

**Leviathan Mine
Supplemental Environmental Project
2010 Annual Report
(First Annual Report)**

**Atlantic Richfield Company
March 23, 2010**

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Camarillo, California**

Acknowledgments

This 2010 Supplemental Environmental Project Annual Report has been prepared and submitted consistent with the Leviathan Mine Project Administrative Settlement Agreement and Order on Consent for Removal Action specifications (U. S. EPA Region IX CERCLA docket No. 2008-29) and constitutes the first annual report provided to the Agency by Atlantic Richfield Company. The Supplemental Environmental Project (SEP) provides for the implementation of multiple riparian restoration, enhancement and monitoring activities in the Carson River Valley, Douglas County, NV. This project was undertaken in connection with the settlement of an enforcement action in the matter of Leviathan Mine, taken on behalf of the U.S. Environmental Protection Agency under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA or Superfund). The identified restoration activities are being implemented at River Fork Ranch, a conservation project site and working ranch managed by The Nature Conservancy (TNC) as part of its Carson River initiative. By Letter of Agreement and SEP specifications, TNC is planning and undertaking prescribed restoration and enhancement activities with E. R. Mancini serving as a SEP Oversight Coordinator and Point of Contact for Atlantic Richfield Company. The Atlantic Richfield Company acknowledges and appreciates TNC's efforts in conducting the project's specified activities through dedicated AR funding at River Fork Ranch.



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Executive Summary

This Supplemental Environmental Project (SEP) annual report provides data and information regarding elements of riparian corridor and wetland complex restoration and enhancement in the Carson River watershed accomplished in 2009 with dedicated AR funding. The report is being submitted consistent with the Administrative Settlement Agreement and Order on Consent for Removal Action specifications (U. S. EPA Region IX CERCLA docket No. 2008-29) and constitutes the first annual report provided to the Agency by Atlantic Richfield Company.

The discrete and primary habitat protection and restoration elements of the SEP are construction of cattle exclusion fencing in sensitive riparian habitat of the West Fork Carson River, restoration of approximately 15-20 acres of cottonwood/willow riparian habitat along ~1 mile of the West Fork Carson River, and creation of ~ 2 acres of wetland habitat along the east channel of Brockliss Slough. In addition, initial monitoring of bird and plant communities to document biological community status and condition have been implemented and are reported here. This first annual SEP report constitutes a summary of activities conducted at River Fork Ranch with dedicated Atlantic Richfield Company funding during 2009 (April 1 to December 31, 2009).

During this first project year, approximately 5000 feet of cattle exclusion fencing was installed or relocated to protect restoration areas and/or widen the riparian corridor along the West Fork Carson River by an average of approximately 20 feet. Proposed cottonwood tree planting was accomplished in Area #1; non-native vegetation was treated/removed from Area #4; restoration design, planning and permitting proceeded for specified projects and onsite TNC administrative management was provided for all project components. Bird and plant community data and information were provided for River Fork Ranch including specific information for the SEP project areas. Of the \$400,000 Atlantic Richfield funding commitment provided in March, 2009, approximately \$150,612 was expended between April and December, 2009.

This first annual SEP report provides narrative and tabular summaries and related documentation of project accomplishments at River Fork Ranch on behalf of AR. The accomplished restoration and enhancement elements are locally significant but also advance the broader restoration goals of TNC's Carson River initiative and leverage Nevada "Question 1" bond funds provided to conserve and restore Carson River Valley resources.

Introduction

This 2010 Supplemental Environmental Project Annual Report has been prepared and submitted consistent with the Administrative Settlement Agreement and Order on Consent for Removal Action specifications (U. S. EPA Region IX CERCLA docket No. 2008-29) and constitutes the first annual report provided to the Agency. The Supplemental Environmental Project (SEP) provides for the implementation of multiple riparian corridor and wetland complex restoration, enhancement and monitoring activities in the Carson River Valley, Douglas County, NV. Table 1 presents a brief summary and description of the SEP elements and anticipated implementation costs. The identified activities are being undertaken, by agreement, with SEP-dedicated Atlantic Richfield Company funds (\$400,000) by The Nature Conservancy (TNC) at River Fork Ranch, Douglas County, NV.

Table 1. Summary of SEP elements, brief project descriptions and anticipated implementation costs.

SEP Element	Description	Anticipated Implementation Costs
Restoration of native riparian/wetland vegetation (cottonwood/willow and native wetland vegetation)	Planting of 15.5 to 20.5 acres of riparian willow and cottonwood (along ~ 1 mile of W. Fork Carson River); creation of ~2 acres of wetland habitat (along ~ 1/10 mile of Brockliss Slough)	\$185,000- \$200,000
Cattle exclusion fencing	Construction of cattle exclusion fencing to prevent grazing-related impacts to vegetation and riparian/aquatic habitat	\$75,000 (~\$5/ft)
Baseline and post-restoration monitoring -Plant community -Avifauna	Baseline and post-restoration plant and avian community assessments	\$80,000
Indirect costs TNC project administration and annual report production	Brief, photodocumented reports, describing accomplished project objectives and monitoring data and information	\$45,000-\$60,000

The primary goal of the conservation and restoration activities at River Fork Ranch is restoration of historic geomorphological characteristics (channel and riparian structure) and related floodplain habitat resources like wetlands and related fish/wildlife and vegetative community diversity (The Nature Conservancy, 2007 and 2008). Plant and bird community monitoring data and information are provided. The primary and discrete elements of the SEP have been or will be implemented at one or more of the identified project restoration areas (Area #1 through #4) or along the existing West Fork Carson River riparian corridor within the property identified in Figure 1.

River Fork Ranch Figure 1

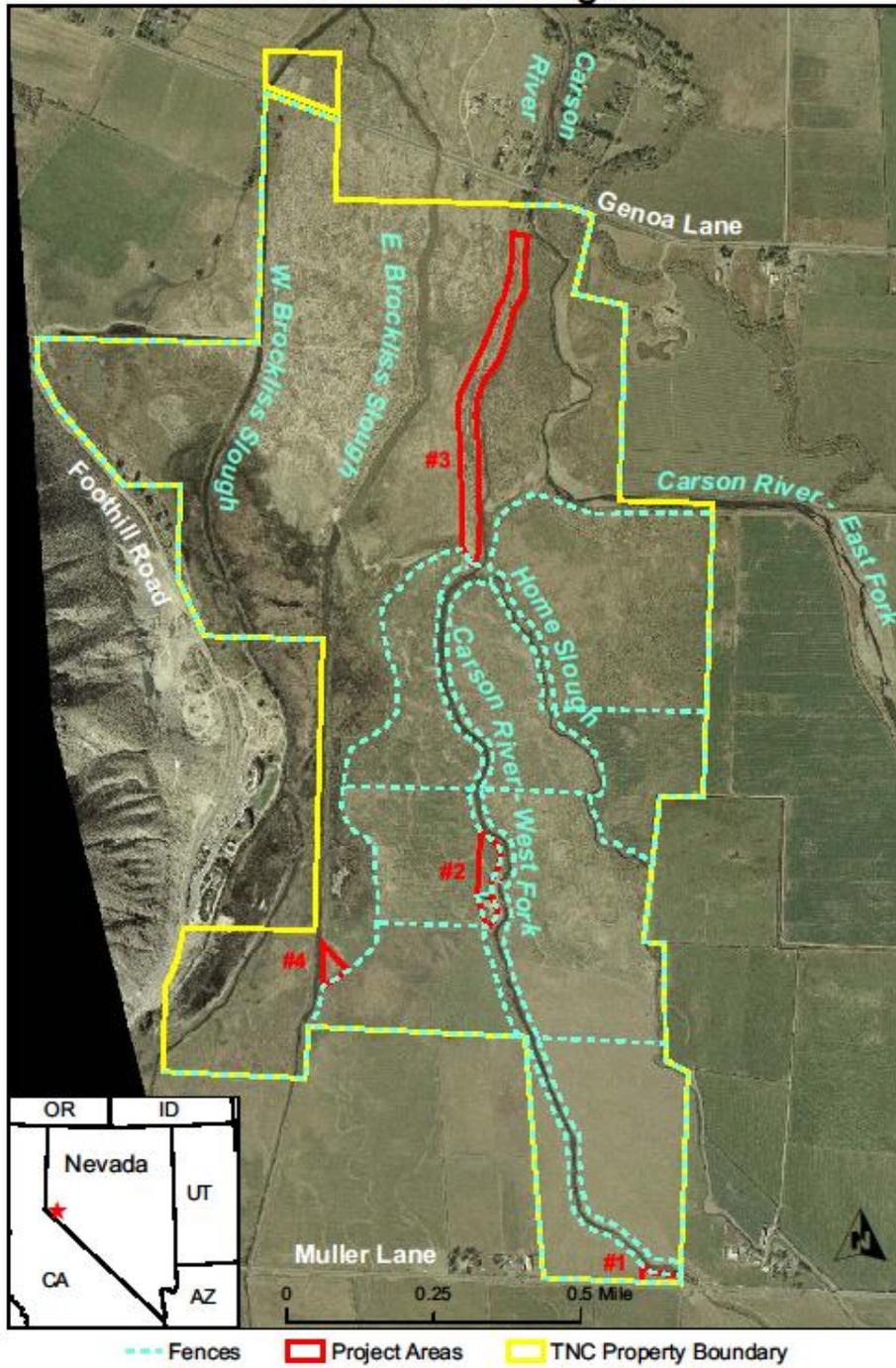


Figure 1. River Fork Ranch, Douglas County, NV indicating the locations of SEP restoration areas numbers 1 through 4 (TNC, 2009).

Biological Characterization and Monitoring

Plant and bird community characterization and monitoring activities have been conducted at River Fork Ranch for several years in order to assist TNC's Carson River restoration objectives. In 2009, focused assessments for SEP Areas #1 through #4 were included in evaluations of vegetation patterns (McBain & Trush, 2010) and bird species/communities (Great Basin Bird Observatory, 2009). Plant and bird community information will be provided under subject matter headings below.

Vegetation/Plant Communities

McBain & Trush (2010) conducted a field investigation at River Fork Ranch in spring 2009 (May). Existing vegetation maps and field sampling information were used to assist in identifying restoration opportunities and providing management recommendations to TNC. Their report provided relevant summaries of vegetation/plant community conditions and documented vegetation patterns (Figure 2) as well as physiographic and hydrologic features to consider in developing restoration plans. Pre-restoration information from TNC and the McBain & Trush report for the proposed SEP restoration areas is briefly described and summarized here for reference. Restoration goals/objectives are also provided.

Area # 1 (Muller Lane cottonwood restoration area): This area was unfenced and overgrazed wet meadow and riparian habitat that consisted primarily of *Fescue*-dominated irrigated pasture. The primary restoration objectives included the exclusion of grazing, passive/natural riparian willow recruitment and the active establishment of a small cottonwood gallery to serve as habitat and seed bank for downstream areas. It is also anticipated that willow and cottonwood in this area will eventually provide cuttings to conduct active restoration at other locations within the riparian zone of the Carson River system.

Area #2 (Central Ranch restoration area): This area was unfenced, partially covered with dredged material and sustained non-native vegetation. Exotic annual herbaceous plant species dominated this fallow alfalfa field which also contained some derelict ranching infrastructure. Primary restoration objectives for this area include exclusion of grazing, reestablishment of overbank flows, creation of a cottonwood gallery forest to serve as habitat and seed bank for downriver locations, removal of dredged material to appropriately lower prevailing topography and development of native understory vegetation. Active or passive willow restoration is under consideration.

Area #3 (North Central ranch restoration area): A dredged material berm was recently removed but exotic annual herbaceous plants (especially disturbance-dependent weed species) dominate this unfenced area. Primary restoration objectives include the exclusion of grazing, treatment/removal of non-native vegetation, reestablishment of seasonal overbank flow to reconnect the river and adjacent wet meadows/grasslands, and revegetation with willows in the riparian zone(s) as well as cottonwoods and native grasses/forbs farther from the river.

Area #4 (COE wetland expansion area): The primary restoration foci for this area are expansion of the existing wetlands and increasing the extent and duration of annual inundation, exclusion of grazing, removal of exotic annuals and transplanting with cattail and bulrush.

Area-specific photodocumentation will be used to demonstrate project activities and status and may be enhanced with aerial photography and ground survey information.

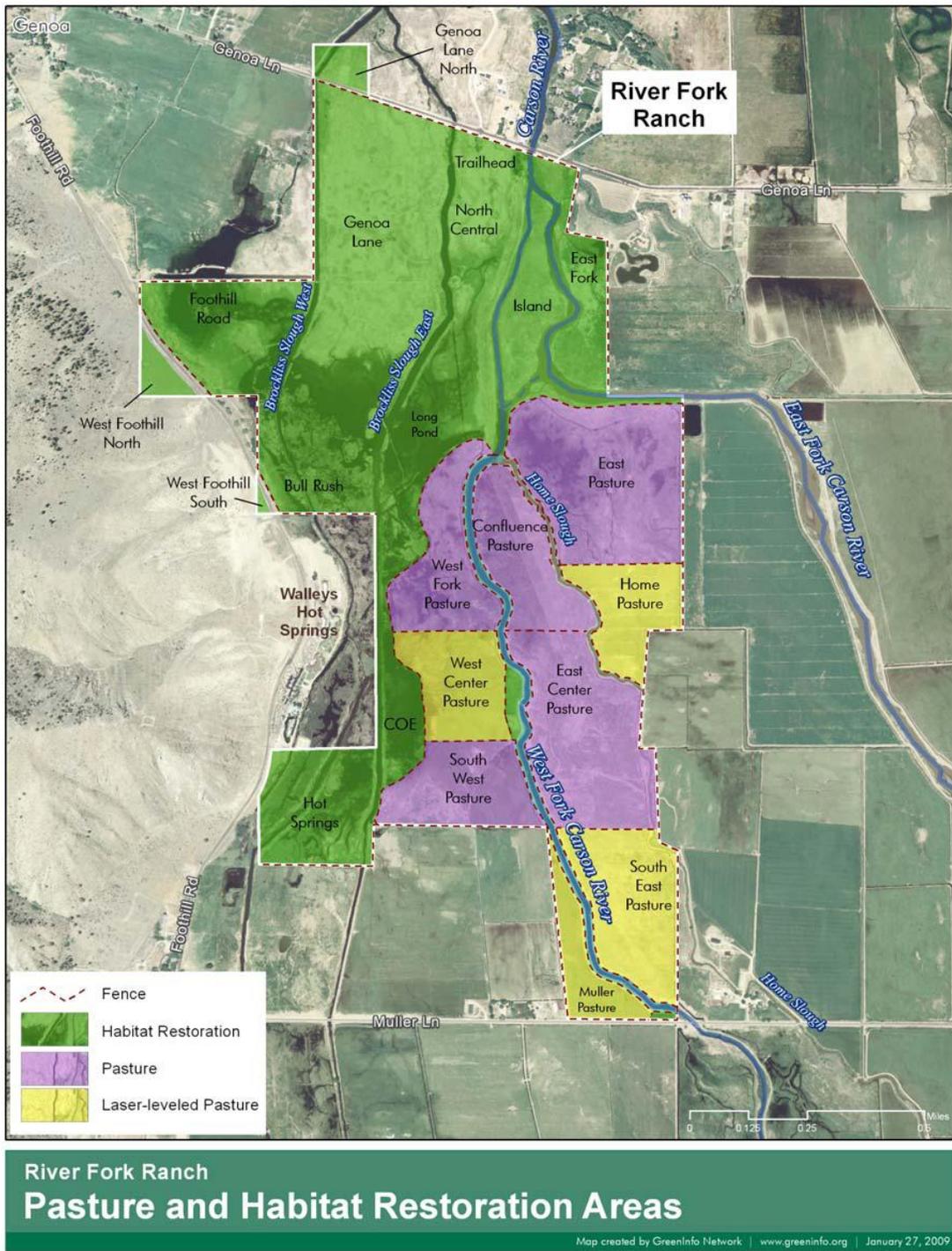


Figure 2. River Fork Ranch, Douglas County, NV indicating pastures and habitat restoration areas (green) including SEP areas as identified in Figure 1 (from McBain & Trush, 2010).

Avifauna/Bird Community

The Great Basin Bird Observatory (GBBO; Reno, NV) has conducted bird monitoring surveys at River Fork Ranch since 2002 and has reported both historical and 2009 monitoring data in a recent Progress Report (GBBO, 2009). Both point count survey and spot-mapping/area search data are provided in the report and these methodologies are described in detail at the GBBO website (www.gbbo.org/Programs/Projects). Between 2002 and 2009, GBBO has identified 95 bird species including 56 riparian/wetland associated species. In 2009, 56 species including 37 riparian/wetland species were documented across River Fork Ranch property from a combination of point count and area search surveys. Table 2 provides a summary of species detected or quantified within or proximate to the SEP Areas #1 through #4 in 2009. Figure 3 identifies search plot and point count survey locations from the 2009 monitoring program.

Table 2. Bird species detected (“D”) or quantified (number/40 hectares) within or proximate to SEP restoration Areas #1 through #4 including point count and area search results in 2009 (summarized from GBBO, 2009). [Riparian/wetland associated species are **bolded**, and superscripts 1, 2, 3 and 4 indicate Areas #1 through #4].

Species	Number/40 hectares (2009)	Area search
American Coot ⁴	3.1	D
American Kestrel ³	D	D
Bewick’s Wren ³	1.2	D
Black Phoebe ¹	-	D
Black-billed Magpie ^{3,4}	1.6	D
Black-crowned Night-Heron ³	0.9	D
Black-headed Grosbeak ³	D	D
Brewer’s Blackbird ^{1,3,4}	6.5	D
Brown-headed Cowbird ³	4.0	D
California Quail ³	0.3	D
Cinnamon Teal ³	4.7	D
Clark’s Grebe ³	-	D
Common Yellowthroat ^{3,4}	0.3	D
Gadwall ^{1,3}	D	D
Horned Lark ³	0.9	D
House Finch ¹	0.6	D
Killdeer ^{3,4}	10.6	D
Mallard ²	3.4	D
Marsh Wren ⁴	4.0	D
Northern Rough-winged Swallow ¹	D	D
Red-winged Blackbird ^{1,2,3,4}	31.7	D
Savannah Sparrow ^{1,4}	5.3	D
Song Sparrow ^{1,3}	2.8	D
Vesper Sparrow ³	0.9	D

Western Meadowlark ^{2,3,4}	7.14	D
Willet ³	3.4	D
Wilson's Snipe ^{3,4}	1.2	D
Wood Duck ⁴	-	D
Yellow-headed Blackbird ³	6.2	D

Twenty-nine species of birds were documented within or proximate to the SEP restoration areas in 2009 and the greatest number of species was observed within riparian willow habitat, especially in SEP Area #3 (north central berm removal area). Nineteen of the documented species in 2009 were riparian/wetland associates. Future bird community data will be provided in subsequent SEP reports.



Figure 3. Bird monitoring area search plots (hatch marks) and point count survey locations (stars) at River Fork Ranch, 2009 (from GBBO, 2010).

Accomplished Restoration Objectives

Table 3 identifies and briefly describes the four restoration areas (Areas #1 through #4), their unrestored habitat conditions as well as their primary restoration goals and objectives. In 2009, multiple restoration elements were implemented, consistent with the SEP restoration plan. Restoration planning and design are complete with most permits/approvals in place but 3 permits currently pending. Restoration activities accomplished in 2009 and planned for 2010 are described below under specific subject matter headings.

Table 3. Summary of SEP restoration area information including proposed dimensions, unrestored habitat conditions and restoration goals.

Restoration Area (approximate dimensions)	Degraded Habitat Conditions	Restoration Goals/Actions
<u>Area 1</u> (~2 acres; 0.1 mile along W. Fork Carson River)	Unfenced and overgrazed wet meadow and riparian habitat	Goal: restore willow and create small gallery cottonwood forest as habitat and seed bank for downstream Action: exclude grazing, allow natural willow recruitment and plant cottonwood
<u>Area 2</u> (5 acres; 0.2 mile along W. Fork Carson River)	Unfenced, covered with dredged material and non-native vegetation	Goal: restore overbank flows, create gallery cottonwood forest as habitat and seed bank Action: exclude grazing, remove dredged material to lower topography, plant cottonwood and native understory vegetation
<u>Area 3</u> (10 acres; 0.7 mile along W. Fork Carson River)	Unfenced, was covered with dredged material and non-native vegetation	Goal: create gallery cottonwood forest as habitat and seed bank, allow river to reconnect to floodplain Action: exclude grazing, remove dredged material, align topography with river to E and meadow to W, plant with willow along E, cottonwood planting in center and native grasses/forbs to W
<u>Area 4</u> (2 acres; 0.1 mile along E. Channel Brockliss Slough)	Unfenced, covered with dredged material and non-native vegetation	Goal: expand existing wetlands Action: exclude grazing, remove dredged material, align topography with W channel, wetlands to N and wet meadows to E and S, transplant cattail and bulrush

Cattle Exclusion Fencing

In July, approximately 5000' of cattle exclusion fencing was installed. All of the SEP Areas are now excluded from grazing and protected by fencing. Approximately 300' of this fencing was installed to establish and protect Area #1 resulting in a dedicated 2 acre area adjacent to the West Fork Carson River for revegetation efforts as described below. This restoration area was originally planned as less than 1 acre of protected habitat but exclusion fencing was used to protect ~ 2acres of habitat for revegetation. Approximately

4750' of cattle exclusion fencing was also installed and/or relocated to widen the riparian corridor along the river by ~20' between the northern end of Area #1 and the southern end of Area #3. This expanded corridor resulted in the additional protection of about 5 acres of riparian habitat. This additional area will allow wider willow and cottonwood recruitment as the riverbed continues aggrading, building inset floodplains and reestablishing hydrologic connections during seasonal flooding.

Area #1 (Muller Lane Cottonwood Restoration Area)

Exclusion fencing was completed in Area #1 in July and this area was planted with cottonwood trees in October and November. Twenty four (24) 3/4-inch diameter and six (6) 2-3-inch diameter cottonwoods were planted by volunteers and/or Tree Nursery personnel. Trees were spaced in random patterns to replicate natural recruitment characteristics. All trees were staked and chicken wire was installed around the bases of the trees to discourage voles. Fence cages were also installed to protect against beaver damage. All of the trees produced buds but several show vole damage including girdling and/or root damage. Additional protective taping was installed around the tree bases and repellent use is under consideration. These trees will be monitored to determine the impact on cottonwood survival rates. Photographs #1, #2 and #3 (Appendix A) show Area #1 before and after the installation of exclusion fencing and after cottonwood tree planting was completed.

Area #2 (Central Ranch Restoration Area)

Area #2 is protected from grazing impacts, restoration planning and design are complete and earth moving will begin in the spring when the ground is sufficiently dry. Revegetation seeding will be conducted to compete with invasive weeds after earth moving has been concluded. This will be followed with multi-age cottonwood and willow plantings.

Area #3 (North Central Ranch Restoration Area)

Area #3 is now protected from cattle access, restoration planning and design are complete and earth moving is planned for spring. Revegetation seeding with a meadow mix will be conducted to compete with invasive weeds. This area provides an extensive riparian and wetland restoration potential along and adjacent to the West Fork Carson River proximate to the TNC offices at the north end of the ranch.

Area #4 (COE Wetland Expansion)

Area #4 is protected from cattle access, has been treated to remove exotic annual vegetation and earth moving is planned for spring. This restoration area adjacent to East Brockliss Slough is intended to expand localized wetlands by encouraging seasonal flooding and natural wetland plant recruitment from adjacent wetland habitat. In addition, cattail and bulrush will be transplanted within the wetted area.

SEP Issues

In 2009, approximately 5000' of cattle exclusion fencing was installed or relocated and each of the SEP restoration areas is currently protected from grazing. While some additional fencing is likely to be installed in 2010, it is unlikely that all of the originally proposed fencing (~15,000') will be required. It is recommended, therefore, that funds not required for fencing be made available to enhance plant community restoration activities.

In early 2010 it was noted by TNC personnel that voles had damaged some of the recently planted cottonwood trees in Area #1. Additional tree protection steps were taken, as described, but cottonwood tree condition will be monitored in 2010 in order to assess survival rates and consider management options.

Literature Cited

Great Basin Bird Observatory. 2003. Nevada Bird Count: A habitat-based monitoring program for breeding birds of Nevada; instruction package and protocol for point count surveys, Reno, Nevada, X pp.

Great Basin Bird Observatory, 2009. Progress report on Carson River landbird monitoring, 2009. Reno, Nevada, 19 pp.

Great Basin Bird Observatory. 2010. Nevada Bird Count: Area searches and spot-mapping; Great Basin Bird Observatory's protocol for conducting bird surveys using the area search and spot-mapping methods, Reno, Nevada, 8 pp.

McBain and Trush, Inc., 2010. An evaluation of vegetation patterns and site opportunities/constraints on the River Fork Ranch, Genoa, Nevada. Arcata, CA, 27pp. plus Appendix.

The Nature Conservancy. 2007. Conservation Action Plan for the River Fork Ranch. The Nature Conservancy, Reno, Nevada.

The Nature Conservancy. 2008. *Conservation Action Plan for the Middle Carson River*. The Nature Conservancy, Reno, Nevada.

Appendix A

SEP Restoration Area Photographs



Photograph 1. Area #1 prior to exclusion fence installation and cottonwood tree plantings.



Photograph 2. Area #1 after fencing installation and cottonwood tree planting.



Photograph 3. New exclusion fencing installed at Area #1. Note grazing impact to the left side of the fence and reduced impact to the right side of the fence within Area #1.



Photograph 4. Protected Area #2 showing remnant alfalfa and grasses prior to earth moving and revegetation.



Photograph 5. West Fork Carson River corridor north of Area #2 prior to fence relocation.



Photograph 6. West Fork Carson River corridor north of Area #2 after fence installation and relocation to provide a wider, protected riparian corridor for passive and active restoration.



Photograph 7. Protected Area #3 with riparian willow growth along the river (left) and prior to earth moving and restoration activities.



Photograph 8. Area #3 after dredged material berm removal and prior to non-native plant treatment/removal and active revegetation.



Photograph 9. Protected Area #4 adjacent to East Brockliss Slough prior to treatment/removal of non-native vegetation and grading to enhance and expand wetland habitat. Note grazing impact left of fence.