Nebraska's Eastern Saline Wetlands Conservation Plan 2018

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An update of:

Implementation Plan for the Conservation of Nebraska's Eastern Saline Wetlands (2003)



Photos at Nebraska's eastern saline wetlands by Michael Forsberg, NEBRASKAland







EXECUTIVE SUMMARY

Nebraska's Eastern Saline Wetlands are the most limited and endangered wetland type and vegetation community in the State and are considered critically imperiled in Nebraska. These wetlands provide habitat for a variety of native plant and animal species that depend on a saline environment, including two endangered species.



Because of their location in and around the city of Lincoln, saline wetlands are ideally located to provide recreational opportunities and flood protection. Past impacts have resulted in the degradation of nearly 90% of the saline wetlands and those remaining face continued threats.

The Saline Wetland Conservation Partnership was established in 2003 and continues to be supported through multi-year inter-local agreements. Initial partners included the City of Lincoln, Lancaster County, Lower Platte South Natural Resources District, The Nature Conservancy, and the Nebraska Game and Parks Commission. The Partnership in 2018 consists of the City of Lincoln, Lower Platte South Natural Resources District, Nebraska Game and Parks Commission, and the Nebraska Chapter of Pheasants Forever, Inc. A coordinator was hired in March 2003 to support the comprehensive strategies outlined in the *Implementation Plan for the Conservation of Nebraska's Eastern Saline Wetlands* (2003).

Since 2002, the Nebraska Environmental Trust Fund (NET) has funded the City of Lincoln with five grants through 2019. The initial funding in 2002 led to the formation of the Saline Wetlands Conservation Partnership (SWCP) in 2003.

This plan update will continue to support the partnership approach for the conservation of saline wetlands and the needs of the community. Its implementation will need cooperation among federal, state, and local agencies strengthened by the business knowledge of private enterprise, the energy and imagination of local conservation interests and non-profit organizations, and participation by private landowners to create pro-active programs, incentives, and strategies.

The Plan **Goal** remains "No net loss of saline wetlands and their associated functions with a long-term gain in sustaining wetland functions through the restoration of hydrology, prescribed wetland management, and watershed protection". To meet this goal the Plan includes Comprehensive Strategies that address: 1) Coordinator, 2) Education and Outreach, 3) Planning and Coordination, 4) Priority Conservation Plan, 5) Funding, 6) Taxes, 7) Wetland Protection, 8) Stream Restoration, 9) Wetland Buffer Management and Development, 10) Research, and 11) Private Lands. Landscape objectives listed, address wetland protection and restoration for about 4,000 acres.

Background and Purpose

This plan promotes the conservation of saline wetlands throughout Lancaster and southern Saunders counties (Figures 1 and 2). Although saline wetlands are the plan's primary focus, it is recognized that this conservation may also address, at least in part, other benefits such as providing greenways and open space, recreation and education areas, flood protection, water quality, storm water management, virgin and restored prairies conservation, sustainable agricultural lands, and habitat for endangered and threatened species as well as pollinators.

The plan will continue to address the conservation of saline wetlands, the needs of the community, and identify the importance of existing programs. Implementation will continue to involve local, state, and federal agencies working in concert with private individuals and organizations to develop additional strategies and programs that encourage saline wetland conservation. Since the adoption of the *Implementation Plan for the Conservation of the Nebraska's Eastern Saline Wetlands* in 2003 new approaches have been developed to address saline wetland conservation and the Partnership has been successful in acquiring and restoring additional properties containing saline wetlands and adjacent natural areas.



Plan Accomplishment

The continued implementation of this Plan will be the responsibility of the primary partners (City of Lincoln, Lower Platte South Natural Resources District, Nebraska Game and Parks Commission, and Pheasants Forever, Inc.). The primary partners will work closely with the Coordinator and other partners to ensure the plan is successful. The effective time period for this Plan is ten years (2018-2028).

Figure 1 Nebraska's Eastern Saline Wetlands Northern Lancaster and southern Saunders County



Figure 2 Nebraska's Eastern Saline Wetlands Southwestern Lancaster County



NEBRASKA'S EASTERN SALINE WETLANDS



Nebraska's Eastern Saline Wetlands are the most limited and endangered wetland type and vegetation community in the State (Kaul 1975) and are considered critically imperiled in Nebraska (Clausen et al. 1989). Once extending over an area estimated to be in excess of 20,000 acres, less than 4,000 acres remain and many of these are highly degraded. They

occur in swales and depressions within the floodplains of Salt Creek and its tributaries in Lancaster and southern Saunders counties (Figures 1 and 2) and are characterized by saline soils and salt-tolerant vegetation. The source of salinity for these wetlands is the discharge of saline groundwater into the stream channels and at the surface of the adjacent floodplain. Channelization of the streams traversing and downstream of these wetlands has lowered the local water table and drastically reduced, or eliminated the amount of saline water discharging at the surface.

These wetlands provide habitat for a variety of native plant and animal species that depend on a saline environment. The state and federally endangered Salt Creek tiger beetle (*Cicindela nevadica* var. *lincolniana*) is found only in Nebraska's Eastern

Saline Wetlands. In addition, Eastern Saline Wetlands are home to several saline plants that are found nowhere else in Nebraska, including saltwort (*Salicornia rubra*) a state listed endangered species. The Nebraska Natural Legacy Project (Nebraska Game and Parks Commission, 2011) lists the Eastern Saline Wetlands as a Biologically Unique Landscape (BUL) and identifies four additional at-risk plant and animal species that use the



saline wetlands: the federally endangered Interior Least tern (*Sterna antillarum athalassos*); federally threatened Piping plover (*Charadrius melodus*); Saltmarsh aster (*Aster subulatus var. ligulatus*); and Texas dropseed (*Sporobolus texanus*).

Eastern Saline Wetlands are also of historical significance since their presence spawned a short-lived salt extraction industry in the 1860's that led to the establishment of the City of Lincoln. This heritage is an important component in the need for the conservation of saline wetlands.

Functions and Values

Nebraska's Eastern Saline Wetlands provide habitat for a variety of wildlife species, and are particularly important as habitat for shorebirds and waterfowl during migration. The exposed saline mudflats provide an abundance of invertebrates as a food source. During the last century, more than 250 species of birds have been reported at the salt basins of Lancaster County (Jorgensen, 2017).



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In October 2005, Nebraska Audubon, recognizing the scarcity of saline wetlands and their importance for certain species of concern, selected four saline wetlands as Important Bird Areas (Jack Sinn Wildlife Management Area (WMA), Whitehead Saline Wetlands, Arbor Lake and adjacent Little Salt Creek, and Frank Shoemaker Marsh).

Since the inception of the Partnership the Nebraska Game and Parks Commission has held two southeast region birding days on saline wetlands.

In May 2008 a birding day was held at Frank Shoemaker Marsh and in May 2014 at Little Salt Fork Mark Preserve, Little Salt Creek West WMA, and Little Salt Springs. The Nature Conservancy held a 2017 Bird Blitz across Nebraska and included the saline wetlands for bird identification. Bird lists for saline wetland areas can be found at:

https://lincoln.ne.gov/city/parks/parksfacilities/wetlands/iba.htm

Wetlands, both saline and fresh, protect stream quality by filtering pollutants and collecting sediment from runoff water, and aid flood control by storing water after rain events and reducing peak flows. Eastern Saline Wetlands are no exception and play a particularly important role given their proximity to Lincoln. Buffer tracts and connecting corridors associated with the wetlands may also help stream quality by trapping agricultural chemical runoff from fields and preventing it from entering the stream flow.



Because of their location in and round the City of Lincoln and their proximity to Omaha, Eastern Saline Wetlands are ideally located to provide recreational opportunities. Bird watching, nature study, walking, and waterfowl and pheasant hunting are the most common outdoor recreation activities pursued in these wetlands. Few wetland areas in Nebraska provide the educational opportunities afforded by the close proximity of these unique wetlands to so many students.

Loss and Threats

Inventory and assessment work by Gersib and Steinauer (1990) and Gilbert and Stutheit (1994) noted extensive wetland losses from expansion of the city of Lincoln and agricultural activities. They further noted that all existing saline wetlands identified in their inventory have experienced recognizable degradation. Eastern Saline Wetlands were given a priority 1 ranking in the *Nebraska Wetlands Priority Plan* due to extensive



losses in the past (Gersib 1991) and are considered an endangered wetland complex (LaGrange 2005).

Because the entire Eastern saline wetland complex is located in and near the city of Lincoln, past losses have been severe, and future threats from development activities are imminent. Saline wetland assessment work by Gersib and Steinauer (1990) indicated that 168 of 188 uncultivated wetland sites were considered to have a high or moderate vulnerability to future wetland degradation or loss.

Categories of threat to Eastern Saline Wetlands include drainage or filling, stream-bed degradation, agricultural conversion, residential or commercial development, road construction, sedimentation, and water pollution. A serious longterm threat is the degradation (deepening)

of stream channels that result in erosive lateral head-cuts (gullies) that eventually drain wetlands, and could lead to locally declining water tables.

The City of Lincoln and Lancaster County 2040 Comprehensive Plan (LPIan 2040, 2016 update), includes the Environmental Resources chapter, which provides an outline of the guiding principles for environmental resources, a discussion of environmental resource features, and a long range planning and implementation approach with associated strategies, entitled "The Greenprint Challenge." The Environmental Resources chapter identifies the following strategies for saline wetlands:



- Continue the efforts of the Saline Wetlands Conservation Partnership to execute the Implementation Plan for the Conservation of Nebraska's Eastern Saline Wetlands.
- Provide appropriate incentives in addition to regulatory mechanisms such as the Federal Section 404 process — to encourage landowners to preserve saline and freshwater wetlands. Incentives to be used or considered further include:
 - Special density credits or bonuses within a Community Unit Plan for wetland conservation.
 - Transfer of development rights.
 - Utilize these areas for wetland bank mitigation.
 - Technical assistance for wetland preservation and enhancement.
 - o Conservation easements with tax incentives.
 - Fee simple purchase of land for preservation.
- Research and seek implementation of procedures for managing lands containing and near to saline wetlands. It would be desirable for this research to be conducted at the watershed level to provide a broad perspective of how area-wide development will interact with this natural resource. A special treatment buffer along the perimeter of saline wetlands could reduce the impact of increased runoff, sedimentation, and other pollutants. Such buffers could serve to provide support for preservation of habitat areas for the county's threatened and endangered species.

Saline Wetlands Conservation Partnership

In 2003, the Saline Wetlands Conservation Partnership was formed. The establishment and continued conservation efforts of the SWCP are enhanced by grant funds received from the Nebraska Environmental Trust by the City of Lincoln for the Eastern Saline Wetlands Project. Primary partners of the inter-local agreement, which established the Partnership, were the City of Lincoln, Lancaster County, Lower Platte South Natural Resources District, The Nature Conservancy, and the Nebraska Game and Parks Commission. Several other agencies and conservation groups are currently involved with the Partnership.



Since 2003, nearly 2,186 acres of land containing saline wetlands has been conserved either through fee-title acquisition (1,609 acres) or conservation easements (577 acres) from willing sellers. This includes 95 acres of native prairie and 330 acres of high-diversity native plant seeding on degraded and formerly farmed areas. Education and wetland restoration projects have been implemented and completed. The SWCP received the Outstanding Bird Conservation Award from the Nebraska Partnership for All-Bird Conservation in 2008 at the 38th Annual Rivers and Wildlife Celebration.

Community support is present for the conservation of saline wetlands. Saline wetlands were identified as an "Environmental Resource Feature" in LPIan 2040. The Lower Platte South NRD conducted a "Community Prioritization Study (Sigma Group, L.L.C.)" in 2015. The public opinion survey of the general public within the district documented public attitudes toward various planning and development issues in the region. The results indicated 53 percent of persons interviewed rated the importance of preserving wetlands as an 8, 9, or 10 with 10 being extremely important and 1 not at all

being important. When asked how supportive they were of public involvement and expenditures for protecting saline wetlands the response was 46 percent strongly support, 35 percent mildly support, and 16 percent do not support. It is imperative the Plan objectives and strategies continue to progress to accommodate the unique needs of the diverse set of stake holders.

This Implementation Plan update will continue to address the preservation and restoration of Nebraska's eastern saline wetlands. The Plan Goal, Comprehensive strategies, and Landscape objectives are established for future conservation of the wetlands. A summary of wetland acres conserved through fee-title acquisition and conservation easements since 2001 through the efforts of the Partnership is provided in Table 1. The summary is based on targets identified within Landscape objectives 1 - 4.

IMPLEMENTATION OF	TOTAL ACRES	ACRES OF WETLAND PROTECTED OR
LANDSCAPE OBJECTIVES	PER OBJECTIVE*	RESTORED 2002-2017
1 – Permanently protect 100% (148 acres) of intact		
Category 1 saline wetlands and their associated	148	47
conservation zones to ensure that the wetlands and		
their functions are sustained		
2 – Restore and Protect 80% (1,412 acres) of		
unprotected degraded Category 1 saline wetlands and	1,412	443
their associated conservation zones to ensure that the		
wetlands and their functions are sustained		
3 – Restore (to intact Category 1 wetlands) and protect		
50% (167 acres) of unprotected Category 3 saline	167	99
wetlands and their associated conservation zones to		
ensure that the wetlands and their functions are		
sustained as intact Category 1 wetlands		
4 – Restore (to intact Category 1 wetlands) and protect		
50% (2,360 acres) of unprotected current non-wetland	2,360	520
areas on saline hydric soils so that they become intact		
and sustained Category 1 saline wetlands		
TOTAL	4,087	1,109

Table 1Summary of wetland acresconserved through fee-title acquisition

* Acres identified in 2003 Implementation Plan

Source: Ted LaGrange and Rachel Simpson of the NGPC, June 2018

GOAL

No net loss of saline wetlands and their associated functions with a long-term gain in sustaining wetland functions through the restoration of hydrology, prescribed wetland management, and watershed protection.

COMPREHENSIVE STRATEGIES

The Comprehensive Strategies are not specific to any one property, but are broader in scope and are necessary for the overall successful conservation of saline wetlands. Many of these strategies have already been initiated and are ongoing. Some of these strategies will require additional objectives and action items.

Partnership Management

Comprehensive Strategy 1 - Coordinator

Employ a coordinator to oversee the implementation of the conservation plan. The coordinator, working in conjunction with the partners, will oversee day-to-day operations, short and long term planning, fiscal responsibilities, and administration of the interlocal agreements between partners.

Comprehensive Strategy 2 - Education and Outreach for the Community

Inform and provide the public opportunities to learn about the importance of the conservation of saline wetlands. Use both traditional and new media applications for sharing information and receiving input regarding saline wetland conservation activities.

Comprehensive Strategy 3 - Planning and Coordination

Include the conservation of saline wetlands in community planning, floodplain management and capital projects through continued participation with other agencies and organizations when applicable.

Comprehensive Strategy 4 - Priority Conservation Plan

Update the document "A Prioritization of Eastern Saline Wetland Areas (2003)" using current Geographic Information System (GIS) for the conservation of saline wetlands and their associated conservation zones. This information forms the basis of the priority conservation plan to accomplish landscape objectives. Prioritization criteria include natural resource conditions and biological characteristics, land usage, adjacent land conformity, and potential for continued conservation.

Comprehensive Strategy 5 - Funding

Identify sources and obtain funds to implement the conservation plan. Provide support and information of Partnership activities to funding resources with quarterly and annual reports. Continue to work with partners to provide funding for the sustainability of the Partnership through existing and future interlocal agreements.

Increase stewardship through the use of Partner funds and staff resources.

Comprehensive Strategy 6- Taxes

Assume tax responsibilities for financing local governments through the payment in lieu of property taxes, as required by policy or under existing laws, for the conservation of saline wetlands.

Natural Resource Management

Comprehensive Strategy 7- Wetland Protection

Maintain the remaining saline wetlands through a no net loss policy. Existing wetlands can be protected with already established laws (Clean Water Act, State of Nebraska Title 117, Farm Bill), as may be updated in the future, and voluntary protection and restoration programs. Wetland mitigation projects following the *Mitigation Guidelines for Nebraska's Eastern Saline Wetlands* (Taylor and Krueger 1997) will help to ensure no net loss of saline wetlands.

Comprehensive Strategy 8 - Stream Restoration

Prevent further stream-bed degradation and restore stream grade and bank characteristics where possible.

Comprehensive Strategy 9 - Wetland Buffer Management and Development

Continue with land management efforts of established buffers surrounding wetland areas. Encourage highly diverse native plantings to benefit grassland birds, pollinators, and other wildlife species.

Comprehensive Strategy 10 - Research

With scientific evidence identifying the source of saline groundwater, research has focused on the hydrogeology of the saline wetland system to understand the discharge pathways of saline groundwater and recharge sources. Much of this research was initiated by University of Nebraska-Lincoln scientists. The Partnership, with the assistance of consultants and other technical experts, will continue to work with the University and explore means to use the science to conserve and enhance saline wetlands.

Comprehensive Strategy 11- Private Lands

Support the historical stewardship of Eastern Saline Wetlands by private landowners. It is recognized that many existing saline wetlands are on private lands and have been sustained by private landowners. This plan will continue to support continued sustainable uses. Private landowner participation in projects funded through this plan is voluntary.

The Partners will continue to develop relationships and share information with private landowners within the project areas and maintain a transparency of Partnership activities with landowners and the community.

LANDSCAPE OBJECTIVES

If fully implemented, Comprehensive Strategy 7 would ensure there will be no net loss of wetlands by direct human-induced activities. Thus, the landscape objectives focus on:

- 1) maintaining protection for wetlands if existing wetland protection laws change;
- 2) protecting and managing the upland areas around the wetland to ensure that the wetlands will be sustainable; and
- 3) restoring and managing wetlands to maintain wetland functions.

Conservation zones or areas designated to protect the rare or threatened habitats and species of Nebraska's Eastern Saline wetlands will require different approaches and if needed, will be determined on a case to case basis. These approaches may include the following:

- Protect delineated wetland
- Water quality buffer areas of 30 180 feet¹ for sediment and nutrient removal; buffer distances may be greater in areas of steep slopes and high intensity land use
- Wildlife protection and human disturbance buffer of 100 300 feet¹, which are dependent on resident species, life-history characteristics of the species, wetland and wetland buffer condition, intensity of surrounding land use, and buffer function should be added onto the water quality buffer
- Additional buffer area can be determined to support hunting, prescribed fire and grazing, connection of wetlands through corridors to allow wildlife interchange, inclusion of wetland watersheds (including streams and floodplains), and scenic view-sheds

¹McElfish,James M, Rebecca L. Kihslinger, and Sandra Nichols. Setting Buffer Sizes for Wetlands. National Wetlands Newsletter, Vol 30, No. 2 Environmental Law Institute. Washington D.C. 2008

Freshwater wetlands are often located on floodplains in close association with saline wetlands and other native habitats such as grassland, native prairie, and woodlands, which occupy buffer areas around the saline wetlands. Although the landscape objectives focus on saline wetlands, it's recognized that freshwater wetlands and other natural habitats provide valuable functions and can enhance adjacent saline wetland complexes in need of conservation. Where possible, the conservation of saline wetlands will include all wetlands, virgin prairie, restored grasslands and riparian corridors associated with the saline wetlands and within the Biologically Unique Landscape.

The landscape objectives are based on categorization data and maps compiled by an interagency team while conducting field site visits in the late 1980s and early 1990s (Gilbert and Stutheit 1994). The categorization data provide general guidance for planning purposes and should be verified through up-to-date on-site data collection and wetland delineation as needed for any project. Following is an abbreviated definition of categories from the *Resource Categorization of Nebraska's Eastern Saline Wetlands*.

Category 1: Site currently provides saline wetland functions of high value or has the potential to provide high values following restoration or enhancement measures.

Category 2: Given current land use and degree of degradation, site currently provides limited saline wetland functions and low values. Restoration potential is low. These sites are so degraded that they are not considered as restorable in the Landscape Objectives section. If, in the future, a Category 2 wetland is determined to be restorable, then the restoration will be considered as contributing to Landscape Objective 4.

Category 3: Site is functioning as a freshwater wetland having freshwater plant communities on a saline soil. Currently provides freshwater wetland values <u>and</u> no feasible restoration measures exist to re-establish the historic salt source and saline plant associations. If, in the future, a Category 3 wetland is determined to be restorable, then the restoration will be considered as contributing to Landscape Objective 4.

Not Categorized (NC): These sites are mapped as wetlands on the National Wetland Inventory maps but access to the site was denied and the site could not be categorized. If and when these sites are categorized, the total acreage objective for each category will need to be adjusted accordingly.

Category 1 wetlands were further classified by Nebraska Game and Parks wetland program staff as intact or degraded based on field notes and site specific knowledge. Wetlands were considered protected if they were under ownership (either fee title or easement) by the City of Lincoln, Lancaster County, Lower Platte South Natural Resources District, The Nature Conservancy, the Nebraska Game and Parks Commission, the Natural Resources Conservation Service, or the Nebraska Department of Roads (wetland mitigation sites) as of September 2001. The acres identified for protection in the landscape objectives are from the 2003 Implementation Plan.

Landscape Objective 1:

Permanently protect 100% (148 acres) of intact unprotected Category 1 saline wetlands and their associated conservations zones to ensure the wetlands and their functions are sustained

Strategy 1: Use <u>easements</u> purchased from willing sellers to permanently protect approximately 50% of intact Category 1 saline wetlands and an associated buffer to ensure that the wetlands are sustained.

Strategy 2: Use <u>fee-title acquisition</u> from willing sellers to permanently protect approximately 50% of intact Category 1 saline wetlands and an associated buffer to ensure that the wetlands are sustained.

Strategy 3: Use <u>private lands programs</u> and local ordinances to provide for sustainable uses in the immediate wetland watershed.

Landscape Objective 2:

Protect 80% (1,412 acres) of unprotected degraded Category 1 saline wetlands and their associated conservation zones.

Strategy 1: Use <u>easements</u> purchased from willing sellers to protect approximately 40% of degraded Category 1 saline wetlands and an associated buffer to ensure that the wetlands are sustained.

Strategy 2: Use <u>fee-title acquisition</u> from willing sellers to protect approximately 40% of degraded Category 1 saline wetlands and an associated buffer to ensure that the wetlands are sustained.

Strategy 3: Use <u>private lands programs</u> and local ordinances to provide for sustainable uses in the immediate wetland watershed.

Strategy 4: Evaluate and determine restoration needs and implement them to ensure the wetlands and their functions are sustained

Landscape Objective 3:

Protect 50% (167 acres) of unprotected Category 3 saline wetlands and their associated conservation zones to ensure the wetlands and their functions are sustained as intact Category 1 wetlands.

Strategy 1: Develop <u>restoration techniques</u> to successfully re-establish salinity sources to restore Category 3 wetlands to Category 1 wetlands.

Strategy 2: Use <u>easements</u> purchased from willing sellers to protect approximately 25% of intact Category 3 saline wetlands and an associated buffer to ensure that the wetlands are sustained.

Strategy 3: Use <u>fee-title acquisition</u> from willing sellers to protect approximately 25% of intact Category 3 saline wetlands and an associated buffer to ensure that the wetlands are sustained.

Strategy 4: Use <u>private lands programs</u> and local ordinances to provide for sustainable uses in the immediate wetland watershed.

Strategy 5: Evaluate and determine restoration needs and implement them to ensure the wetlands and their functions are sustained

Landscape Objective 4:

Restore (to intact Category 1 wetlands) and protect 50% (2,360 acres) of unprotected current non-wetland areas on saline hydric soils so that they become intact and sustained Category 1 saline wetlands.

Strategy 1: Use <u>easements</u> purchased from willing sellers to permanently protect approximately 25% of current non-wetland areas on saline hydric soils and an associated buffer to ensure that the wetlands are sustained.

Strategy 2: Use <u>fee-title acquisition</u> from willing sellers to permanently protect approximately 25% of current non-wetland areas on saline hydric soils and an associated buffer to ensure that the wetlands are sustained.

Strategy 3: Use <u>private lands programs</u> and ordinances to provide for sustainable uses in the immediate wetland watershed.

Strategy 4: Evaluate and determine restoration needs and implement them to ensure the wetlands and their functions are sustained

Landscape Objective 5:

Manage 100% of restored and protected saline wetlands to maintain their associated functions.

Strategy 1: The Partnership will determine which partner will manage acquired properties, in part based upon resource availability.

Strategy 2: Develop prescribed management plans for each area protected.

Strategy 3: Use <u>private lands program</u> to provide management assistance to privately owned wetlands.

Strategy 4: Continue annual meeting of saline wetland land managers to discuss and share information regarding management techniques.

Landscape Objective 6:

Manage and enhance protected saline wetland buffers not on saline soils

Strategy 1: The Partnership will determine, which partner will manage acquired properties.

Strategy 2: Develop prescribed management plans for each area protected.

Strategy 3: As needed, introduce native high diversity seeding to uplands and supplement riparian areas with native woody species.

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