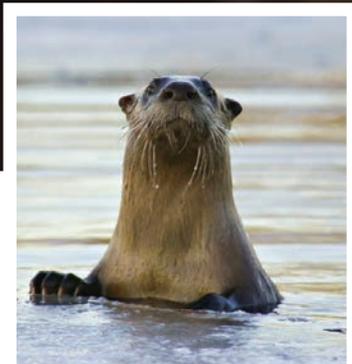




# The Nebraska Natural Legacy Project Nebraska Environmental Trust Final Report April 2010-June 2013



See You Out There





# The Nebraska Natural Legacy Project Nebraska Environmental Trust Final Report April 2010-June 2013

## Mission Statement

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The Mission of the Nebraska Natural Legacy Project is to implement a blueprint for conserving Nebraska's flora, fauna and natural habitats through the proactive, voluntary conservation actions of partners, communities, and individuals.

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# Executive Summary

The Nebraska Natural Legacy Project (Legacy Project) has developed an effective structure of partnerships that implement voluntary, incentive-based conservation actions for the benefit of at-risk species and many common species. Ground-level habitat delivery is focused primarily in Biologically Unique Landscapes (BUL) and orchestrated by Coordinating Wildlife Biologists (CWB). These local Coordinating Wildlife Biologists rely on collaboration with landowners and partners to accomplish large-scale habitat improvements across fence lines.



The objectives for this grant were to implement conservation projects on private and public lands; conduct education and outreach; and inventory and monitoring to better inform conservation.



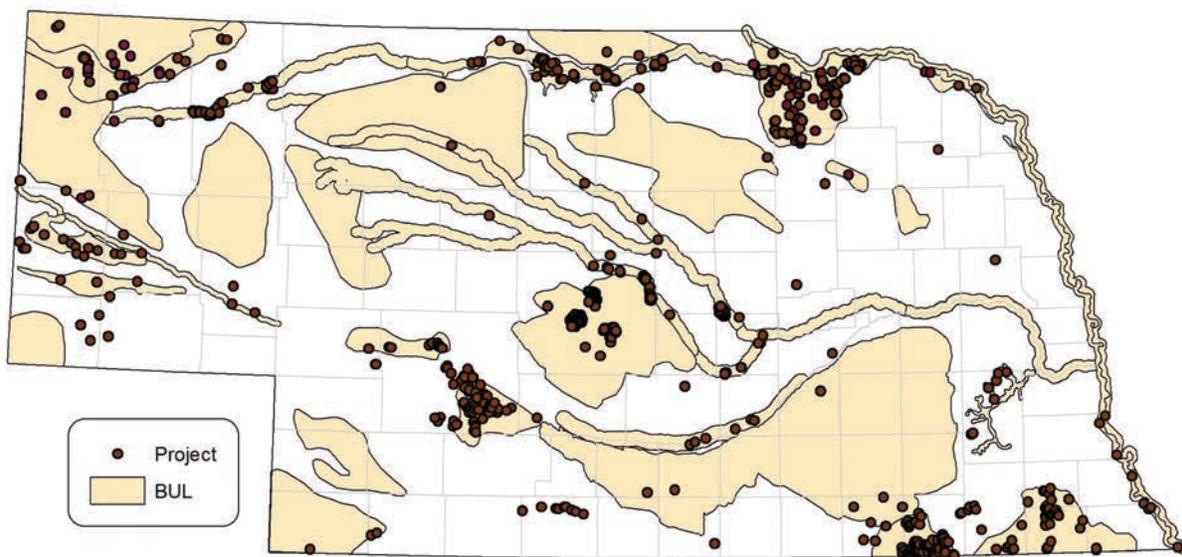
## Executive Summary

**Objective 1: Implement Legacy Project conservation actions on private lands and conservation lands in Biologically Unique Landscapes. This grant will enhance approximately 75,000 acres of at-risk species habitat statewide.**

Some of the most common actions include invasive species removal, re-introducing natural disturbance such as prescribed fire and modifying existing management tools such as grazing. Prescribed fire is a controlled version of the historic disturbance that maintained the grasslands and can be a valuable tool to control the encroachment of invasive or undesirable species. In some of Nebraska's forests, tree densities have increased significantly. Tree thinning restores the understory community, retards the spread of the devastating diseases and destructive insects, and reduces wildfire risk. Conservation actions also include wetland restoration and riparian corridor improvements. Although conservation actions are designed for at-risk species, habitat restoration benefits the more common species as well.

### Accomplishments:

- **197,600 acres enhanced (96% private land)**
- **426 projects**
- **260 landowners engaged in projects**
- **Habitat improved for 89 at-risk species**



**The map shows locations of habitat projects, 96% of which are on private lands. Actions reach across the state, but are focused in Biologically Unique Landscapes.**

## Executive Summary



These photos show the “before and after” contrast on a severely cedar-encroached area overlooking the Niobrara River near Meadville. Marketable products such as cedar logs and fence posts were harvested, and the slash was mulched, also yielding a marketable product and eliminating the need for burning piles. Following completion of cedar removal, prescribed fire will be used to maintain the open grassland.

Historically, most fires consumed and prevented invasive tree encroachment over many thousands of acres. Contemporary prescribed fires are rarely larger than a couple hundred acres, however across Nebraska there is a growing interest in safely implementing prescribed fire among local landowners. With an increasing cultural acceptance of prescribed fire, landowners are cooperating not only with resource professionals, but also with each other. This photo is from the Prescribed Fire Training Exchange which was supported by the Legacy Project to capitalize on expertise from outside Nebraska’s border. In the Exchange Program, firefighters from all over the country, and beyond, assemble to conduct prescribed burns that may be 5,000 acres in size across multiple private land properties.



# Executive Summary

## Objective 2: Implement a statewide conservation toolbox through the Legacy Partnership Team for on-the-ground conservation projects.

Conservation of Nebraska’s biodiversity is a task larger than the resources of any one organization, community or individual. Therefore, successful development and implementation of the Natural Legacy Project is driven by collaborative partnerships. The Natural Legacy Partnership Team is integral to implementation of the Natural Legacy Project. This team reached to new partners and developed criteria for “innovative” projects.

**Accomplishments:**  
**Five diverse projects were accomplished from the Panhandle to the Missouri River that engaged new partners.**

<b>Natural Legacy Partnership Team</b>		
<b>Audubon Nebraska</b>	<b>Nebraska Corn Growers Association</b>	<b>Nebraska Wildlife Society</b>
<b>Ducks Unlimited, Inc.</b>	<b>Nebraska Department of Agriculture</b>	<b>Pheasants Forever, Inc.</b>
<b>Farmers Union</b>	<b>Nebraska Farm Bureau</b>	<b>Ponca Tribe of Nebraska</b>
<b>Nebraska Alliance for Conservation and Environment Education</b>	<b>Nebraska Forest Service</b>	<b>Rainwater Basin Joint Venture of Nebraska</b>
<b>Nebraska Association of Resources Districts</b>	<b>Nebraska Game and Parks Commission</b>	<b>Sandhills Task Force</b>
<b>Nebraska Bird Partnership</b>	<b>Nebraska Land Trust</b>	<b>The Nature Conservancy</b>
<b>Nebraska Cattlemen</b>	<b>Nebraska Soybean Association</b>	<b>USDA Natural Resources Conservation Service</b>
<b>Nebraska Corn Board</b>	<b>Nebraska Wildlife Federation</b>	<b>US Fish and Wildlife Service</b>
		<b>US Forest Service</b>

## Executive Summary



*Nearly one-and-a-half miles of Upper Niobrara River and Box Butte Creek stream bank were restored in 2011 by a partnership of Rocky Mountain Bird Observatory, Nebraska Game and Parks Commission, U.S. Fish and Wildlife Service, Natural Resources Conservation Service, Playa Lakes Joint Venture and Sandhills Task Force. The photo shows members of the Pine Ridge Job Corps planting native willows where not long ago there was invasive Russian-olive.*

## Executive Summary

### Objective 3: Implement education and outreach directed towards biodiversity conservation and sustainable land and water management

Education and outreach programs build value for Nebraska's biodiversity and are tailored to reach different audiences. Nebraska's children need to experience and learn about Nebraska's natural resources such as prairies, rivers and woodlands. Landowners and local communities need opportunities to learn about programs and resources available to assist them in managing wildlife habitat. Workshops and seminars provide opportunities for landowners, conservation practitioners and researchers to share recent advances in management and science.

**Accomplishments:**  
**14,700 students, landowners, practitioners, educators and individuals from the public were reached through Natural Legacy education and outreach programs**



## Executive Summary

### Objective 4: Inventory for at-risk species and habitats and evaluate of conservation actions

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Delivering efficient and effective conservation means that there is a constant need to further our understanding of at-risk species, and their habitat requirements and to evaluate the effectiveness of our conservation actions. The research and inventory conducted is changing conservation action delivery. Many of the projects initiated during this grant will continue over the next several years.

**Accomplishments:**  
Eleven projects have influenced how conservation action is delivered among partners. The information from this grant will continue to impact future actions.



*Coordinating Wildlife Biologist Ben Wheeler ages an endangered Least Tern egg.*

# Executive Summary

## Contributing Match

It is difficult to separate one partner from the collective group, but two partners pledged match to this Nebraska Environmental Trust Grant: the Natural Resources Conservation Service (NRCS) and the U.S. Fish and Wildlife Service. The NRCS has integrated the Natural Legacy Project into Farm Bill programs through an Environmental Quality Incentives Program (EQIP) Special Initiative. Beyond the Special Initiative the NRCS is a strong partner in providing quality habitat for at-risk species. The U.S. Fish and Wildlife Service is also a strong partner and works collaboratively on the ground, but also in planning and establishing goals at the BUL level.

## Partner Contributions



- **118,000 acres improved**
- **Valued at \$1,468,300.00**



- **33 Total Projects**
- **Valued at \$383,400.00**

## Objective 1: Implement Legacy Project conservation actions on private lands and conservation lands in Biologically Unique Landscapes with ongoing partnership efforts or where new efforts will be developed

The Nebraska Natural Legacy Project (Legacy Project) has developed an effective structure of partnerships that implement conservation actions that collectively improve over 70,000 acres annually for the benefit of at-risk species and many common species. Ground-level delivery is based on specific conservation actions in Biologically Unique Landscapes (BUL) identified in the Legacy Project. Conservation actions for the Legacy Project are always voluntary and incentive-based. Successful delivery of habitat improvements is orchestrated by Coordinating Wildlife Biologists (CWB), that serve in partnership positions with Pheasants Forever, Inc., Quail Forever, Inc., Rocky Mountain Bird Observatory, and Northern Prairies Land Trust. Through the leadership of the CWBs, large-scale habitat improvements are accomplished across fence lines, and limited resources are stretched by leveraging various funding sources and engaging multiple partners.

### Pine Ridge, Oglala Grasslands, Panhandle Prairies, and Upper Niobrara River Biologically Unique Landscapes

In these BULs, nearly 20,000 acres were affected and numerous at-risk species benefited. The Oglala Grasslands and Panhandle Prairies BULs are relatively intact rolling hills in the Panhandle. The Pine Ridge BUL has a rocky escarpment that rises several hundred feet from the surrounding plains covered in ponderosa pine woodlands, forest

and mixed-grass prairie. The Upper Niobrara River occupies the Niobrara River channel, and a two-mile wide buffer on each side of the river. Here, the Niobrara River is a narrow, coldwater stream with an open, gently sloping valley with few trees.

#### Acres of Improved Habitat

- Upper Niobrara River: 12,000
- Pine Ridge: 6,700
- Panhandle Prairies: 470
- Oglala Grasslands: 300

Total Projects: 47

Number of Landowners engaged in projects: 35

In the Upper Niobrara River BUL alone, an ongoing, partnership-driven project of note has seen the restoration and enhancement of 7,744 acres and more than 15 miles of the Niobrara River and its tributaries. This is contributing to goals set in the Legacy Project and the specific plans of partners, such as the BCR-18 Area Implementation Plan from Playa Lakes Joint Venture, for species of high conservation priority including Long-billed Curlew, Short-eared Owl, and Grasshopper Sparrow. Similar efforts are on-going in the Pine Ridge, Oglala Grasslands, and Panhandle Prairies BULs with unique habitats and species benefiting from targeted conservation action in each. The momentum gained during the last 3 years will undoubtedly lead to expanded and improved activity throughout the Shortgrass Prairie Region. Landscape level planning is newly underway for the Pine Ridge Biologically Unique Landscape. The CWB in the region, along with conservation partners and other stakeholders, have begun the process of strategically considering at-risk species and natural communities in the BUL,

identifying which are a priority and establishing landscape goals to meet the needs of those selected priorities.

**In winter of 2012 and 2013, several agencies worked together to create seed blocks that would be distributed throughout the burned areas of the Pine Ridge. These blocks consist of a mixture of evergreen, deciduous trees, and shrub species that are native to the area, as well as molasses, minerals and grains to create an attractant to local wildlife. Approximately 600 seed blocks were distributed to private landowners. The success rate is unknown, but trail cameras documented use by deer (both muledeer and whitetails), coyote, fox squirrel and turkey.**

The primary partners for project delivery include multiple landowners, volunteers and members from the following organizations: Rocky Mountain Bird Observatory, Natural Resources Conservation Service, Natural Resource Districts (NRD), U.S. Forest Service, Nebraska Forest Service, U.S. Fish and Wildlife Service, Sandhills Task Force, UNL-Extension, Playa Lakes Joint Venture, The Nature Conservancy, county weed boards, Rocky Mountain Elk Foundation, National Wild Turkey Federation, Pheasants Forever, Inc., and Platte River Basins Environments.



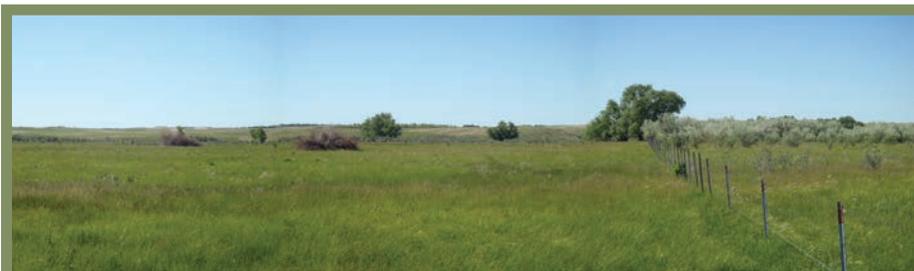
*You can see this forest through the trees thanks to a recent ecologically-sensitive tree thinning. This conservation strategy identified in the Legacy Project addressed a stress to many at-risk wildlife species because of increased densities of ponderosa pine.*



*Jean Parker of Cross L Cattle Ranch on the Upper Niobrara River receives the 2010 Nebraska Bird Partnership's Land Stewardship Award from Andrew Pierson and Shelly Stolley. Jean has worked with the regional CWB to improve her ranch for wildlife and provided access for monitoring of at-risk species. She has also hosted a landowner workshop.*

***"I've always felt that bird and wildlife conservation is important, and I like the fact that RMBO [via work with CWB] helps landowners protect birds. They have been instrumental in helping me protect the ecosystem I have here. Through my association with RMBO, I am now much more knowledgeable, appreciative, and adamant about protecting the land."***

***Jean Parker***



*The removal of invasive plant species such as Russian-olive is a conservation priority in the Upper Niobrara River BUL. Here is a restored Niobrara River wet meadow on the left and the preconditioned exotic riparian shrubland still represented on the adjacent property.*

## At-Risk Species that benefited from conservation actions:

### Upper Niobrara River:

Bald Eagle  
 Bell's Vireo  
 Brewer's Sparrow  
 Burrowing Owl  
 Ferruginous Hawk  
 Loggerhead Shrike  
 Long-billed Curlew  
 Short-eared Owl  
 Swainson's Hawk  
 Blacknose Shiner  
 Finescale Dace  
 Pearl Dace  
 Plains Topminnow  
 Regal Fritillary  
 Black-tailed Jackrabbit

Long-tailed Weasel  
 Northern River Otter  
 Swift Fox  
 White-tailed Jackrabbit

### Pine Ridge:

Bell's Vireo  
 Black-billed Magpie  
 Brewer's Blackbird  
 Brown Creeper  
 Cassin's Kingbird  
 Ferruginous Hawk  
 Golden Eagle  
 Lewis's Woodpecker  
 Loggerhead Shrike  
 Prairie Falcon

Pygmy Nuthatch  
 Townsend's Solitaire  
 Violet-green Swallow  
 Tawny Crescent  
 Fringed Myotis  
 Long-legged Myotis  
 Rocky Mountain Bighorn Sheep  
 Townsend's Big-eared Bat

### Panhandle Prairies:

Ferruginous Hawk  
 Plains Topminnow

### Oglala Grasslands:

Ferruginous Hawk



*The addition of this simple solar-powered well and livestock tank provided an alternative water source away from Sheep Creek in the Panhandle Prairies BUL. This allowed the landowner to exclude the creek from excess livestock pressure and improve habitat for at-risk species known to exist in the creek such as Plains Darter, Orangethroat Darter and Tier 1 Plains Topminnow.*

*The CWB helped build 312 wildlife escape ladders with the Nebraska Prairie Partners for use in the Kimball Grasslands BUL. Another 300 ladders were built via contract for use in the Northern Panhandle BULs. A cooperative project with the U.S. Forest Service also saw the production and installation of tank ladders into the 1100 livestock tanks on National Forest and Grassland properties in the state.*

## Central Loess Hills and Lower Loup Rivers Biologically Unique Landscapes

Conservation activities in the Central Loess Hills and Lower Loup Rivers Biologically Unique Landscapes have been very dynamic since the inception of the Legacy Project. The landscape consists of rolling to steep loess hills with a mosaic of mixed-grass prairie and cropland, dissected by the valleys of the Loup Rivers. Many grassland and wetland Legacy Project agreements have been initiated. Grassland projects usually feature practices such as invasive tree removal, grazing management, and prescribed fire, while our wetland projects often contain excavation of silt from wetland sloughs, seeding, invasive tree removal, grazing management, and prescribed fire. In fact, we have observed Greater Prairie-Chickens performing spring displays in areas that were not being used by prairie grouse prior to our projects and Whooping Cranes using some of

our wetland projects as stopover sites during spring migration. Overall, the Legacy Project has impacted over 32,000 acres through projects ranging from technical advice about grassland management for at-risk wildlife, to land tracts included in the popular Prescribed Fire Training Exchange. The monitoring activities that have been performed have been critical in prioritizing areas for conservation projects and initiatives. For example, many of the areas selected for the Prescribed Fire Training Exchange are based upon models developed from Prairie-Chicken monitoring in the Central Loess Hills. In the future, we are looking to further refine our monitoring, which will allow us to select with more confidence the best areas to be implementing conservation. Monitoring will also identify the most appropriate individual practices that will provide the most effective and efficient biological response for Legacy Project species and leverage the energy that we are already injecting into the Central Loess Hills.

*Members of the Central Nebraska Prescribed Burn Association conduct a prescribed fire in Howard County. Historically, most fires consumed and prevented invasive tree encroachment over many thousands of acres.*

### Central Loess Hills

- Acres of Improved Habitat: 32,000

**Total Projects: 140**

**Number of Landowners engaged in projects: 94**



The primary partners for project delivery include multiple landowners, volunteers and members from the following organizations: Natural Resources Conservation Service, Pheasants Forever, Inc., Tern and Plover Conservation Partnership, U.S. Fish and Wildlife Service, Rainwater Basin Joint Venture, The Nature Conservancy, Prescribed Burn Task Force, and the Custer Prescribed Burn Association.

### At-Risk Species that benefited from conservation actions:

Northern River Otter  
Bell's Vireo  
Greater Prairie-Chicken  
Whooping Crane  
Blanding's Turtle  
Plains Topminnow  
Ottoe Skipper  
Regal Fritillary  
Piping Plover  
Least Tern  
Small White Lady's Slipper  
Bald Eagle  
American Wigeon  
Sharp-shinned Hawk  
Swamp Sparrow  
Plains Minnow  
Prairie Kingsnake



*Invasive woody plants are sprayed with herbicide from an amphibious applicator along a Middle Loup River wetland project.*

*A tree removal contractor cuts invasive eastern red-cedar trees on a project site along the Middle Loup River in Custer County.*



*Piping Plovers are closely monitored at facilities for sand and gravel mining in cooperation with the Tern and Plover Conservation Partnership. Biologists have positive working relationships with managers and staff at these facilities to ensure that terns and plovers are able to complete nesting while mining activities can continue in a manner that does not disrupt the birds.*

## Loess Canyons Biologically Unique Landscape

### Loess Canyons

• Acres of Improved Habitat: 49,400

Total Projects: 45

Number of Landowners engaged in projects: 40

The Loess Canyons Biologically Unique Landscape also has a long history of successful conservation implementation. This landscape consists of steep loess hills and canyons that support mixed-grass prairie that has been highly invaded by cedar trees in recent decades. In this landscape, the CWB, in cooperation with partners, works collaboratively with landowners to develop a plan and actions focused on responsible stewardship and sustainable production. Projects are often designed to restore grasslands by removing invasive trees. Many projects include planning and implementing fire-breaks so they can conduct prescribed burns. Other practices include tree cutting, rest-rotation grazing systems, and invasive species control. As a result, tens of thousands of acres of native prairie have been restored and 27 wildlife species of concern have found refuge in the diversity of restored prairies and woodlands.

*"I think one of the greatest things we have fostered in the Canyons is relationships. I am consistently amazed at the level of trust and functionality of the relationship between conservation partners and ranchers. They trust partners to come through with things like money, equipment, training, and technical advice. The partners trust landowners to follow through with projects, restore and maintain diverse wildlife habitat, commit to sustainable practices, and provide honest feedback about what they need, what works, and what doesn't work. As a result, the landowners are taking genuine value in not only game species, but also endangered species. They take pride in not only a productive ranch, but a sustainable ranch." Andy Moore, Coordinating Wildlife Biologist*

Legacy Project implementation has a very strong start in this BUL and great accomplishments. There are an increasing number of ranchers that use fire as a management tool, and there is a growing interest in the removal of cedar trees. Future actions will address the challenges of invasive grasses and provide the knowledge and tools to manage them. Using developed tools such as "GIS tree canopy cover estimation", biologists will increase the effectiveness of conservation delivery. Ranchers are engaged in developing management necessary to pass on a diverse, healthy, functioning ranch to the next generation. The future of conservation in the Loess Canyons BUL will involve actions already underway, but on a larger scale, with more people,

### At-Risk Species and focus species that benefited from conservation actions:

Bell's Vireo  
Swainson's Hawk  
Ferruginous Hawk  
Golden Eagle  
Prairie Falcon  
Merlin  
Northern Saw-whet Owl  
Greater Prairie-Chicken  
Northern Bobwhite  
Long-billed Curlew  
Barn Owl  
Burrowing Owl  
Short-eared Owl  
Loggerhead Shrike

Savannah Sparrow  
Scissor-tailed Flycatcher  
Black-billed Magpie  
Black-tailed Jackrabbit  
Plains Pocket Mouse  
Plains Harvest Mouse  
Hispid Cotton Rat  
Eastern Woodrat  
Elk  
Speckled Kingsnake  
American Burying Beetle  
Regal Fritillary  
Whitney's Underwing  
Married Underwing

more efficiently and with more focus. Management of species of conservation need means engaging people in a meaningful way; one project at a time, one landowner at a time, one workshop at a time.

The primary partners for project delivery include multiple landowners, volunteers and individuals from the following organizations: Pheasants Forever, Inc., Quail Forever, U.S. Fish and Wildlife Service, Natural Resources Conservation Service, Twin Platte NRD, Ecosystem Management Research Institute, North American Grouse Partnership, Farm Service Agency, UNL Extension, Loess Canyon Rangeland Alliance, Prescribed Burn Task Force, The Nature Conservancy - Prescribed Fire Training Exchange, U.S. Forest Service, Nebraska Forest Service, Colorado fire camp, Nebraska Land Trust, and multiple contractors.



Loess Canyons BUL contains one of the largest known populations of the federally and state endangered American Burying Beetle. The American Burying Beetle benefits from reduced cedar tree densities.

## BEFORE:



## AFTER:

*In the Loess Canyons BUL, cedar tree removal is challenging because of the steep terrain, but conservation actions still benefit the endangered American Burying Beetle and species like Greater Prairie-Chicken and Elk.*



*This project will create a burn unit of 2,175 acres that encompasses properties owned by at least four landowners. It was delayed because of drought, but should be accomplished in 2014. This property is already a model for what rangeland in the Loess Canyons and habitat could look like to benefit wildlife species, and will be much improved after the fire. Here, Russ Sandstrom is addressing a crowd on a tour of his property in October 2012.*

## Sandstone Prairies, Southeast Prairies, Indian Cave Bluffs, and Rulo Bluffs Biologically Unique Landscapes

The nature of the work in these four BULs has begun to shift over the past 3 years. Sandstone Prairies BUL has large blocks of native tall-grass prairie interspersed with cropland and includes the bluffs and breaks along the Little Blue River and Rose Creek. The Southeast Prairies BUL includes the rolling hills that are primarily cropland, with many tall-grass prairie remnants. When efforts began in the two prairie BULs a decade ago, the primary type of habitat project was clearing invasive trees from prairies. While productive, this type of work was always viewed as a means to an end with a culture of prescribed fire among local landowners as one of the ultimate goals. In the Sandstone Prairies BUL in particular, work is entering a new phase with

### Acres of Improved Habitat

- Sandstone Prairies: 18,600
- Southeast Prairies: 3,800
- Indian Cave Bluffs: 6,520
- Rulo Bluffs: 1,570

**Total Projects: 67**

**Number of Landowners engaged in projects: 49**

prescribed fire as the primary project type and tree clearing playing a reduced role. One of the most exciting developments is the increasing number of 1000+ acre multi-landowner fires that are being carried out. These types of burns are far safer than burns of individual pastures, and they are necessary in order to apply fire on a meaningful scale in the BUL. The established culture of prescribed burns is

## At-Risk Species that benefited from conservation actions:

Greater Prairie-Chicken  
 Black-and-white Warbler  
 Eastern Whip-poor-will  
 Green Dragon  
 Pale Indian-plantain  
 Henslow's Sparrow  
 Barn Owl  
 Eastern Chipmunk  
 Hairy Gayfeather  
 Prairie Fawn Lily  
 Massasauga  
 Brown Creeper  
 Eastern Gray Squirrel  
 Hairy Mountain-mint  
 Purple Milkweed

Timber Rattlesnake  
 Carolina Wren  
 Prairie Kingsnake  
 Hoary Pea  
 Roundhead Prairieclover  
 Wood Thrush  
 Kentucky Warbler  
 Slender Glass Lizard  
 Indian Pipe  
 Showy Orchid  
 Regal Fritillary  
 Louisiana Waterthrush  
 Bigroot Morning-glory  
 Iowa Crab Apple  
 Slender Fimbry  
 Southern Flying Squirrel

Pileated Woodpecker  
 Button-snakeroot  
 Limestone Wild Petunia  
 Spikenard  
 American Ginseng  
 Sedge Wren  
 Clasping-leaf Milkweed  
 May Apple  
 Thickspike Gayfeather  
 Nodding Pogonia  
 Summer Tanager  
 Dwarf Larkspur  
 Ohio Buckeye  
 Wool Grass  
 Yellow Lady's Slipper



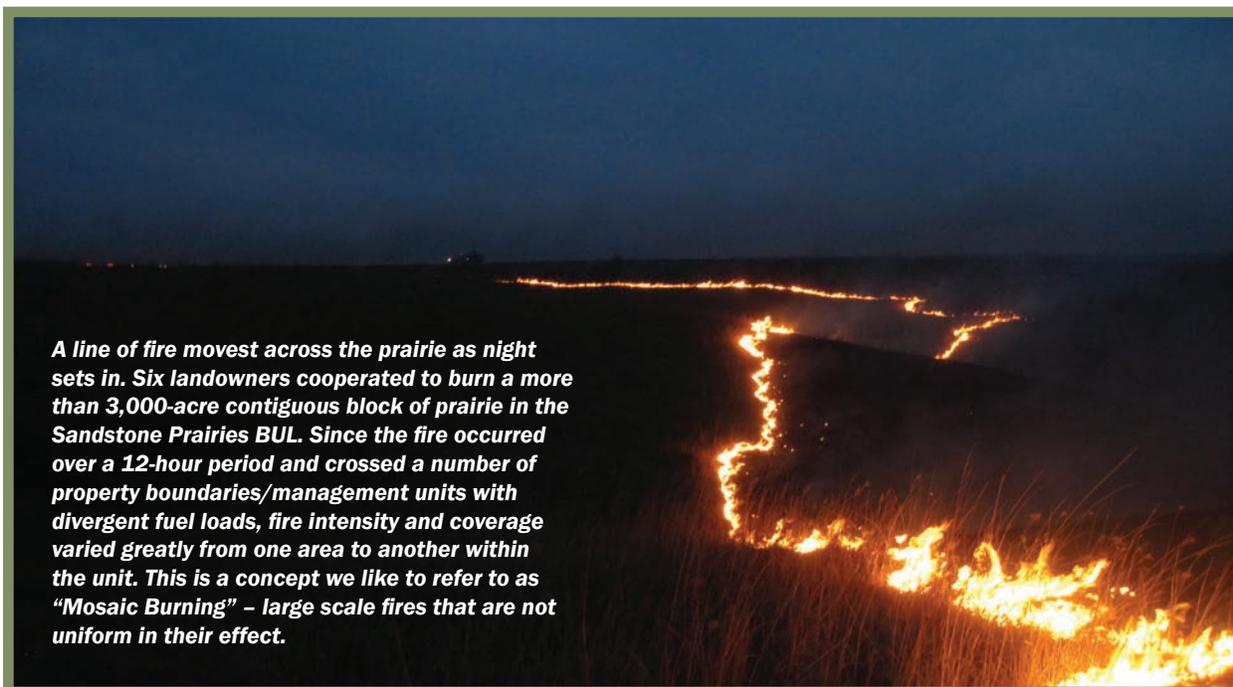
*The area locally known as the "Steele City Canyons" is one of the largest contiguous blocks of tallgrass prairie in Nebraska. It includes a roadless area that is over 3 miles wide from east to west and, at one point 2.5 miles from north to south. In cooperation with seven landowners, tree clearing projects were completed on nearly 3,000 acres within this area. What was once heavily infested with invasive trees, primarily eastern red-cedar, is now wide open prairie interspersed with bur oak-filled canyons.*

becoming apparent as landowners that have never received assistance from the Natural Legacy Project are now beginning to conduct prescribed burns on their own. Because of the more fragmented nature of the Southeast Prairies BUL, large scale fire is harder to achieve. However, efforts continue to concentrate on creating habitat complexes suitable for Greater Prairie-Chickens, massasaugas, and other at-risk prairie species through a combination of tree clearing, grazing management, and prescribed fire.

The two woodland BULs perched on the Missouri River bluffs received increased habitat work over the last several years. Indian Cave Bluffs BUL and the Rulo Bluffs BUL includes the steep bluffs of the Missouri River with the majority of the bluffs supporting eastern deciduous forest of oaks, hickories and basswood. Indian Cave State Park is the dominating feature of the Indian Cave Bluffs BUL (half of all the woodlands in the BUL are in the park), so efforts have been focused there. With the invasion of garlic

mustard, extensive invasive species control efforts are underway. Additionally, over 6000 acres of oak woodland have been enhanced by prescribed burns in just the past few years. In the Rulo Bluffs BUL, we are in the early stages of several tree-thinning projects. These projects have potential as a mechanism to achieve large-scale multi-landowner prescribed fires, similar to what has been accomplished in the Sandstone Prairies BUL. In addition to habitat work, over 500 individuals have been impacted by education and outreach.

The primary partners for project delivery include multiple landowners, volunteers and individuals from the following organizations: Northern Prairies Land Trust, Spring Creek Prairie Audubon Center, The Nature Conservancy, Weston Family Foundation, Southeast Grassland Association, U.S. Fish and Wildlife Service, Five Rivers Weed Management Area, Natural Resources Conservation Service, Prairie Plains Resource Institute and Moonshell Media LLC.



***A line of fire movest across the prairie as night sets in. Six landowners cooperated to burn a more than 3,000-acre contiguous block of prairie in the Sandstone Prairies BUL. Since the fire occurred over a 12-hour period and crossed a number of property boundaries/management units with divergent fuel loads, fire intensity and coverage varied greatly from one area to another within the unit. This is a concept we like to refer to as "Mosaic Burning" – large scale fires that are not uniform in their effect.***



*The Massasauga Rattlesnake is a Tier 1 at-risk species and a high priority target of habitat improvement. This snake was found on a project site in the Southeast Prairies BUL.*

*Garlic mustard is a highly destructive plant in Nebraska's oak woodlands. Routine application of prescribed fire forms the foundation of oak woodland management, but pulling established clumps of garlic mustard is one of the critical components to management.*



## Verdigris-Bazile Watershed, Lower Niobrara River, Willow Creek Prairies, and Ponca Bluffs Biologically Unique Landscapes

The Biologically Unique Landscapes in the northeast consist of a mosaic of habitat types, ranging from mixed and tallgrass prairie, riparian woodlands, upland oak woodlands, and wetlands. Many of these natural areas have been degraded due to lack of naturally occurring fire and invasive woody species encroachment. The landowners in this area have expressed a strong interest in working with the Nebraska Natural Legacy Project to improve their grassland and woodland habitats. Completed prescribed fire and mechanical tree removal projects can be seen across the BULs and have enhanced over 39,000 acres of native woodland, grassland, and wetland habitat. Besides habitat improvement projects, the Nebraska Natural Legacy Project has a deeper impact across the BUL by increasing knowledge and appreciation of the natural resources through a variety of outdoor education events, workshops, and tours. The activities throughout the BULs would not have been possible without the great number of federal, state, local, and private partners that have provided assistance.

The primary partners for project delivery include multiple landowners, volunteers, and individuals from the following organizations: U.S. Fish and Wildlife Service, Natural Resources Conservation Service, the Nebraska Forest Service, Pheasants Forever, Inc., the National Turkey Federation, the Northeast Nebraska Resource Conservation and Development (RC&D), Northern Prairies Land Trust, the National Park Service, the Santee Sioux Tribe of Nebraska, the Ponca Tribe, the Lewis and Clark NRD, the Lower Niobrara NRD, the Upper Elkhorn NRD, and the Lower Elkhorn NRD.



- Acres of Improved Habitat: 39,000
- Total Projects: 98

### At-Risk Species that benefited from conservation actions:

Greater Prairie-Chicken  
Bell's Vireo  
Loggerhead Shrike  
Regal Fritillary  
Iowa Skipper  
Ottoe Skipper  
Small White Lady's Slipper  
Western Prairie Fringed Orchid  
Wood Thrush  
Plains Topminnow  
Plains Pocket Mouse  
Black-tailed Jackrabbit  
White-tailed Jackrabbit



*These pictures highlight a 900-plus acre burn that occurred within the BUL. The Natural Resources Conservation Service was a partner for this project. This tract of land had a number of small- to moderate-sized eastern red-cedars. Many of the cedars were successfully killed, and a number of native tallgrass prairie plants flourished as a result of the prescribed burn.*



## Middle Niobrara River Biologically Unique Landscape

The Middle Niobrara BUL includes a 76-mile reach of the river in Cherry, Keya Paha, Rock, and Brown counties. The Middle Niobrara River valley is deeply incised, and is the intersection of five diverse plant communities: northern mixed-grass prairie, Sandhills prairie, Rocky Mountain pine woodland, northern boreal woodland, and eastern deciduous woodland. Efforts in this landscape are focused primarily on enhancing mixed-grass prairies, Sandhills prairies, pine woodlands, and deciduous forests. As with many other landscapes, cedar has invaded natural communities to the detriment of landowners and at-risk species. The most common conservation actions in this landscape include invasive species removal, prescribed burning, and planned grazing with associated practices such as tanks, pipeline, and cross-fencing. The Coordinating



*ABOVE: In the Willow Creek BUL there are populations of two rare orchid species, the Small White Lady's-Slipper Orchid (shown) and the Western Prairie Fringed Orchid. Surveys are conducted with assistance from the Nebraska Department of Roads and U.S. Department of Agriculture to monitor the orchids. Other management activities, including prescribed fire and leafy spurge control, have been completed to improve habitat for these species.*

*LEFT: These photos highlight a wetland restoration project that was completed under NRCS's Wetland Reserve Program. A ditch constructed to divert the flow of water was filled to restore the wetland habitat to its natural state. This property, along with approximately 11,000 acres along the Verdigris Creek, Bazile Creek, Missouri River, and Niobrara River are enrolled in this conservation easement program to perpetually protect the natural habitat. The regional CWB, along with additional staff from NGPC, NRCS, and the U.S. Fish and Wildlife Service, provide technical service on restoration and management of these properties.*

- **Acres of Improved Habitat: 8,750**
- **Total Projects: 23**

Wildlife Biologist for this BUL provided technical assistance on 23 conservation projects, on 8,640 acres of private land and a project involving 112 acres of public land. This position became vacant about half way through this grant. The position has been re-filled and the momentum of conservation actions for this landscape will continue into the future. The next Coordinating Wildlife Biologist will have additional responsibilities in the Keya Paha Watershed BUL. In cooperation with South Dakota Game, Fish and Parks and South Dakota State University, efforts to conserve several fish species in this watershed across the political boundary have been initiated.



The photos show the “before and after” contrast on a severely cedar-encroached sandhills prairie site in Brown County. These agreements include the use of prescribed fire, mechanical tree removal, and planned grazing and water development for the benefit of at-risk species, including the regal fritillary and Bell’s vireo. Typically tree piles are burned over the winter with grazing deferred the following growing season in order to conduct a prescribed fire the following spring to kill any cedar seedlings that have sprouted.

The primary partners for project delivery include multiple landowners, volunteers and individuals from the following organizations: US Fish and Wildlife Service, the Natural Resources Conservation Service, The Nature Conservancy, the Nebraska Game and Parks Commission, Northern Prairies Land Trust, the Nebraska Forest Service, the National Park Service, the Niobrara Council, Niobrara Valley Outdoor Education Partners, the North Central RC&D, the Middle and Lower Niobrara NRDs, the Prescribed Burn Task Force, the Fire Learning Network, the Niobrara Valley Prescribed Burn Association, volunteer fire departments, UNL extension offices, the Middle Niobrara Weed Awareness Group and county weed boards, and the Nebraska Grazing Lands Coalition.



*In Spring 2012, the Middle Niobrara River BUL was the setting for an information workshop and demonstration burn put on by the Great Plains Fire Learning Network’s training exchange. Forty current and in-training fire personnel from across the country gathered for an informational workshop and a 1,400 acre burn demonstration.*



*In the nearby Keya Paha Grasslands BUL, located just north of the Middle Niobrara BUL, an evaluation of habitats in Holt Creek, Cottonwood Creek, and Willow Creek is underway. In cooperation with South Dakota State University, sampling at various locations from their headwaters to confluence with the Keya Paha River in search of Blacknose Shiner, Finescale Dace, Northern Redbelly Dace, Plains Topminnow (pictured) and other at-risk species will inform practitioners regarding future riparian conservation actions.*

**At-Risk Species that benefited from conservation actions:**

- Burrowing Owl
- Bailey’s Eastern Woodrat
- Greater Prairie-Chicken
- Bell’s Vireo
- Regal Fritillary
- Iowa Skipper
- Ottoe Skipper
- Wood Thrush
- Plains Topminnow
- American Burying Beetle

## Wildcat Hills North and South Biologically Unique Landscapes

The Wildcat Hills is a rocky escarpment that is composed primarily of sandstone, siltstone and volcanic ash. The north bluff of the escarpment is steep and deep canyons cut into the bluff. The canyons support stands of mountain-mahogany, eastern red-cedar and Rocky Mountain juniper, while slopes support ponderosa pine woodlands. Mixed-grass prairie, rock outcrops, and scattered patches of sandsage prairie occupy the remainder of the Wildcat Hills. The Coordinating Wildlife Biologist retired halfway through this grant cycle. The conservation efforts are continuing with district biologists and partners. Conservation actions include pine thinning projects, as well as fencing, prescribed burning, cedar removal, grazing management planning, and watering system development. The CWB also worked very closely with Platte River Basin Environments (PRBE), which is a very active conservation presence in Nebraska.

The primary partners for project delivery include multiple landowners, volunteers, and individuals from the following organizations: U.S. Fish and Wildlife Service, Natural Resources Conservation Service, Pheasants Forever, Playa Lakes Joint Venture, North Platte and South Platte NRDs, Nebraska Forest Service, Platte River Basin Environments, The Nature Conservancy, Rocky Mountain Bird Observatory, National Wild Turkey Federation.

- Acres of Improved Habitat: 18,500
- Total Projects: 6

### At-Risk Species that benefited from conservation actions:

Fringe-tailed Myotis  
Rocky Mountain Bighorn Sheep  
Swift Fox  
Bell's Vireo  
Brewer's Sparrow  
Regal Fritillary  
Plains Topminnow  
Golden Eagle  
Pinyon Jay  
Cassin's Kingbird  
Townsend's Big-eared Bat



*ABOVE: The Wildcat Hills also are home to one of three Rocky Mountain bighorn sheep populations in the state. Bighorn Sheep are a Tier 1 species.*

*LEFT: A portion of an agreement was completed with the placement of a new 1-mile long, wildlife-friendly fence that prevents cattle from grazing to a 200-acre riparian corridor.*



*The Wildcat Hills contains several properties creating a wildlands complex that encompasses approximately 30,000 acres, including rugged topography with ravines separated by steep, eroded rocky outcrops. Properties include Buffalo Creek Wildlife Management Area (WMA), Cedar Canyon WMA, Wildcat Hills WMA, Platte River Basin Environments, Inc. Bead Mountain, Montz Point, and Carter Canyon ranches, Scotts Bluff National Monument, and The Nature Conservancy's Murphy Ranch. This complex presents multiple opportunities for large landscape scale conservation actions across fence lines.*

## Summary

The successful implementation of nearly 200,000 acres of improved habitat for species of greatest conservation need actions and habitat improved described in this section is a tribute to the initiative and positive working relationships between landowners, Coordinating Wildlife Biologists, and conservation partners. A culture of conservation and stewardship is expanding where livestock production and wildlife habitat coexist in a sustainable, beneficial manner.

## Objective 2: Implement a Statewide Conservation Toolbox

The Natural Legacy Partnership Team (see list of members) was tasked with deciding where geographic gaps in conservation delivery existed, what types of projects were lacking with our current delivery, and which partners should be sought for collaboration. The team developed criteria and marketing to reach new partners and develop “innovative” projects. From this process, the following five projects were completed.

### Upper Niobrara Riparian Restoration

The purpose of this project was to restore the historic riparian habitat within portions of the Upper Niobrara River Biologically Unique Landscape for the benefit of Tier 1 & 2 species. An expansive area

adjacent to Box Butte Creek and the Upper Niobrara River had shifted from a native plant community to a dense thicket of Russian olives. Historically, the riparian area supported a diverse mix of vegetation, including towering Cottonwoods, low lying shrubs, and a variety of willow species. Over time, the native riparian vegetation has diminished to the point where the habitat is no longer suitable for imperiled fish and other wildlife species. Based on the lack of existing native vegetation and the historic grazing practices, it appeared that without intervention, recovery could take decades, or much longer. Portions of this project began in 2009, this grant funded “phase two” of the riparian restoration.

This project was accomplished through a partnership comprised of the Sandhills Task Force STF), U.S. Fish & Wildlife Service (FWS), Nebraska Game and Parks Commission (NGPC) and the Rocky Mountain Bird Observatory (RMBO). The project was entirely on private land. In 2009, Russian olive

### Natural Legacy Partnership Team

<b>Audubon Nebraska</b>	<b>Nebraska Corn Growers Association</b>	<b>Pheasants Forever, Inc.</b>
<b>Ducks Unlimited, Inc.</b>	<b>Nebraska Department of Agriculture</b>	<b>Ponca Tribe of Nebraska</b>
<b>Farmers Union</b>	<b>Nebraska Farm Bureau</b>	<b>Rainwater Basin Joint Venture of Nebraska</b>
<b>Nebraska Alliance for Conservation and Environment Education</b>	<b>Nebraska Forest Service</b>	<b>Sandhills Task Force</b>
<b>Nebraska Association of Resources Districts</b>	<b>Nebraska Game and Parks Commission</b>	<b>The Nature Conservancy</b>
<b>Nebraska Bird Partnership</b>	<b>Nebraska Land Trust</b>	<b>USDA Natural Resources Conservation Service</b>
<b>Nebraska Cattlemen</b>	<b>Nebraska Soybean Association</b>	<b>US Fish and Wildlife Service</b>
<b>Nebraska Corn Board</b>	<b>Nebraska Wildlife Federation</b>	<b>US Forest Service</b>
	<b>Nebraska Wildlife Society</b>	

trees were removed (phase one). This project involved collecting Sandbar willow “whips” in 2010 to propagate additional willows in a nursery. Five thousand native shrubs, including American Plum, Buffalo Berry, and Chokecherry were purchased from the Upper White Natural Resource District and hand planted by independent contractors. In the summer of 2011, nearly 3,000 rooted willows were planted by 40 volunteers from the nearby Pine Ridge Job Corp. In 2012, nearly 8,000 willows planted by hand by the Pine Ridge Job Corp along two miles of stream. The Job Corp students were a delight to work with and needed very little guidance. Over the next few years, the survival rates of the willows and shrubs will be monitored and the information will be valuable for future projects.

Traditionally, this portion of Box Butte Creek and the Niobrara River has been viewed as a reliable source of water for cattle. As a result, it was a fairly dramatic step for the landowners to make a long term commitment to restoring the native vegetation. Each of the three landowners involved in this project proposed locations for a series of riparian grazing units that had unique habitat valuable for fish and wildlife. Having each landowner involved from the ground up in the design of this project was crucial considering the management considerations provided by the landowner and the length of the project. The resulting series of riparian grazing units will allow grazing to be deferred until the willows and other native shrubs are established. The three permanent riparian units range from 15 to 25 acres.

## Invasive Species Removal on the Loup and Calamus Rivers

The Platte Valley and Sandhills Weed Management Areas (WMAs) implemented an Early Detection and Rapid Response (EDRR) program along river systems and to reduce invasive species and increase communication and information exchange with landowners. During summer of 2010, the WMA’s performed initial aerial surveys of the Loup Rivers. Infestations of invasive plants were found and documented along the North, Middle and South Loup Rivers. Public meetings for local landowners were held to increase landowner awareness, knowledge and potential methods of removal for the identified invasive plant species. County weed districts collaborated with landowners to apply direct control on infestations.

In the summer of 2012, aerial surveys of the Loup River systems were performed to document treatment of previous infestations. Additionally, the Calamus, Cedar and Elkhorn rivers were surveyed using GPS digital cameras and a voice activated GPS system. Portions of rivers outside of this grant coverage were funded by WMA partners. Flights documented invasive plant species present on the Calamus and Cedar Rivers. Infestation documentation was given to local county weed districts, which used this information to target eradication efforts. By implementing EDRR, invasive species can be detected early and treated, thus preventing ecosystem damages done by invasive species resulting in quality habitats for biodiversity.



Volunteers from the Pine Ridge Job Corp plant willows by hand. The restoration included removing the Russian Olive.

## Improved Habitat Management for Greater Prairie-Chicken & Blowout Penstemon

This project supported, encouraged, and improved habitat management and monitoring for the Greater Prairie-Chicken and Blowout Penstemon on private lands in partnership with the Gracie Creek Landowners. Greater Prairie-Chicken habitat was improved by clearing 2,228 total acres of upland Sandhills grasslands of eastern red-cedar. Prescribed grazing recommendations, as outlined in the collaboratively established Stewardship Plan, were deployed on the project area. Two prescribed burns were conducted after conservative stocking rates were implemented on the project area, totaling approximately 850 acres. Bird surveys were conducted in April of 2011 and 2012 by the Gracie Creek Landowners. Habitat was improved within approximately 1.6 km of seven Greater Prairie-Chicken leks (as well as 6 Sharp-tailed Grouse leks). It was evident that leks free of invasive red-cedar tended to have larger concentrations of birds. With only a one year comparison, the data is preliminary but supports management practices.



*Tires and other debris were placed in blowouts for stabilization*

Habitat for the continued health of Blowout Penstemon was maintained by comparing the grazing habits of yearling steers vs. cows and calves. The yearlings proved to “work over” the blowouts, helping ensure a shifting sands environment, while still allowing conservative stocking rates within the prescribed grazing plan. In addition, five targeted priority blowouts were cleared partially or completely of man-made materials to further encourage a shifting sands environment. Two hundred new penstemon



*Blowout Penstemon in full bloom. The shifting sands environment now supports Blowout Penstemon.*

seedlings were planted, and over 500 seeds were spread. A penstemon count was performed in 2012 with 579 stems being counted. Six years ago the project had 0 stems. Most of the growth of new stems has been in the past three years.

This project also encouraged education and outreach. A website page devoted to the project can be found at [www.graciecreeklandowners.org](http://www.graciecreeklandowners.org). Neighbors and local fire volunteers were asked to help conduct the prescribed burns where the goals of the practice as it related to the project were shared. Tourism guests of the Switzer Ranch were informed of the project when taking ranch tours. A Ranch Tour for local landowners was conducted that covered the project goals and accomplishments. This project was a successful demonstration of the great potential of public-private partnerships benefiting conservation in our state.

## Restoration of Early Successional Riparian Forests for the Benefit of At Risk Species

Plains cottonwood was once the dominant floodplain vegetation along the Missouri River. Many years of human alteration of the river and its floodplain has eliminated much of the cottonwood ecosystem, to the point where very little regeneration now occurs. The decline in quality and quantity of cottonwood forest has been identified as a state and regional priority for restoration of the Missouri River. This partnership between the Natural Legacy Project, The Nature Conservancy and the Arbor Day Foundation helped realize a new partnership to demonstrate alternative techniques while restoring cottonwood forests on private land, resulting in habitat improvements for dozens of Tier 1 and Tier 2 species.

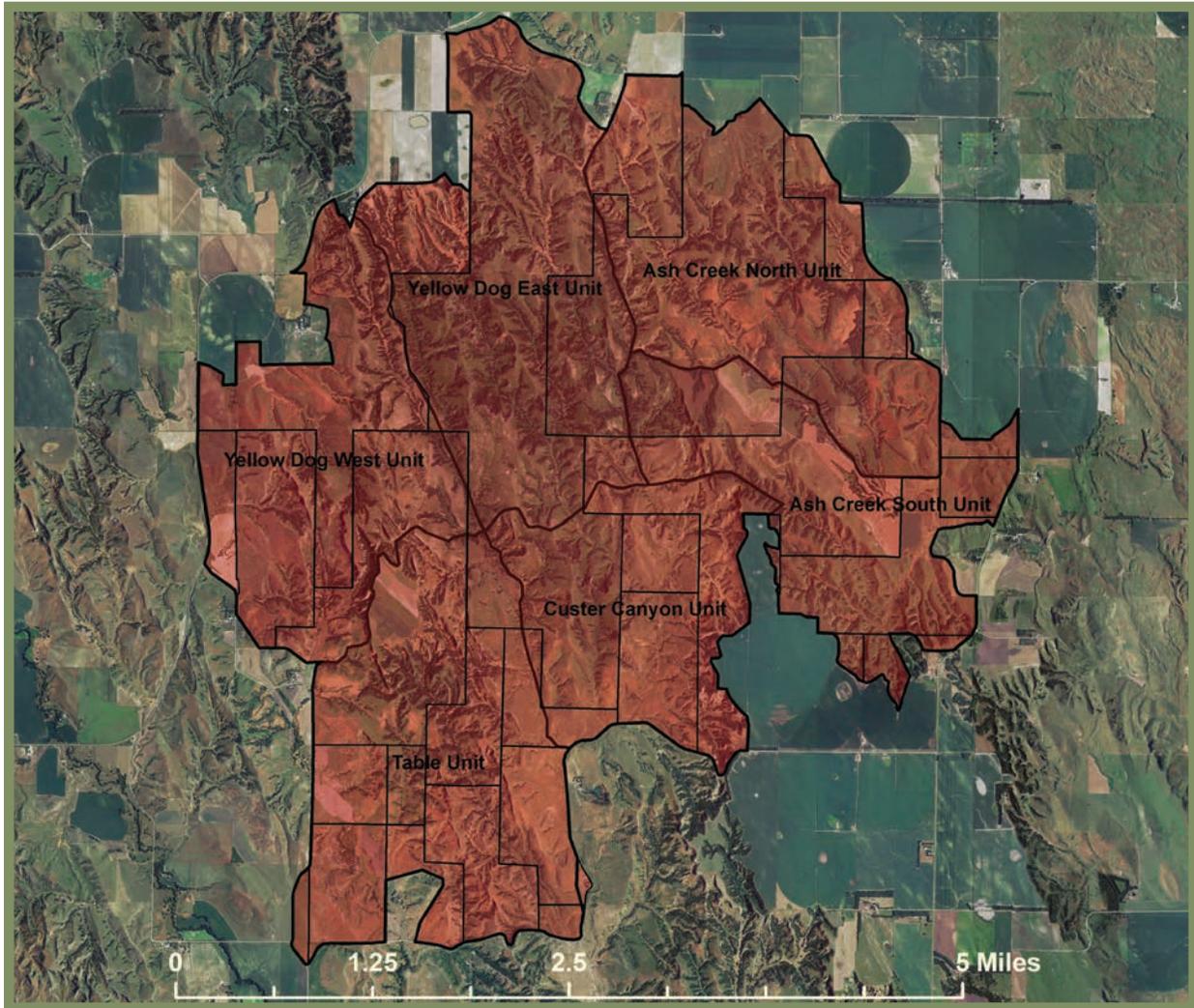
Specifically, this project restored approximately 190 acres of cottonwood forest on private lands in the Missouri River valley, using multiple techniques on diverse sites. This project used volunteers in addition to staff. Over two years, over 40,000 cottonwood cuttings were collected, and over 1,000 seedlings planted. This project also created a showcase of riparian forest restoration strategies and benefits through a comprehensive education and outreach program consisting of field days,

workshops and publications targeted to natural resource professionals. This information was used to help update the Nebraska NRCS Field Office Technical Guide. This project is ongoing with other funding sources. It is anticipated that the grand total for the project will be over 300 acres improved by the end of 2013.



*BELOW: Arbor Day Foundation staff collecting cottonwood cuttings. RIGHT: Cottonwood seedling.*





ABOVE: Map of Fire Learning Network Burn Units  
 OPPOSITE: A crewmember surveys smoke and fire behavior during the 2011 Prescribed Fire Training Exchange in Custer County.

## Fire Learning Network

The Prescribed Fire Training Exchange has been active in Nebraska for several years. Multiple complementary goals are pursued during this event. Ecologically, we are working to reduce the invasion of eastern red-cedar and deliver fire to the landscape at a scale that is historically relevant. This program offers valuable training for wildland firefighters while introducing Nebraska landowners to new paradigms of prescribed fire implementation. Wildland firefighters from all over the country and beyond travel to Nebraska to participate on the fireline, generate experience, and increase their fire-related qualifications. In exchange for volunteering their land to host the Prescribed Fire Training Exchange, participating landowners have their land burned.

While developing prospective areas for the Prescribed Fire Training Exchange, we target large contiguous areas of grassland with few roads and structures. We also consider areas that are key areas for focus species like the Greater Prairie Chicken. Landowners are approached with the Prescribed Fire Training Exchange concept approximately a year in advance to begin the process of planning the prescribed fire and preparing the burn units. The Prescribed Fire Training Exchange features large units (often over 1,000 acres) that span multiple property boundaries. Most contemporary prescribed fires feature 100 to 200 acre burn units owned by one landowner. This scale of burning has not been effective at deterring the encroachment of eastern red-cedar into Nebraska grasslands. Through the Prescribed Fire Training Exchange, we are introducing landowners to the concept of larger burn units and partnering with multiple landowners to more effectively and efficiently treat our grasslands and manage invasive woody species.

To date, several thousand acres have been enrolled in the Prescribed Fire Training Exchange. For instance, in the Central Loess Hills, over 15,000 acres have been burned as a result of the Prescribed Fire Training Exchange. Plans are being made to continue this valuable program in Nebraska for future years. We have been working on plans for the 2014 prescribed fire season and are already making plans for 2015 as well.



## Objective 3: Implement education and outreach directed towards biodiversity conservation and sustainable land and water management



**Education and outreach programs build value for Nebraska’s biodiversity. It is impossible for people to value what they do not know. Once people understand Big Bluestem, American Burying Beetles, and Prairie-Chickens, and the interactions and interdependence of the life found in their “backyard,” they will begin to value them. When people value the species, they will value the process necessary to maintain their habitat.**

Many workshops for teachers, landowners, children and other specific audiences were held throughout the duration of this grant. Products such as brochures and educator packets were made available for continuing education and outreach. Photography and webcams are used not only to monitor species, but share at-risk species with Nebraskans. Seminars and conferences shared technical information. Education actions were primarily implemented by the Wildlife Education Specialist, Natural Legacy Biologist and Coordinating Wildlife Biologists and reached thousands of people of all ages.

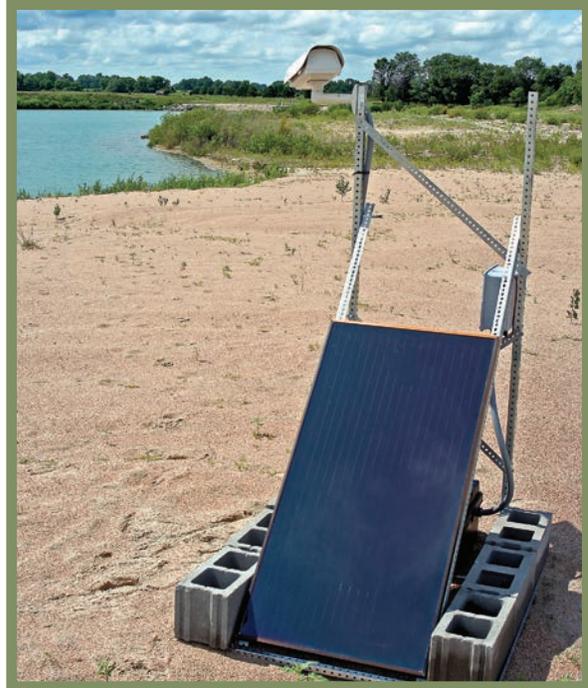
## Visual Education and Outreach

**Time Lapse Photography:** In 2012, a time-lapse photography project at Indian Cave State Park in cooperation with Moonshell Media (Michael Forsberg) was initiated. There were three permanent camera stations installed that encompass different aspects of bluff woodlands. Each camera takes a picture per hour, every day and all year round. A mobile camera can be set up to capture shorter term events, such as the movement of prescribed fire through the woodlands or the flowering of yellow lady's slipper orchids. The cameras will augment the existing monitoring protocols at the park. With large scale restoration efforts, it is easy to lose context and perspective of initial conditions. The cameras will provide a record of what happens as the restoration process proceeds. More importantly, they will allow us to tell the story of oak woodland restoration to others in an extraordinary way. A sample of the time lapse photography is available at [www.NebraskaNaturalLegacy.org](http://www.NebraskaNaturalLegacy.org).



*Yellow Lady's Slipper blooming at Indian Cave State Park.*

**TernCam:** The TernCam was introduced in 2010 as an outreach activity in which live photos of a nest of endangered least terns are streamed across the Tern and Plover Conservation Partnership website. Through TernCam, many individuals all over the world have the opportunity to enjoy Nebraska's unique wildlife by witnessing the nesting activity of a least tern without disturbing the birds. At this point, the TernCam has featured five nests. The local Coordinating Wildlife Biologist monitors the TernCam and the terns. Learn more at <http://ternandplover.unl.edu/aboutus/terncam.asp>.



*Solar powered TernCam is focused on a Least Tern nest.*

## Workshops, Conservation Demonstrations and Tours

### **Two-Day Tallgrass Prairie Educator Workshop:**

The 2-day intensive workshop focused on getting educators immersed in the prairie. Experts from several different fields presented during the workshop on the following topics: reptiles & amphibians, mammals, birds & bird banding, plants, fire ecology, and native cultures. Teachers also received numerous resources to incorporate prairies into their curriculums. This intensive 2-day workshop has been found to have an immense impact on K-12 education.



*Educators are immersed in the tallgrass prairie for two days to learn techniques, to share their experiences and educate others.*

*“The tallgrass prairie workshop impacted not only my classroom, it impacted my school! My team has put into place a strong united front for more nature education. We’ve been able to host a training for 20 of our coworkers. I’ve also found colleagues interested in securing grants and developing opportunities for our school. I’m currently trying to develop parent education regarding importance of connecting with nature.”*

*Kassandra Mayo – Educator  
Brownell-Talbot, Omaha*



*Educators are immersed in the tallgrass prairie for two days to learn techniques to share their experiences and educate others.*

**Warner College Tour:** The Nebraska Natural Legacy Project hosted 16 students from the Warner College of Natural Resources from Colorado State University on a 2-day tour to learn about State Wildlife Action Plans, Nebraska’s at-risk species, conservation in the state, the Natural Legacy Project, witness the wonder of spring crane migration, and participate in data collection. “The trip exceeded every possible expectation,” a Warner College student said. “I can say without a doubt that it will be something I remember for the rest of my life.”

**Patch Burn Workshop:** This workshop was hosted by the Southeast Biologically Unique Landscapes in August 2011. There were attendees from eight states, representing the length of the Great Plains. This workshop created much needed opportunities for discussions about fire and grazing management.

**Northeast Annual Wildflower and Habitat Tours:** These tours are hosted with assistance from Pheasants Forever, Inc., NGPC, U.S. Department of Agriculture, and the Northeast Nebraska RC&D. These tours have covered a variety of topics, including wildflower, bird, and butterfly identification, lek tours of Greater Prairie-Chickens, and demonstrations of

prescribed fire and mechanical tree removal on native grasslands. These tours are held once or twice a year, with approximately 30 participants partaking in each event.

**Power of Pollinators:** Three workshops were held where participants learned not only about pollination and Nebraska’s pollinators, but also received training on how to develop pollinator habitat and utilize pollinators to meet state educational standards. A total of 43 educators were trained at the workshops.



*Twenty-two on-lookers enjoy learning more about the ecology of Greater Prairie-Chickens as they watch the birds perform their spring ritual on a lek in the Verdigris-Bazile BUL.*

**LEED Workshop:** In June 2011, the Northeast Coordinating Wildlife Biologist along with NGPC staff, hosted a special workshop targeted at local education professionals in Northeast Nebraska. Twenty-one teachers ranging from early childhood, elementary, and high school education participated in a 3-day intensive workshop that immersed participants in the landscape and illustrated techniques of environmental education. All participants were given the opportunity to become certified in Project WILD, Growing Up WILD, and the Leopold Education Project. This valuable experience left participants with an increased appreciation of the outdoors and a variety of skills that they can use to incorporate outdoor education into their daily curriculum.

**Beyond Bats:** Two of these popular workshops taught participants about the natural history of Nebraska's bats, the role of bats in the ecosystem, and how to incorporate bats into their educational efforts. Participants received the, "Discover Bats Educator Guide," "About Bats: Educator Activities" curriculum guides, a bat house, and a bat-related literature book. A total of 37 participants were trained through these workshops.

**Wild About Raptors:** This workshop, focusing on Nebraska's raptor species, was held at the Wildcat Hills Nature Center in Gering, Nebraska. Participants had the chance to see raptors up-close (through Raptor Recovery Nebraska), travel to see raptors and raptor nests in the field, and learn about raptor educational activities. Twelve educators attended this workshop.

**Hop into Action: Amphibian Education:** This workshop was designed specifically for educators of younger students (preK-4th grade). Educators were taught the natural history of amphibians, why are



*A presenter at the Rangeland Management Workshop in Custer County. The Rangeland Management Workshop has been held annually for 5 years and offers area grassland managers information and insight into grazing strategies, invasive species control techniques, and wildlife management on private land.*

they important, how to search for them outside, and how to teach young children about them. Participants received the "Hop into Action: Amphibian Educators Guide," an amphibian-related literature book, a frog life cycle manipulative set, and an amphibians of Nebraska poster. Seventeen educators attended the workshop at Pioneers Park Nature Center in Lincoln, Nebraska.

**Nebraska Endangered Species (at Nebraska Association of Teachers of Science):** This session helped teach the basics of Nebraska's at-risk species and showed educators simple (but effective) activities for teaching about an often complex topic. Forty-four educators attended the session.

**Camp'n in the Canyons:** In 2011, The Loess Canyons Coordinating Wildlife Biologist worked with UNL Extension to host a 2-day and 1-night event. It took place on privately owned rangeland south of Maxwell in the Loess Canyons BUL. A total of 23 children participated in the camp where 11 different presenters gave talks and led activities about local plants, wildlife, and outdoor skills.



*The Coordinating Wildlife Biologist holds a bat for the campers.*

**Rangeland Management Workshop:** Beginning in 2008, we have held an annual Rangeland Management Workshop in the Loess Hills BUL. This workshop is designed for area landowners and grassland managers and offers them a chance to learn about grassland research, new and innovative grassland management strategies and provide information about available conservation programs. Usually, we also visit a local active grassland operation as well. In the past, presenters at the Rangeland Management Workshop have included representatives from the Natural Resources Conservation Service, Nebraska Game and Parks Commission, Prairie Plains Resource Institute, Pheasants Forever, Inc., and the U.S. Fish and Wildlife Service.

**Education 8950 Rangeland Workshop:** A presenter at the Rangeland Management Workshop in Custer County. The Rangeland Management Workshop has been held annually for 5 years and offers area grassland managers information and insight into grazing strategies, invasive species control techniques, and wildlife management on private land.

**Prescribed Burn Workshops and Habitat Tours:** All the Coordinating Wildlife Biologists participate and support workshops for landowners designed to discuss and demonstrate a variety of conservation actions. The burn workshops introduce landowners and land managers to the basics of prescribed fire including planning, preparation, safety, and prescribed fire techniques. Hundreds of people have attended these workshops. Funding for the workshops themselves was not always covered by this grant.

**Third Grade Science Day:** The Nebraska Natural Legacy project led natural science activities for the entire third grade at Squire John Thomas Elementary School in Gretna, Nebraska. More than 100 third graders learned science-based principles with a focus on wildlife and habitat.

## Conferences and Seminars

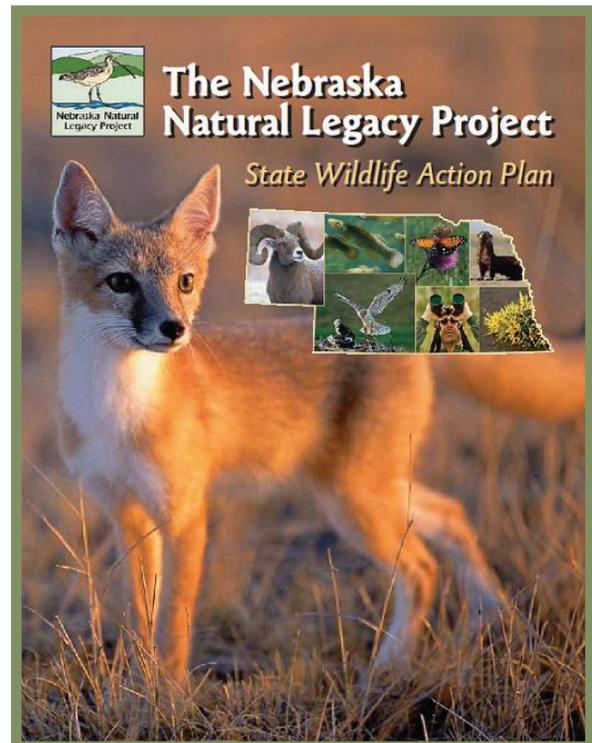
**Nebraska Natural Legacy Conference:** The Nebraska Natural Legacy Conference is well on its way to becoming a known entity for sharing information crucial to wildlife and habitat conservation in the state, as well as a place where biologists, natural resource practitioners, researchers, graduate students, and proactive landowners can develop and collaborate their efforts. The presentations are accompanied by field tours that demonstrate on-the-ground achievements. Over the past 2 years, more than 250 individuals have attended the Natural Legacy Conferences.



**Summer Natural History Seminar Series:** In 2010, four seminars were held for the public in Broken Bow to learn more about the wildlife of the Central Loess Hills. Seminar topics included Bald Eagles and the Long-billed Curlew tracking program, River Otters in central Nebraska, Least Tern and Piping Plover conservation, and Whooping Crane use of the Loup Rivers. Presentations were made by representatives from a variety of agencies and organizations, including the U.S. Fish and Wildlife Service, Nebraska Game and Parks Commission, and the Tern and Plover Conservation Partnership.

## Printed Materials

During the revision of the Legacy Project a series of public input meetings were held in 2010 across Nebraska to address concerns, gather ideas and input from communities, and promote the Natural Legacy Project. These meetings occurred in 10 cities and were attended by more than 200 people. Nearly 300 copies have been distributed, but the actual reach of the document is much greater because the plan is available online and accessed frequently. [www.outdoornebraska.ne.gov/wildlife/programs/legacy/Natural\\_legacy\\_document.asp](http://www.outdoornebraska.ne.gov/wildlife/programs/legacy/Natural_legacy_document.asp)

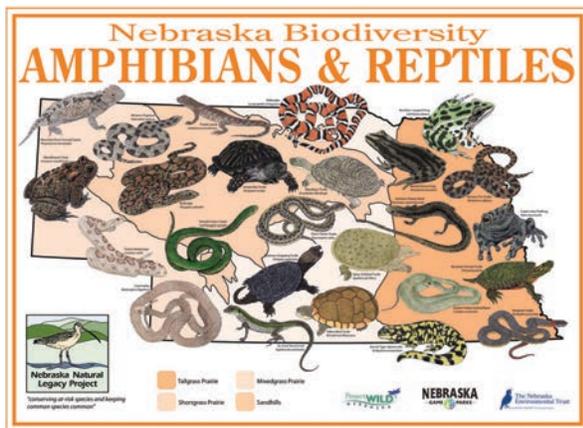


ABOVE: 278 copies of the revised Nebraska Natural Legacy Project have been distributed.

LEFT: Long-Billed Curlew

**Nebraska's Threatened & Endangered Species Pamphlets:** A series of pamphlets highlighting 18 of Nebraska's Threatened & Endangered Species were created to educate the general public. Each pamphlet includes numerous photos and information about the species' natural history, range, habitat, and conservation management.

**Biodiversity Posters:** A series of 7 Nebraska Biodiversity posters were printed. The series includes mammals, insects, amphibians & reptiles, birds, plants, fish, and Threatened & Endangered species. Each poster has 25 hand-drawn images located on an ecoregion map of Nebraska.



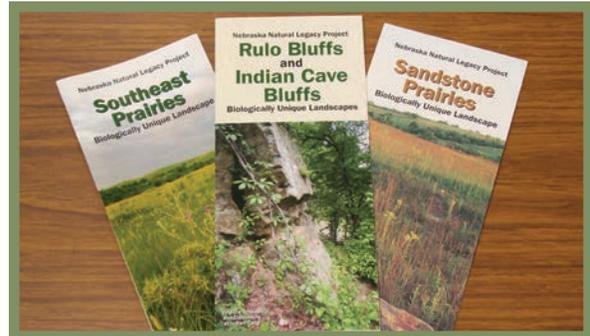
*Photo Education Reptile Poster PDF: The Reptile Poster is one of 7 posters in this series. The posters have information about each species on the back and are available for free distribution.*

## Education Resources

**Nebraska's Rare Species Website ([www.rarespecies.nebraska.gov](http://www.rarespecies.nebraska.gov)):** A new website was developed to provide a public-friendly place to learn about Nebraska at-risk species. The website contains general information about Threatened & Endangered species, educator activities, and images of Nebraska's T&E species. This website will continue to be enhanced with the next NET grant.

**Threatened & Endangered Species Educator Packets:** Two packets were created – one for Kindergarten – 4th grade educators, one for 5th – 12th grade educators. Each packet includes three classroom activities and a T&E species poster. These packets are available for free for Nebraska's formal and non-formal educators.

**Development of Threatened and Endangered Species Educator Trunks:** Three trunks were developed in partnership with the U.S. Fish & Wildlife Service. Trunks include skulls, pelts, bird eggs, literature books, reference books, and numerous educational activities. Trunks are available for educators to “check out” for free and use in the classroom.



*Education BUL Brochures: Brochures are available for many of the Biologically Unique Landscapes.*

## Outdoor Classrooms and Nature Centers

**Outdoor Classroom Educator Workshops:** Often educators are excited about implementing an outdoor classroom, but once the actual construction is completed, they are unsure about how to utilize this new resource. A new guide – “Using Outdoor Classrooms to Meet Educational Standards” was developed. In addition, two workshops were held in Lincoln to help teachers who currently have outdoor classrooms utilize them for quality learning.



*Educators are learning how to utilize their outdoor classroom to engage students in hands on activities while meeting education standards.*

**Supplies for Biodiversity Education at State Parks:** The classroom at Ak-Sar-Ben Aquarium received a much-needed update to help educate visiting families about Nebraska's biodiversity. New exhibits include: skulls & pelts of Nebraska's mammals, scat and tracks of Nebraska's mammals, a reading area highlighting children's biodiversity literature, a life cycles station to teach visitors about several species' life cycles, and a microscope station allowing visitors to see small, but important details of Nebraska's insects.

**Wildcat Hills Nature Center:** An update to the Wildcat Hills Nature Center exhibits includes a reading area highlighting children's biodiversity literature, puppet area, and new skulls & pelts of Nebraska's mammals. Additionally, red head lamps were purchased to allow for exploration of nocturnal species.

**Ponca State Park:** Resources provided to Ponca State Park include a new reading area highlighting children's biodiversity literature, puppet area, and a new outdoor pollinator garden to engage visitors in pollinator education.

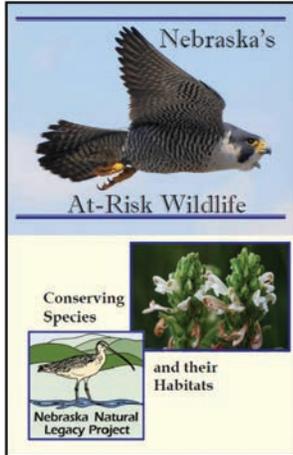
**Fort Kearney State Rec Area:** Biodiversity and conservation resources were provided including skulls & pelts of Nebraska's mammals, binoculars for bird watching, and supplies for making nature-related crafts for family events.

**Norfolk Outdoor Classroom:** An outdoor classroom was developed on the grounds of the Norfolk Nebraska Game & Parks Commission office. The majority of the site was developed using mitigation funds from a separate Nebraska Department of Roads project, but Legacy Education funds purchased plants native to Nebraska to help educate visitors about the importance of native plants.

**Biodiversity Display Project:** Work has begun on a large, traveling biodiversity display. The display (to be purchased with the next NET grant) will feature 180 images of Nebraska's species. This current grant has paid for supplemental materials to be placed around the wall of images. Activities include turtle shells and skulls, skulls and pelts of mammals, mounted insects with microscopes, books, puppets, and more.

*Children and educators from the Norfolk area now have an outdoor classroom to explore and enjoy learning about Nebraska's biodiversity.*





ABOVE LEFT: Seven-thousand copies of 'Nebraska's At-Risk Wildlife: Conserving Species and their Habitats' have been distributed to date to raise awareness about Nebraska's species of greatest conservation need and promote their conservation. ABOVE RIGHT: Newsletters from multiple Biologically Unique Landscapes are produced regularly by Coordinating Wildlife Biologists to update landowners on current conservation activities, management and information about local species. The Niobrara Valley Habitat Newsletter has a distribution of over 400 recipients and covers activities in the Middle Niobrara River BUL.

**Forestry Field Day at Indian Cave State Park:** In May 2012 conservation practitioners met to discuss management possibilities of Nebraska's oak woodlands. Participants included personnel from Nebraska Game & Parks Commission, Nebraska Forest Service, Northern Prairies Land Trust, The Nature Conservancy, National Wild Turkey Federation, and Bureau of Indian Affairs.

The Local Coordinating Wildlife Biologist is leading a birding day hike for the public in the Toadstool Geological Park area of the Oglala National Grasslands in the Oglala Grasslands BUL.



## Objective 4: Inventory for at-risk species, their habitats and evaluation of conservation actions.

Research, inventory, and monitoring of Nebraska's at-risk species were conducted across the state to learn more about these species, and adjust conservation actions to achieve desired results. This information is used to also develop the most effective conservation strategies. Evaluation of existing actions was conducted to ensure that the intended results are attained.

### Floristic Quality Analysis of the Wildcat Hills

The purpose of this study was to determine the impact of a planned prescribed burn on the mixed-grass prairie flora of the Wildcat Hills. The burn was planned for the spring of 2013 on the Platte River Basin Environment, Inc.'s (PRBE) Carter Canyon Ranch.

There were vegetation monitoring plots in mixed-grass prairie within the proposed burn unit and additional plots located in mixed-grass prairie outside the burn unit to act as controls. The plots were sampled in June of 2012 by a contract botanist. The vegetation data have been analyzed.

Unfortunately due to the severe drought of 2012, the prescribed burn during the spring of 2013 was not completed. There were not enough fuels accumulated to allow a burn and extremely dry conditions inhibited a safe burn. It is the intent to complete the burn in coming years. The summer after the burn, the plots will be resampled to make a comparison of pre-fire and post-fire vegetation composition. These data will determine the impact of fire on the mixed-grass prairie of the Wildcat Hills.

### Trail Cameras

Swift fox currently occupy only 21% of their historical range, and only occupy 42% of Nebraska that continues to contain seemingly high quality swift fox habitat. Trail cameras were purchased to help support a project with University of Nebraska – Lincoln (UNL) to further understand how habitat and landscape attributes, as well as behavioral interactions with other canids (especially coyotes) affect habitat use and geographic distribution of swift fox. This information will be important regarding conservation actions and understanding potential impacts to future disturbances on the landscape. They will also be used to evaluate the effectiveness of using trail cameras vs. the traditional track plate methods of detecting swift foxes. If, as the literature suggests, trail cameras are more effective, this will allow much greater and cost-effective information to be gathered for this species.



*Trail cameras have detected use of seed blocks by many species.*

## Trail Cameras

*Coyotes are often recorded with a trail camera in swift fox territory.*



Trail cameras have also been used to monitor species' use of the re-seeding efforts in the Pine Ridge using the edible seed blocks. Animals are using and feeding on the seed blocks.

A pilot study using trail cameras for detection of river otters found that the cameras are highly effective, and the documented distribution of the otters has increased because of trail camera use. In the fall of 2013, cameras will be moved to areas of suitable habitat where we have no record of otters. Documentation of river otters throughout Nebraska is important, because this species is currently listed as threatened but may have sufficient numbers and distribution to warrant de-listing.

## Plains Pocket Mouse Detection Study

Does the Plains Pocket Mouse inhabit suitable habitat on selected private land in the Sandstone Prairies Biologically Unique Landscape? The Natural Legacy Project is expanding its list of collaborative partners to include the Nebraska Master Naturalist Program. Mike Schrad, a Master Naturalist, is volunteering with local Coordinating Wildlife Biologist Kent Pfeiffer to determine if the plains pocket mouse is present in areas of suitable habitat in Biologically Unique Landscapes. This information will be used to direct future management actions, and likely where additional research should be conducted.

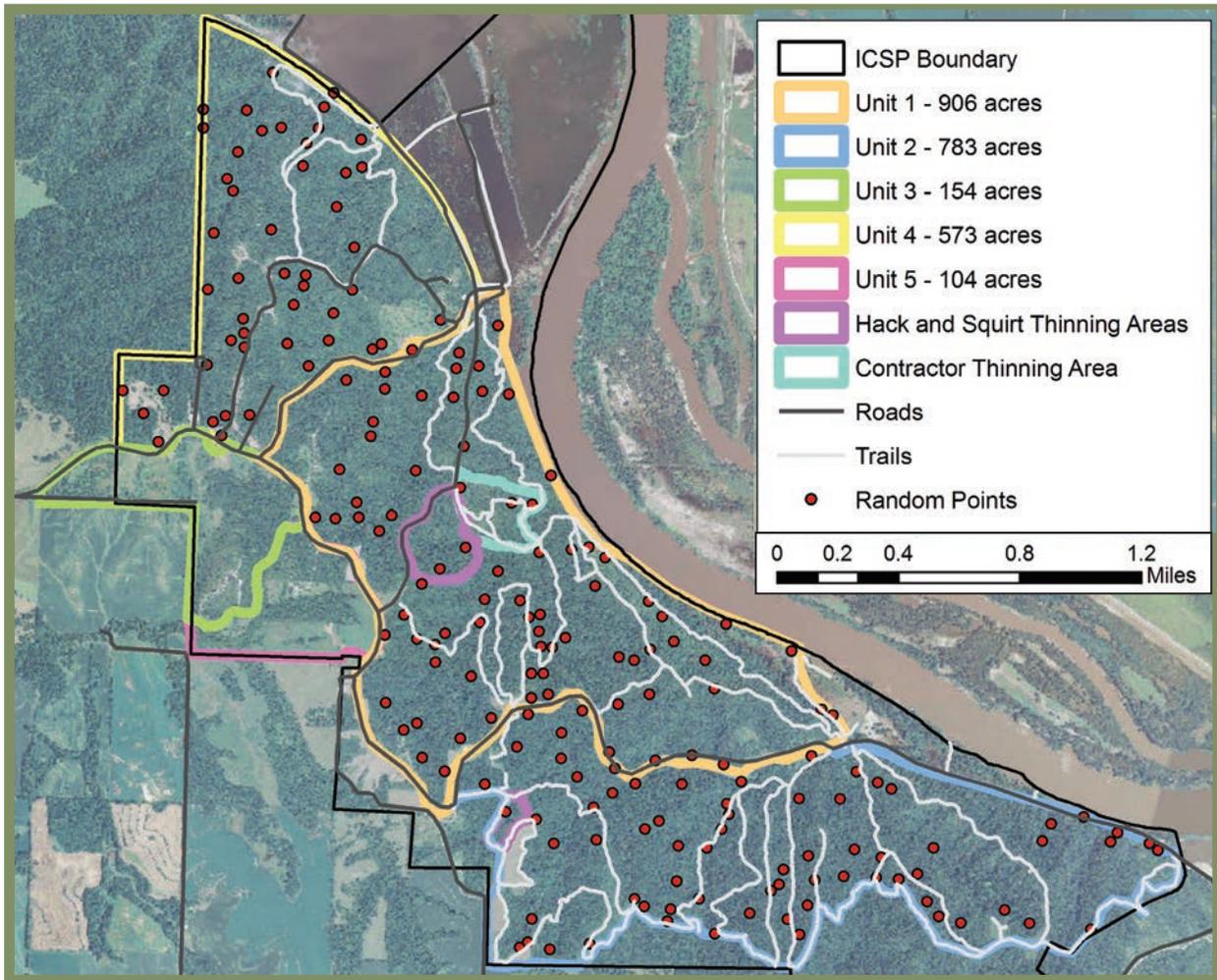
The study used Sherman Traps along transects during the full moon. The study is preliminary with only a spring sampling and plans to repeat in the fall. Thus far, no pocket mice have been detected. Trap results were marginal ( $n = 7$ ), which represents a trap success of just over 1.4%. Additionally, species diversity was low with only one species, *Peromyscus maniculatus*, found in traps.

## Breeding Bird Survey in Oak



*No Pocket Mice were detected in the Sandstone Prairies BUL, but the more common deer mouse (*Peromyscus maniculatus*) was trapped.*

# Indian Cave State Park Survey Map



Indian Cave State Park boundary, management units, and distribution of random breeding bird survey point transects.

## Woodlands

Midwestern oak dominated forests, woodlands, and savannas support populations of several bird species of high conservation concern including Legacy Tier I species (Wood Thrush and Cerulean Warbler) and Tier II species (Ruby-throated Hummingbird, Chuck-will's-widow, Eastern Whip-poor-will, Pileated Woodpecker, Acadian Flycatcher, Yellow-throated Vireo, Tufted Titmouse, Yellow-throated Warbler, Louisiana Waterthrush, Kentucky Warbler, and Summer Tanager). In Nebraska, two important oak woodland reserves include Indian Cave and Ponca State Parks. At these two sites, managers have recently implemented management to improve overall ecosystem function and health. To understand how management will affect individual bird species of conservation concern, we

implemented robustly-designed breeding bird monitoring at these sites using a random sampling design and Distance Sampling. We produced density estimates for all breeding species that met minimum detection requirements. These results will serve as an important baseline to evaluate changes in the breeding bird community in the future in response to management actions to benefit the woodland ecosystem. 2012 was the first year of a 3-year study, so results are preliminary.

More information can be found at:

<http://outdoornebraska.ne.gov/wildlife/programs/nongame/NGBirds/pdf/2012%20ICSP%20and%20PSP%20breeding%20bird%20monitoring%20report.pdf>

## Invasive Species Inventory with Weed Management Districts

A portion of the project mentioned in the innovative grant section includes purchasing digital cameras and voice activated GPS system. These were used to further document new infestations with increased accuracy for eradication. Five county weed districts were able to benefit from the purchase of GPS cameras. Cameras will be used strategically to conduct field inventory of infestations and document and prioritize future invasive species removal work. GPS cameras will also aid in monitoring previously treated species to ensure long-term control is implemented by landowners.

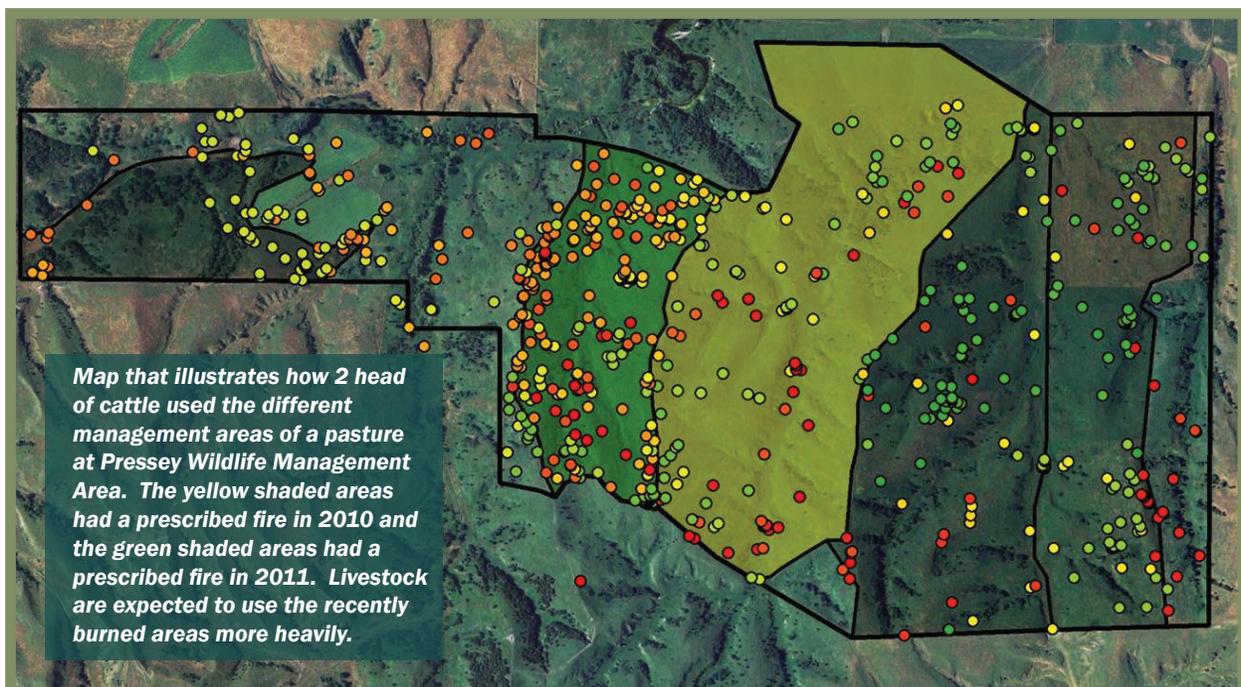
## Patch Burning Grazing Study in Loess Hills Biologically Unique Landscape

Beginning in 2011, a patch burn grazing program was initiated at Pressey Wildlife Management Area in south Central Custer County. This program involved dividing a pasture into several subunits and performing a prescribed fire on one subunit every year on a rotational basis. Following the prescribed fire, livestock are introduced and allowed access to the entire pasture. Since livestock will typically spend a majority of their time in the

area burned most recently (and the least amount of time in the area least recently burned), a patch burning system provides a diversity of structural habitat types for a wide array of grassland species. We have been using GPS collars on two head of livestock to document their movements in the patch burn unit throughout a season. The information from these collars is being used as an educational and outreach tool to introduce the patch burning concept to area land managers. The attached map shows how the two head of livestock used the patch burning unit in 2011. The green shaded area was burned in 2011 and the yellow shaded area was burned in 2010.

## GIS and Database Development for Southeast Nebraska Biologically Unique Landscapes

A GIS database of private lands conservation projects in southeast Nebraska was created. The majority of these projects are within the Sandstone Prairies and Southeast Prairies Biologically Unique Landscapes (BULs), but also include a few projects in the Indian Cave and Rulo Bluffs. Project types entered in the database include: tree clearing, burning, fencing (for rotational grazing), reseeding (prairie restoration), herbicide application (for control of invasive plants such as sericea lespedeza), water developments (installation of



water line, wells, and stock tanks to facilitate rotational grazing and/or spread grazing pressure more evenly across pastures), and patch-burn grazing systems (rotational burning and grazing). This database is already in use and has been instrumental in creating and updating maps of project boundaries and locations of photo points used to monitor vegetation response to tree clearing and burning activities.

A GIS, field verified map of the native woodlands of southeast Nebraska is nearly established but will continue to be ground truthed with continual refinements. The product has already aided in conservation planning and implementation. Work began with digitizing all woodlands greater than approximately 1 acre in size visible on aerial photos. Quality control efforts (field ground truthing) to categorize type and condition of woodlands have been completed in the Indian Cave Bluffs and Rulo Bluffs BULs.

## Lepidoptera Surveys and Data Acquisition in Eastern Nebraska Grasslands

The Nebraska Natural Legacy Project identifies nine species of butterflies and moths as Tier 1 species and 88 lepidopterans as Tier 2 species. Prior to this project, there were very few records for these species in the Natural Heritage database. The objective of the project was to obtain records for these species by two means. The first was to begin conducting field survey work for priority grassland



*Whitney's Underwing is a Tier 1 species.*

species in the eastern half of the state during the summer of 2012. Tier 1 priority species for the survey work included the Iowa Skipper, Bucholz Black Dash, Ottoe Skipper, Mottled Duskywing, Married Underwing, and Whitney Underwing. Tier 2 priority species included: Arachne Checkerspot, Arogos Skipper, Bysuss Skipper, Creamy Marblewing, Delilah Underwing, Hairy Duskywing, and Western Green Hairstreak. In addition, occurrence information on any other Tier 1 and 2 species incidentally observed during survey work was recorded. Collecting conditions were impacted by a spring warm-up that began 3-4 weeks earlier than normal. This resulted in lower population densities for some species. In addition, extreme drought conditions in mid-late summer also appeared to reduce the number and/or activity level of butterflies and moths. The results of the survey produced four new records for Tier 1 species and five new records for Tier 2 species.

The second aspect of the project was to obtain records for the 97 Tier 1 and Tier 2 species by having prominent collectors go through their collections and field notes and transcribe records of Tier 1 and Tier 2 species onto Natural Heritage data forms. This portion of the project resulted in 539 records of Tier 1 and Tier 2 lepidopterans. These records represent a significant resource not only for documentation of occurrences of a species but also for establishment of a baseline of relative rarity, distribution, habitat use, and time of flights.

## Species Conservation Assessments

Species Conservation Assessments (SCAs) are being developed for priority at-risk species for the Nebraska Natural Legacy Project. The purpose of SCAs is to provide detailed information regarding life requisites of species and management techniques found in the literature, so conservation practitioners can adjust management techniques accordingly after considering a suite of options. These assessments also illustrate where information is lacking, and where additional research is needed. The information being gathered is being used to guide the conservation planning effort underway in Nebraska's Biologically Unique Landscapes. The write-ups can be accessed on the Nebraska Game and Parks Commission's website at: [www.outdoornebraska.ne.gov/wildlife/programs/legacy/species-conservation-assess.asp](http://www.outdoornebraska.ne.gov/wildlife/programs/legacy/species-conservation-assess.asp)

# Stream Monitoring



Participants learn about stream health and participate in the rapid stream monitoring.

## Bazile Creek Monitoring:

Stream monitoring effort along the Bazile Creek has been conducted on a biannual basis with assistance from Wayne State College, the Northeast RC&D, NGPC, the Coordinating Wildlife Biologist, and other interested local residents. The rapid stream monitoring protocol assesses the general health of the stream by documenting general stream chemistry, macroinvertebrate populations, and physical stream characteristics. This monitoring effort was started in 2004.

## Consistent Monitoring in Biologically Unique Landscapes:

All Coordinating Wildlife Biologists, as well as partner staff, conduct regular inventory and monitoring of multiple at-risk species and their habitats. Examples of these surveys include Breeding Bird Surveys, Greater Prairie-Chicken



Greater Prairie-Chickens display on a lek.

(prairie grouse) routes, orchid surveys, fish sampling, nest occupancy survey flights of Golden Eagles and Ferruginous Hawks, invasive species monitoring, and surveys for American Burying Beetles. Coordinating Wildlife Biologists also conduct regular monitoring to ensure that landowners have complied with contracts, and use established photo points to assist with documentation of changes to the landscape.

*Any program that receives federal funding from the National Park Service, or the United States Fish and Wildlife Service prohibits unlawful discrimination on the basis of race, color, religion, age, gender, marital status, national origin, age, disability or political affiliation. Any person who believes he or she has been discriminated against in any program, activity, facility, or service, should contact the Nebraska Game and Parks Commission, Lincoln, NE 402-471-0641, the Equal Opportunity Commission, Lincoln, NE 402-471-2024, TTY/TDD 402-471-4693; United States Fish Wildlife Service, Civil Rights Coordinator, 4401 N. Fairfax Drive, Arlington, VA 22203; Director, Equal Opportunity Program, U.S. Department of Interior, National Park Service, 1849 C Street NW, Mail Code 0008, Washington, D.C. 20240-0001.*

