor quality, and the salinity was not ideal for the almonds and fruit grown in the region. To make matters worse, the diesel generators emitted exhaust, contributing to an air pollution problem in the area that was already significant.

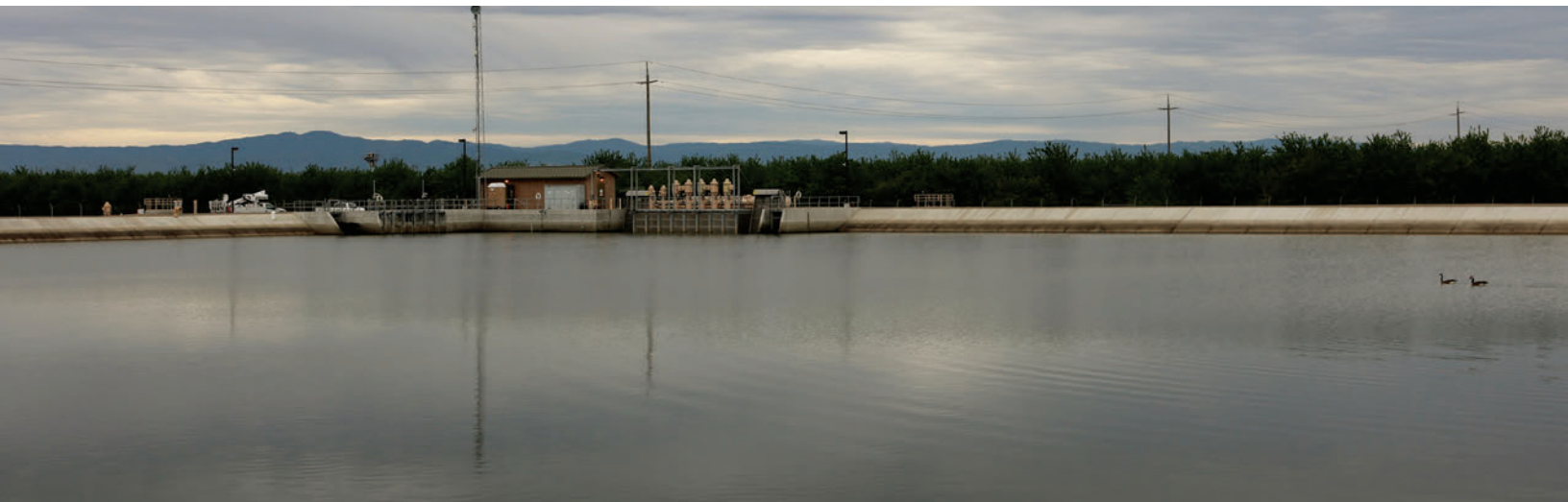
In 2012, the irrigation district realized it was time to explore alternatives that could conserve water and provide farmers with greater flexibility for irrigation schedules. The district decided to install

a pressurized, on-demand delivery system on 3,800 acres of irrigated land as a pilot project.<sup>19</sup> The new system pumps water from the reservoir through pipelines to individual fields, where sprinklers and drip systems are now used to irrigate crops, avoiding the wasteful flooding of the past. Moisture sensors are embedded in the earth, and farmers can use smartphones or computers to check the levels in real time. If moisture levels look low, farmers no longer have to wait until the next time the gravity-flow system is turned on to irrigate—they can instead go online and immediately order more water for irrigation.

Many farmers were initially hesitant to implement the new approach because it came with a cost. The \$14 million pressurized system was largely paid for by revenue from existing hydropower plants that the irrigation district had installed on its reservoir, but farmers still had to pay a portion of the cost to install these new technologies on their individual fields. Farmers who elected to link their land to the new system paid the district \$2,500 for equipment and installation—with the district covering an additional \$37,500 cost per farm. In addition, the base cost of pumping water increased from \$24 to \$30 per acre for farmers who adopted the pressurized system.<sup>20</sup>

In the end, the amount of water conserved—and, as a result, the extra money left in farmers' pockets—has changed many opinions on the new system. The adoption of a pressurized irrigation system has saved about 12,500 acre-feet of water each year by preventing it from evaporating, spilling out of open canal systems, or overwatering cropland.<sup>21</sup> Now, even though the irrigation district has stopped helping cover the costs, many farmers have proven willing to pay the full \$40,000 for the infrastructure to hook into the pressurized system.





The pressurized water system in the South San Joaquin Irrigation District allows farmers there to grow 30 percent more crops with 30 percent less water (top left). Workers install a pressurized water system (top right). Despite drought, the South San Joaquin Irrigation District was able to ensure its farmers had ample water (bottom).

In the future, the South San Joaquin Irrigation District would like to expand the pressurized system throughout the entire district by piping its open canals, but the endeavor would cost \$300 million. To raise the money, the irrigation district would ideally trade some of its excess water to other districts downstream, whose farmers pay as much as \$1,200 per acre-foot.<sup>22</sup> The scheme would help allocate water to areas where it is exceptionally scarce, while also funding conservation efforts in the San Joaquin. Unfortunately, the plan is on hold because California's complicated and lengthy regulations on trading water make it incredibly difficult to transfer water between irrigation districts.

Even at its small scale, the conservation benefits of the district's pressurized system have had a big impact. It has conserved immense amounts of water, and more direct irrigation means less chemical runoff from fertilizers, benefiting farmers downstream. In the midst of the recent drought, crops in the San Joaquin flourished, and farmers found themselves with more cash in their pockets thanks to reduced water costs and increased profits. As we continue to face water shortages, the efforts by the South San Joaquin Irrigation District provide an example of how to improve water quantity and quality while still providing for agricultural needs.

# DAIGLE RANCH

## Controlled burning cultivates longleaf pine savannas in Louisiana

“The ranch is a great place to raise cattle, timber, kids, and a lot of special plants and animals,” says Louisiana rancher David Daigle.<sup>23</sup> A direct descendant of early Cajun settlers who grazed their livestock on the South’s longleaf pine savannas, Daigle now manages his own ranch with the aim of restoring the native trees that once dotted the landscape. By balancing ranching with longleaf pine conservation, he is helping protect one of the United States’ most threatened ecosystems and the dozens of endangered species that call it home.

Until European settlers arrived, longleaf pines dominated the coastal plains from Virginia to Texas, but they were quickly cleared by settlers, largely to be used in shipbuilding. In recent decades, many landowners have replaced longleaf pine stands with field crops or faster-growing commercial species like loblolly pine, fragmenting a specialized habitat. Today, less than 4 percent of historic longleaf pine forests remain.<sup>24</sup>

Daigle describes a longleaf savanna as “a prairie with trees.” Whereas the densities associated with many other tree species often crowd out undergrowth, longleaf pine stands are much less dense than stands of other species. Their small crowns allow sunlight to reach the ground, yielding a lush herbaceous layer. This diverse ecosystem supports up to 40 species per square yard and provides habitat for nearly 30 threatened or endangered species, including the red-cockaded woodpecker.<sup>25</sup>

In 1982, Daigle acquired his first 80 acres of land. Most of it was loblolly pine forest, but he quickly began to plant longleaf pine seedlings to restore the native habitat. His holdings have since grown to 1,400 acres of longleaf pine habitat, much of which is considered wetlands.

Daigle’s cattle benefit from the longleaf savannas. Cattle are considered to be “compatible grazers” with the longleaf ecosystem because with carefully managed stocking rates and proper rotation their hooves and grazing stimulate the herbaceous layer without destroying it. Daigle is careful to make sure that he runs the appropriate amount of cattle for the right length of time to avoid negative effects of overgrazing. Currently, he has 90 head of cattle and typically averages about one cow per 15 to 25 acres of grazable land, which maximizes benefits for the longleaf pines.<sup>26</sup>

A healthy longleaf pine forest is a mix of old and young trees, with some trees over a century old. To maintain a healthy forest, Daigle thins his tree stands to create openings to allow for new growth. Trees that are harvested during thinning are high quality and are sold to be used as poles, beams, and flooring. This timber brings in revenue for the ranch while also improving forest health.

Even with efforts to restore longleaf pine savanna through cattle grazing and timber thinning, brush and invasive Chinese tallow trees threaten the landscape. To combat these threats and manage overgrown areas, Daigle uses prescribed burning. Longleaf pines are extremely resistant to fire, so burning the undergrowth clears the land while also recycling nutrients, promoting plant diversity, and creating new growth for wildlife. Daigle tries to burn two or three times in a five-year period, and for each fire he creates a management plan, including smoke management, to minimize the chance a fire grows out of control. The prescribed burns also reduce wildfire fuel, mitigating fire risk for the public.

The prescribed burning, along with applications of a targeted herbicide, keep the invasive Chinese





Recruitment clusters provide valuable habitat for the endangered red-cockaded woodpecker (left). Controlled burns can help control invasive species and promote healthy rangeland (center). Longleaf pine trees flourish on the Daigle ranch (right).

tallow from encroaching onto his longleaf pine savannas. The tallow is an incredibly resilient tree that can quickly crowd out pines, meaning less grass for livestock and other wildlife, less harvestable timber, and less habitat for endangered woodpeckers. Daigle says that without active management, the tallow would completely take over the native landscape. Thus far he has been successful, but he warns that it is a mighty task.

The work Daigle has done to create healthy longleaf pine savannas also provides valuable habitat for the endangered red-cockaded woodpecker. The woodpecker's traditional habitat was the longleaf pine, but as the pines were cut and replaced with fast-growing trees or crops, the bird's population declined drastically. Because the woodpecker prefers the dispersed longleaf that grow on southern savannas, Daigle's efforts have created excellent habitat for the bird.

In fact, even though the Endangered Species Act imposes stringent restrictions on the habitats of most species it protects, the U.S. Fish and Wildlife Service encourages forest thinning to create better red-cockaded woodpecker habitat. The agency has found that because of the unique qualities of longleaf pine savannas, there are many ways to harvest timber that are not only consistent with

the woodpecker's natural needs but also sometimes necessary to maintain the open conditions the bird requires.

Daigle has also installed recruitment clusters, which are roosting sites prepared for the endangered woodpecker, by inserting artificial nest cavities into trees. The goal is to attract the woodpeckers to a safe and healthy habitat. The recruitment clusters on Daigle's property have attracted the red-cockaded woodpecker to his trees, where the birds have been photographed.

The ranch is also home to the American chaffseed, an endangered herb found in open, moist pine woods and fire-maintained savannas—the exact habitat on Daigle's ranch. Chaffseed plants grow on a specific tract of the ranch, where they're protected from grazing and human disturbance.

Daigle manages his ranch as an integrated system, realizing that when he conserves his land, it's more productive. By restoring longleaf pine savanna, he is not only restoring one of the most imperiled ecosystems in the world but also providing for his family, supplying the public with food and timber, reducing wildfire risk, and preserving two endangered species. On Daigle's ranch, doing good for the environment means doing well for the business.

# CONCLUSION

As these case studies demonstrate, working lands are in a powerful position to provide valuable conservation benefits. Landowners have the power to conserve endangered species, improve water quality and quantity, and stop the spread of invasive species. As we continue to pursue solutions to environmental problems, it is essential to involve working lands and reward landowners for their vital role in privately supplying environmental benefits to the public.

Unfortunately, these lands and their valuable role in environmental conservation are under threat. More than one acre of working land is lost per minute to fragmentation and conversion.<sup>27</sup> This loss has negative implications for natural resource conservation and the ecosystem services provided to the public from working lands. Often, government policies aimed at preserving the environment are filled with complex regulations, unnecessary red tape, and burdensome taxes that undermine property rights and increase the cost of environmentally conscious business decisions on working lands.

Part II of this collection, Policy Challenges to Conservation, examines the regulatory obstacles the subjects of these case studies were able to overcome and how we can reduce regulatory barriers to encourage more private conservation on working lands.

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