Galena Property Management Plan

Division of Forestry, Fire & State Lands
Utah Department of Natural Resources

Approvals

As principal author, this management plan was prepared using sound ecological principles, the collaborative expertise of others, the openness of a public process, the direction of the Division's mission, and the guiding mandates of the Utah Code.

Ben R. Bloodworth
Ecologist/GIS Lands Administrator

25 May 2006
Date

This document meets the guidelines established in Utah State Law and Administrative Rules and is consistent with the mission and vision of the Division. The undersigned advocate plan approval in its entirety and that management activities described within be implemented as recommended.

Barbara Gardner
Wasatch Front Area Manager

5/23/06
Date

David Grierson
Planner

5/24/06
Date

This document represents the management direction that the Division will take for the subject property. The process was open and collaborative, and the recommendations are consistent with the Division's mission and legislative mandates. In consideration of the foregoing, I approve the Galena Property Management Plan and sanction the implementation of the management actions contained herein upon my signature.

A. Joel Frandsen
Director, Division of Forestry, Fire and State Lands

5/26/06
Date

Table of Contents

INTRODUCTION

This document presents historical background data for the Galena property (formerly known as "the prison property"), summarizes current onsite conditions, develops approaches for managing resources identified, and prioritizes actions concerning the management issues presented. Due to the parcel's position in the landscape, encompassing upland, wetland, and riparian areas, as well as its important role in the Jordan River corridor, the most prudent approach to comprehensive management will be through collaboration and partnership.

In January 2000 the Utah Legislature enacted Utah Code 63A-5-222 (Appendix A). This code dealt with a parcel of land north of Bangerter Highway on the east side of the Jordan River (Figure 1). The property was initially managed by the Department of Corrections and owned by the Division of Facilities Construction and Management (DFCM). The Legislature declared this property "critical land" and the title to the property was subsequently transferred to the Division of Forestry, Fire, and State Lands (FFSL). This transfer of management responsibilities juxtaposes with the Division's ongoing management of sovereign lands along the Jordan River.

The Division is directed by state statute to manage the 250-acre parcel for specific objectives. These are outlined in the Utah Code as follows:

OBJECTIVES

1. Preservation and enhancement of natural resources.
2. Eradication, control, and management of noxious vegetation.
3. Development of a recreational and educational trail system.
4. Preservation of a continuous corridor of open space along the Jordan River.
5. Preservation of a significant archaeological site and development of an interpretive center.
6. Preservation and enhancement of wildlife habitat.
7. Provision of information on attributes of public trust lands and encouragement of the use of State sovereign lands.
8. Rehabilitation of the previously used dump site.
9. Creation of additional wetlands to offset the loss of such through construction in the Salt Lake Valley.
10. Establish conservation easement for preservation in perpetuity.
11. Cooperate with all stakeholders, including county and city governments, as well as all State departments and divisions, and any interested federal agencies, in order to best manage the Galena property.

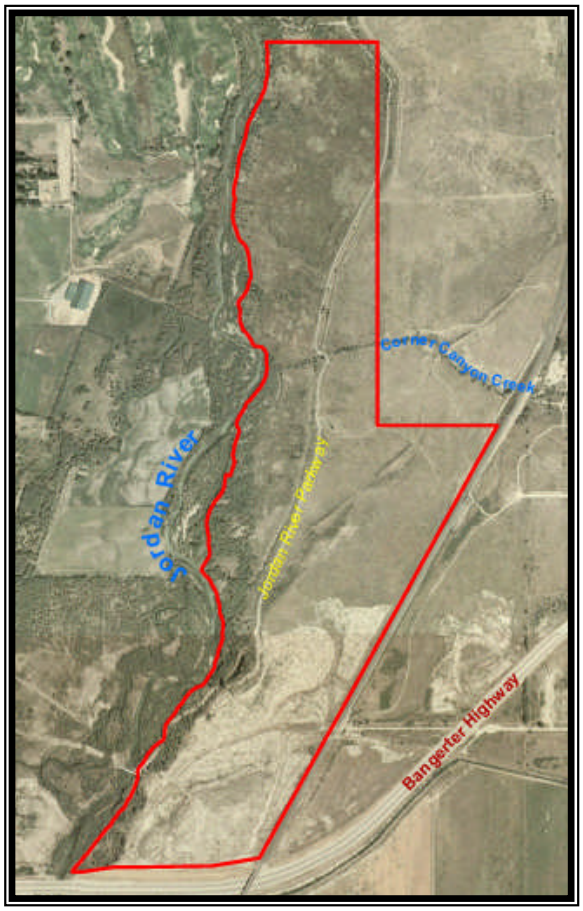


Figure 1: Galena Property

GENERAL SITE DESCRIPTION

Location

The Galena Property consists of approximately 250 acres of land that was previously managed as part of the State Correctional Facility property. It is located between 12300 South and 14600 South in Draper City, Salt Lake County, Utah (Figure 2). The property is bounded on the south by the Bangerter Highway, on the east by the Lehi Bamburger Railroad, on the west by the Jordan River, and on the north and northeast by undeveloped open space.

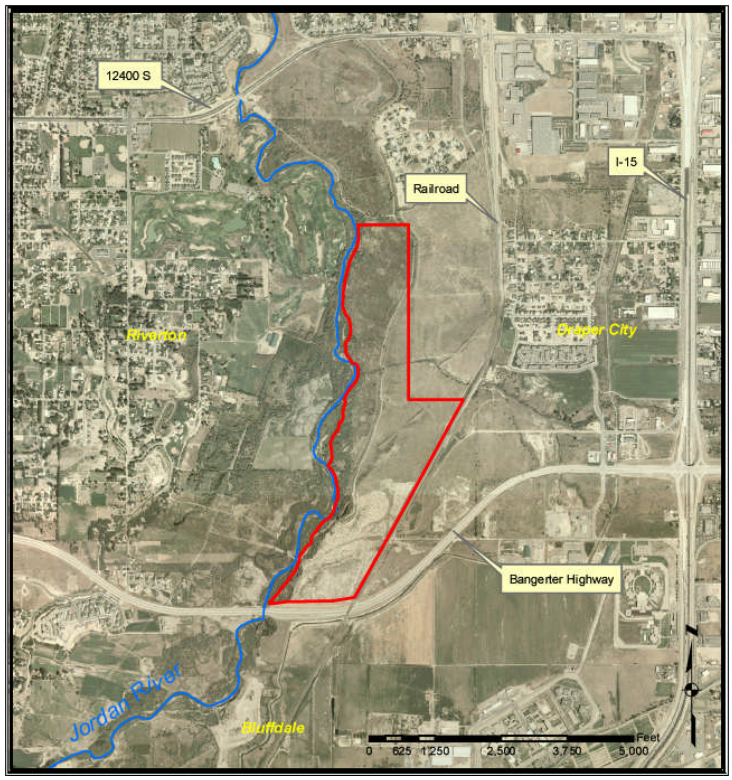


Figure 2: Location of Galena Property. Boundary is in red.

Historic Land Use

The Jordan River has been important in shaping the natural, commercial, and cultural aspects of Salt Lake Valley. Long before Euro-Americans entered Utah, Native Americans lived adjacent to the Jordan River and used it for hunting and fishing. Members of the Desert Archaic Culture were the earliest known inhabitants, occupying the region between 10,000 B.C. and A.D. 400. This culture was comprised of nomadic hunter-gatherers using not only implements of wood and bone, but also flaked-stem stone tools and developed basketry (Powell 1994). Associated with the end of this period was the emergence of the Fremont Culture. This culture had more sophisticated basketry as well as distinctive gray pottery and is generally thought to have had a more agriculturally based society. The Fremont Culture persisted for about 1500 years before being displaced by the Numic-speaking peoples: the Ute, Shoshone, and Paiute (Madsen 1989). These tribes were present in the region when settlers began arriving from the east.

Historically the Jordan River served as a corridor for movement between Utah Lake and the Great Salt Lake. Sagebrush Archaeological Consultants discovered an archaeological site located on the property during an assessment of one of the alternate routes for the Bangerter Highway. This site was evaluated and subsequently deemed eligible for inclusion on the National Register of Historic Places. The site covers almost 30 acres along the edge of the bluff for approximately 2500 feet, and contains at least one large hearth feature (Birnie 2000). Radiocarbon dating determined the site to be more than 3,000 years old, making it one of the

earliest prehistoric sites in Salt Lake Valley. This discovery confirms the presence of archaic hunter-gatherers in the region preceding the agronomic Fremont Culture (GOPB 1998).

Euro-Americans began making inroads into Utah in the early part of the 19th century, with Eastern settlers coming in the mid-1800's. Since the arrival of Mormon pioneers in 1847, humans have significantly modified the Jordan River. These settlers farmed sections of the Jordan River floodplain, grazed livestock, and later diverted water to irrigate upland areas. Water diversions ranged from ditches and canals to large dams. The river was first dammed in 1859, and the "narrows" area (a few miles upstream (south) of the Galena property) was impounded in 1872. In 1881 a dam at the head of the Jordan River designed to control flooding was constructed, transforming Utah Lake into a controlled reservoir (Hooton 1996). The subsequent installation of canals and diversions along the Jordan River further reduced water available for instream flows and for the maintenance of historical flooding regimes. By 1900, more than 50,000 acres of resultant agricultural land were irrigated by waters from Utah Lake and the Jordan River. Thousands of additional acres were irrigated as more canals were constructed in the early part of the 20th century (Hooton 1996). Seven historic canals removed water from the Jordan River upstream of the Galena property (Figure 3). Most of these are still active and have entitlement to over 280,000 acre-feet of water (Hooton 1996).

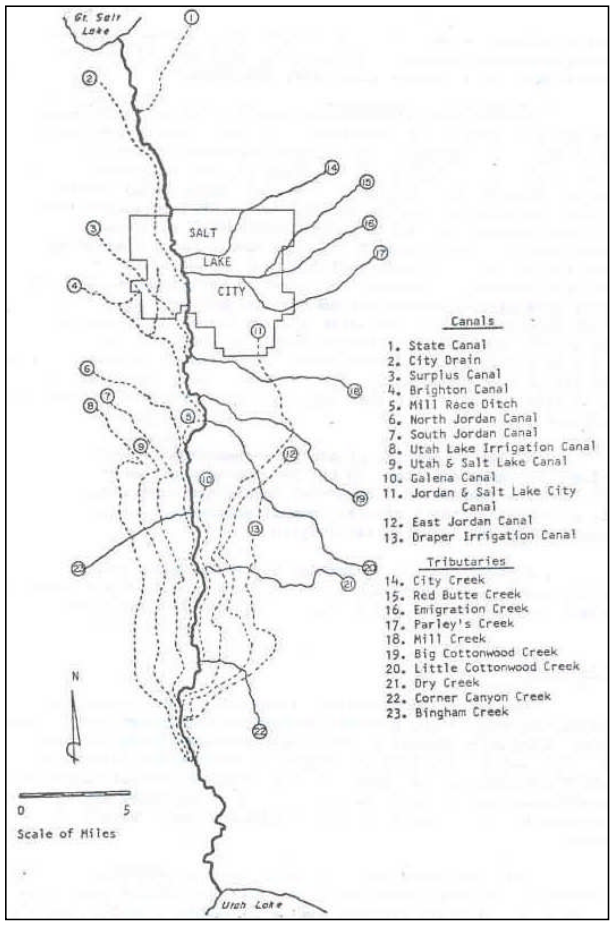


Figure 3: Location of historic canals and diversions along the Jordan River. (taken from CHES 1975)

Dredging and channel straightening for flood control in the 1950's, and again in the 1980's, further entrenched the river within its historic floodplain. Due to the anthropogenic alterations, the frequency and duration of over-bank flooding events have been greatly reduced, and the local water table has been lowered. As a result, a substantial amount of historical wetlands have been converted to upland habitats (Hooper 2003), and the native communities of willow (*Salix* spp.) and cottonwood (*Populus* spp.) have been replaced by tamarisk (*Tamarix ramosissima*) and Russian olive (*Elaeagnus angustifolia*), both exotic species. Most of the remaining wetlands have

degraded functional capacities due to isolation on the abandoned floodplain and a lack of typical vegetative cover. The original pioneers took advantage of the vast expanse of grasslands along the Jordan River by grazing cattle. Since that time, the river and adjacent uplands have been heavily grazed, which when combined with the hydrologic alterations, altered the natural vegetation. Subsequently, the native willow/grass communities have been converted to non-native assemblages.

Prison Dump Site

The former prison landfill is located along the east bank of the Jordan River at approximately 13800 South. This landfill operated from the late 1950's until 1985, at which time it was closed and capped with soil. Years later, during construction of the Bangerter Highway, the entire landfill was covered with spoil material. Fabric was installed along the escarpment to prevent this material from eroding into the riparian areas and onto the Jordan River Parkway. Presently the fabric has exceeded its usefulness and has become an ineffective erosion control device. Visible remains from the old dump extend along this escarpment and throughout the disturbed area, with previously buried debris occasionally surfacing along the slope.

Wetland Creation Area

Under a Memorandum of Understanding (MOU) between the Utah Department of Transportation (UDOT) and the Department of Natural Resources (through the Division of Forestry, Fire, and State Lands) in 2004, a section of the Galena property is being used for wetlands mitigation banking. The U.S. Army Corps of Engineers (USACE) issued a permit to UDOT for the establishment of a 25-acre single-user bank. Under this permit, UDOT is creating 25 acres of wet meadow/ emergent marsh wetlands and realigning the reach of Corner Canyon Creek west of the Jordan River Parkway (Figure 4). This realignment is a Class I restoration, creating an entirely new channel and placing the previously incised stream back onto an active floodplain, meeting one of the objectives of the legislative intent.

Newly aligned Corner Canyon Creek

The earthwork and hydrologic manipulations for the project are complete and watering of the site is currently underway. Due to unconsolidated gravel and cobble immediately underlying the creation area, much of the water intended to inundate the area is moving beneath the berm

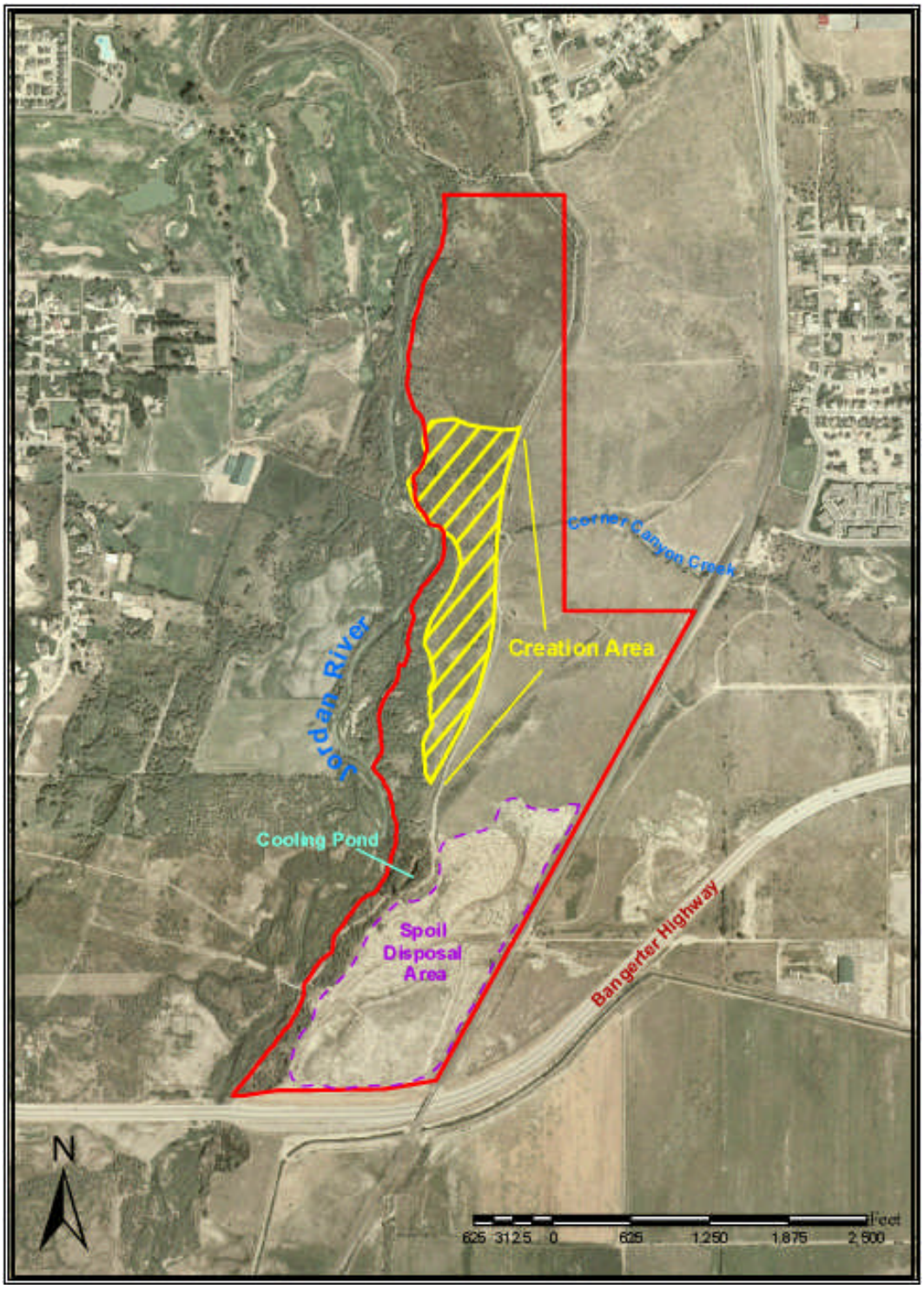


Figure 4: Galena property with wetland creation site, spoil disposal area, and cooling pond noted.

of the newly flooded Galena canal, and passing down-gradient below the majority of the creation surface, slowing the watering process (pers. observ.). The site has recently been planted with sapling trees and shrubs and will be monitored closely to ensure that water is available for their establishment. For detailed information about creation site design and future monitoring and development, see the Final Banking Instrument for UDOT Project No. SP-0201(5)13.

Creation area in the early stages of watering – looking north

Current Land Use

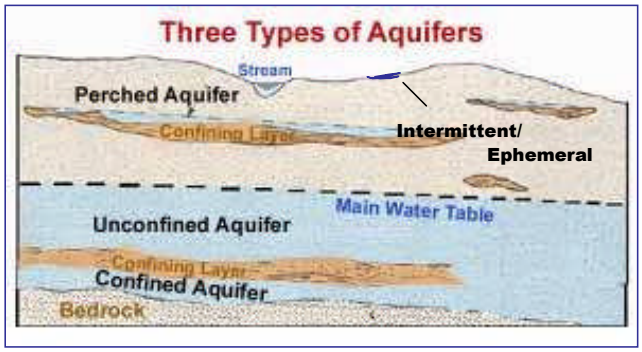
The increasing demands for urban expansion, coupled with the value of river front property have put tremendous pressures on the Jordan River ecosystem. The majority of the remaining open space is susceptible to development. Residents in the cities of Riverton, Draper, and Bluffdale have expressed their interest in preserving the Jordan River corridor from 11400 South to Utah County. Other local groups have expressed interest in regards to seeing this area remain natural with improved access for hikers, cyclists, and horseback riders, as well as educational and interpretive opportunities for the public. The legislation enacted in 2000 to protect this 250-acre parcel was intended to provide critical open space in this highly urbanized valley.

Subsequent to legislation all livestock were permanently removed from the property and currently the land is being utilized for recreational purposes. The Jordan River Parkway bisects the property (Figure 1) with a paved trail providing access for pedestrians, cyclists, and roller-bladers to enjoy the Jordan River and its adjoining resources. Other uses include horseback riding on the equestrian trails, bird watching, picnicking, and photography.

Neighboring land uses include: the State Correctional Facility, Lehi Bamburger Railroad, power line rights-of-way, golf courses, residential and commercial developments, and agricultural lands.

Hydrology

The hydrology of the Jordan River Valley can be characterized by five main systems: (1) a deep, confined aquifer; (2) perched aquifers, such as the slope of the high terrace; (3) an unconfined alluvial aquifer associated with the Jordan River; (4) intermittent drainages and ephemeral water bodies caused by runoff from snowmelt or storm events; and (5) perennial stream flow (Waddel et al. 1984).



As previously discussed, the major effects on hydrology in the Valley have been anthropogenic in nature, due mostly to channelization and canal construction. Extensive canal systems and structures to regulate flow were built throughout the Jordan River Valley to distribute water for agricultural needs. In addition to regulation, the Jordan River has been repeatedly dredged and straightened in efforts to prevent flooding, channel migration, and loss of land. As a result, the gradient of the river was increased by the removal of natural meanders, the channel became entrenched, and the historical floodplain was abandoned. Because the river can no longer dissipate surging flood flows on its floodplain, the erosion of riverbanks and sedimentation of the aquatic habitat has been greatly accelerated throughout the river's course. In addition, the incising of the river channel has lowered the water table beneath the historical floodplain in many places (Bio/West, Inc.1998).

Water Quality

Anecdotal evidence, in the form of a successful historical trout fishery, suggests that the Jordan River was at one time cooler and possibly less turbid than its current condition (NAS 2000). However, anthropogenic impacts to Utah Lake and the Jordan River have changed these conditions.

As human use and misuse of the watershed has increased, water quality has decreased. Overgrazing in the floodplain and cultivation throughout the valley led to dramatic increases in sediment loads. The discharge of raw sewage directly into the river took place for almost 100 years before sewage treatment plants were constructed. Historical mining operations in the valley also had major deleterious effects on the river. Tailings and general operating procedures of more than 40 smelters around the valley led to contamination of the river by heavy metals, mostly lead and arsenic (NAS 2000). The remnants of most of these have been removed, but sections of the river still receive elevated amounts of heavy metals. With the removal of sewage discharge, the reduction of agriculture, the cessation of mining activities, and concentrated cleanup efforts, the river has returned somewhat to its historical conditions.

However, an increase in non-permeable surfaces and urban run-off may lead to non-point source problems with sections of the river in the near future, as the valley undergoes further urbanization.

Before the development of the wetland creation project onsite, there were concerns about geothermal water from the Galena property being discharged into the Jordan River. Historically, the portion of the Jordan River adjacent to the property was identified as being impacted by Total Dissolved Solids (TDS) (NAS 2000), while a segment immediately upstream is impacted by elevated average temperatures (DWQ 2004). Both of these parameters would be negatively affected by a direct release of geothermal water into the river. The design of the creation area incorporated the use of this geothermal source to maintain the creation site's hydrology. The water had previously been ponded onsite to allow minor cooling and settling of precipitants, as geothermal waters have high salt concentrations. The current use allows for not only complete cooling of the water, but also utilizes the created wetland as a filter to remove all TDS from the water before confluence with the Jordan River. All waters leaving the site, either from Corner Canyon Creek or as seepage from the wetland creation, should currently have TDS loads lower than those extant in the Jordan River.

An environmental assessment and groundwater investigation were conducted in 2000 near the old landfill (IHI(2) 2000); located along the east bank of the river on the southern portion of the property. Three groundwater wells were drilled to determine the amount and types of pollutants in the aquifer and to determine the source of these contaminants. Two of the three samples collected were up gradient of the landfill and contained arsenic at levels higher than the EPA's Maximum Contaminant Level (MCL). The third well, located down gradient from the landfill, had arsenic levels lower than the MCL (IHI 2000). So while the contaminants were identified, their source was not. The source could be historical mining operations, but there were no known ore smelters in the Draper area that could account for the elevated levels observed. However, there are other areas in Salt Lake County with elevated groundwater arsenic concentrations that cannot be attributed to a particular source (Herbert pers. comm.).

While some reaches of the Jordan River are considered "impaired" (303(d) listed) and are under review for Total Maximum Daily Load (TMDL) sampling, the section adjacent to the Galena property is currently not listed as one of these (DWQ 2004). The Utah Division of Water Quality has classified this section of the Jordan River as class 2B, appropriate for secondary human contact, i.e. – boating, wading. It is also categorized as a 3A stream, for use as a cold water game fishery, and as class 4 waters, for irrigation and stock watering (DWQ(2) 2004).

Soils

The Galena property includes three natural geomorphic levels that are topographically distinct. There are ten separate soil series within these three discrete zones that relate directly to site

topography (Figure 5). Following is a summary of the geomorphology and general incidence of soils onsite. (See Appendix C for descriptions of the soil classifications and a map of series locations across the site)

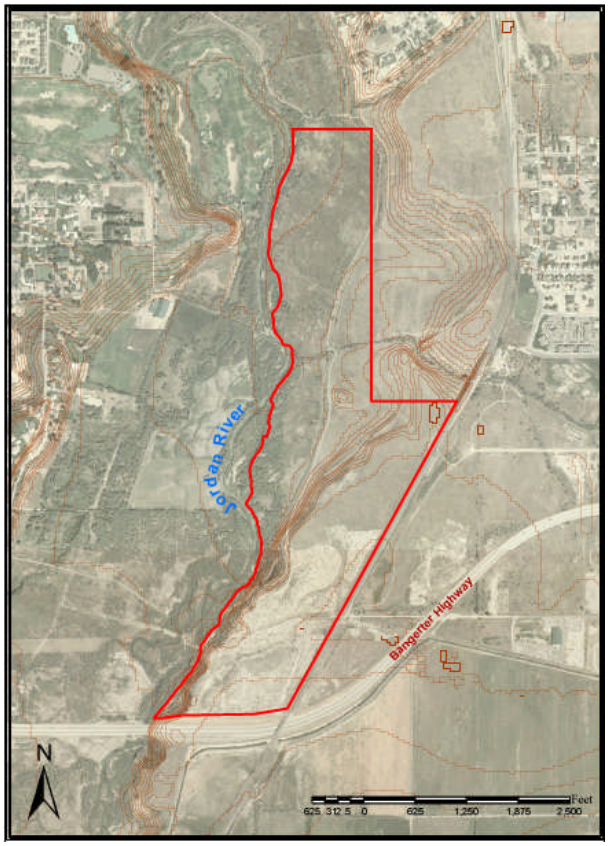


Figure 5: Site topography, 10 ft contours

Upland Terrace

The highest level is an upland terrace that confines the Jordan River meander corridor. This high upland terrace is approximately 50 to 60 feet above the present-day river valley, and is comprised of fine clays and silts that were deposited on the bottom of ancient Lake Bonneville and subsequently overtopped with riverine sand and gravel deposits (Personius and Scott 1992).

Lower Terrace

The Lower terrace is considered to be the historical floodplain of the Jordan River prior to the area's settlement by Mormon pioneers in the mid-1800's. It was created at the end of the last Ice Age when there was a period of abrupt down-cutting of glacially fed rivers transporting extremely high stream flows and sediment loads that formed the new river valley. Most of the soils underlying the upland grassland are mapped as Magna silty clay loam, listed as a hydric soil type by the U.S. Department of Agriculture Soil Conservation Service (USDA-SCS 1987). A few areas of upland grassland appear to be underlain by soils mapped as Chipman silty clay loam, which is not listed as a hydric soil type but is poorly drained and typically located at a depth between 20 and 40 inches (USDA-SCS 1974).

Riparian

Most soils underlying the riparian areas are mapped as mixed alluvial land and stony alluvial land. These soils tend to have a poor moisture retention capacity because they are mostly cobbles, gravels, and sands with a thin organic layer formed from leaf litter. Due to the lack of seasonal flooding and the lowering of the water table, these soils are only briefly saturated during the spring snowmelt and during relatively large flood events (Bio/West, Inc.1998).

Disposal Site/Surplus Soil
A fourth, unnatural, layer of soil is found on the surface of the previously discussed refuse site. This area, immediately adjacent to the Bangerter Highway, was illegally used as a repository for waste and surplus soil during highway construction (Figure 4). The soil was deposited in a 3 to 18 foot layer across 54 acres of the Upland Terrace. The soil classification for this area is unavailable, but most of the soils visible are fine clays. Aside from the old dump site, some of this surplus soil overlies 20-30% of the previously discussed archaeological site. While speculation has been made as to removing the surplus soil, it has been proposed that soils overlying the historical site should be left in place to minimize further damage to the site (GOPB 1998).

Vegetation
Vegetation provides many important functions to the landscape. A diverse array of riparian and upland plant species benefit wildlife, providing birds, mammals, and herptiles with food and cover. Vegetation along streams and rivers stabilizes banks, reduces damage from flooding, improves water quality and fisheries, and provides "open space" and other intangible values.

The Galena property contains both upland and wetland areas. The upland vegetation is comprised of three classes that roughly correlate with the geomorphology of the soils, these are: range, grassland, and riparian. The wetlands are made up of palustrine vegetation in a few different classes. A brief description of the vegetation follows.

Uplands

Range
Range occurs only on the high upland terrace. It is approximately 50 to 60 feet higher than the lower terrace on the valley bottom. This rangeland appears to be well drained and is dominated by shrubby species such as sagebrush (*Artemisia tridentata*), rabbitbrush (*Chrysothamus nauseosus*), and snakeweed (*Gutierrezia sarothrae*), as well as the introduced Russian thistle (*Salsola iberica*). The dominant grasses are introduced species including cheat grass (*Bromus tectorum*), crested wheatgrass


Rangeland

(*Agropyron cristatum*), and tall wheatgrass (*Thinopyrum ponticum*), with a few scattered native bunchgrasses. Historically the primary use of the rangeland was livestock pasture. (Bio/West, Inc. 1998). In certain areas there are concentrated groupings of the exotic musk thistles (*Carduus nutans*).

Grassland

Grassland occurs on the lower terrace and is dominated by a similar suite of grasses present in the rangeland. Some of the overgrazed areas exhibit a subdominance of thistles and other undesirable plant species.

Riparian

The riparian community is dominated by tamarisk and Russian olive, both exotic invasives. Water development has altered the natural hydropatterns and fluvial processes of the Jordan River, removing historical over-bank flooding events that are essential for the recruitment of native willows and cottonwoods. Tamarisk and Russian olive tend to be more tolerant of drier conditions and have adapted more readily to these unnatural hydropatterns. Grazing livestock compound this problem, selecting native cottonwood and willow over the invasive species (Figure 6) increasing the dominance of invasives across the riparian areas.

Figure 6: Horses grazing on native willow (mid-ground) and leaving exotic tamarisk alone (background).

Wetlands

It has been estimated that 30% of the wetlands in the Jordan River floodplain were lost from 1974 to 1986 (Dahl 1990), with the trend continuing as existing wetlands are isolated on the historic floodplain. This makes the preservation of wetlands currently on the Galena property, as well as the rehabilitation of previous wetlands, paramount in maintaining or restoring historic floral and faunal assemblages onsite. According to National Wetland Inventory (NWI) maps, the northern section of the property was historically emergent marsh (Figure 7). With the addition of the created wetlands, almost all property west of the Jordan River Parkway will be in riparian or wetland vegetation.

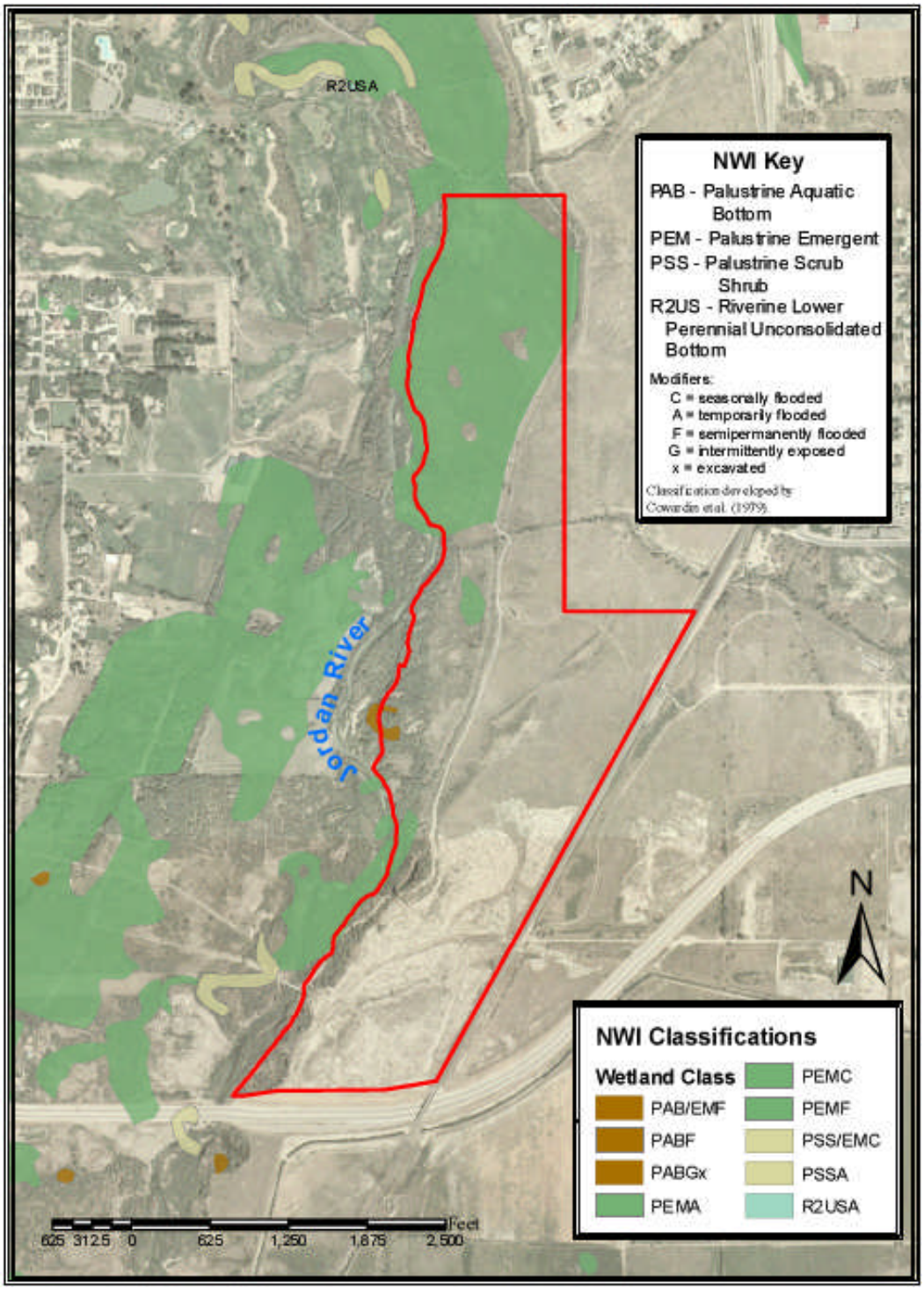


Figure 7: National Wetland Inventory (NWI) data.

Wet Meadow

Wet meadows are palustrine emergent wetlands and occur only on the lower terrace in areas that are mapped as Magna silty clay loam and Chipman silty clay loam (USDA-SCS 1974). The wet meadows are underlain by soils that are saturated for significant portions of the growing season and are dominated by rushes (*Juncus spp.*), sedges (*Carex spp*.), saltgrass (*Distichlis spicata*), foxtail barley (*Hordeum jubatum*), redtop (*Agrostis borealis*), Muhly scratchgrass (*Muhlenbergia asperifolia*), and other hydrophytic graminoids (Bio/West, Inc. 1998).

Wet meadow ***Photo by Matt Turnbow***

Slope Wetland

Slope wetlands are also palustrine emergent wetlands, but they occur on the banks of the upland terrace in association with seeps and springs. The underlying soils are mapped as clayey terrace escarpments (USDA-SCS 1974). Slope wetlands are saturated throughout the growing season, as denoted by the presence of wetland plants such as cattail (*Typha angustifolia*) and bulrush (*Schoenoplectus* spp.), and an increasing presence of common reed (*Phragmites* spp.).

Emergent Marsh

Emergent marshes are palustrine wetlands and are found in two different topographic settings onsite. The first type is associated with abandoned oxbows and occurs on the lower terrace in the depressional remnants of old meanders created by the Jordan River. The depressions tend to be very wet because they intercept groundwater and receive surface drainage. As a result, oxbow marshes are often ponded and tend to be dominated by species such as cattails, bulrush, duckweed (*Lemna* spp.), and spike rush (*Eleocharis* spp.). A similar vegetative species assemblage is found in a second topographic setting, the historical Galena agricultural canal. While there were isolated patches of hydrophytic vegetation in the canal before the wetland creation project was begun, now that the canal is inundated the margins should start to show significant growth of emergent marsh species.

Noxious and Invasive Plants

Urbanization and agricultural development have reduced much of the Jordan River riparian corridor. In addition, the removal of seasonal over-bank flooding and a lowering of the water table have dramatically affected the riparian areas that remain. Due to these factors much of the Jordan River corridor has been invaded by exotic species, such as tamarisk and Russian olive (NAS 2000). This is true of the conditions on Galena property, where there are several invasive tree or tall shrub species, as well as numerous exotic grasses and forbs (Figure 8).

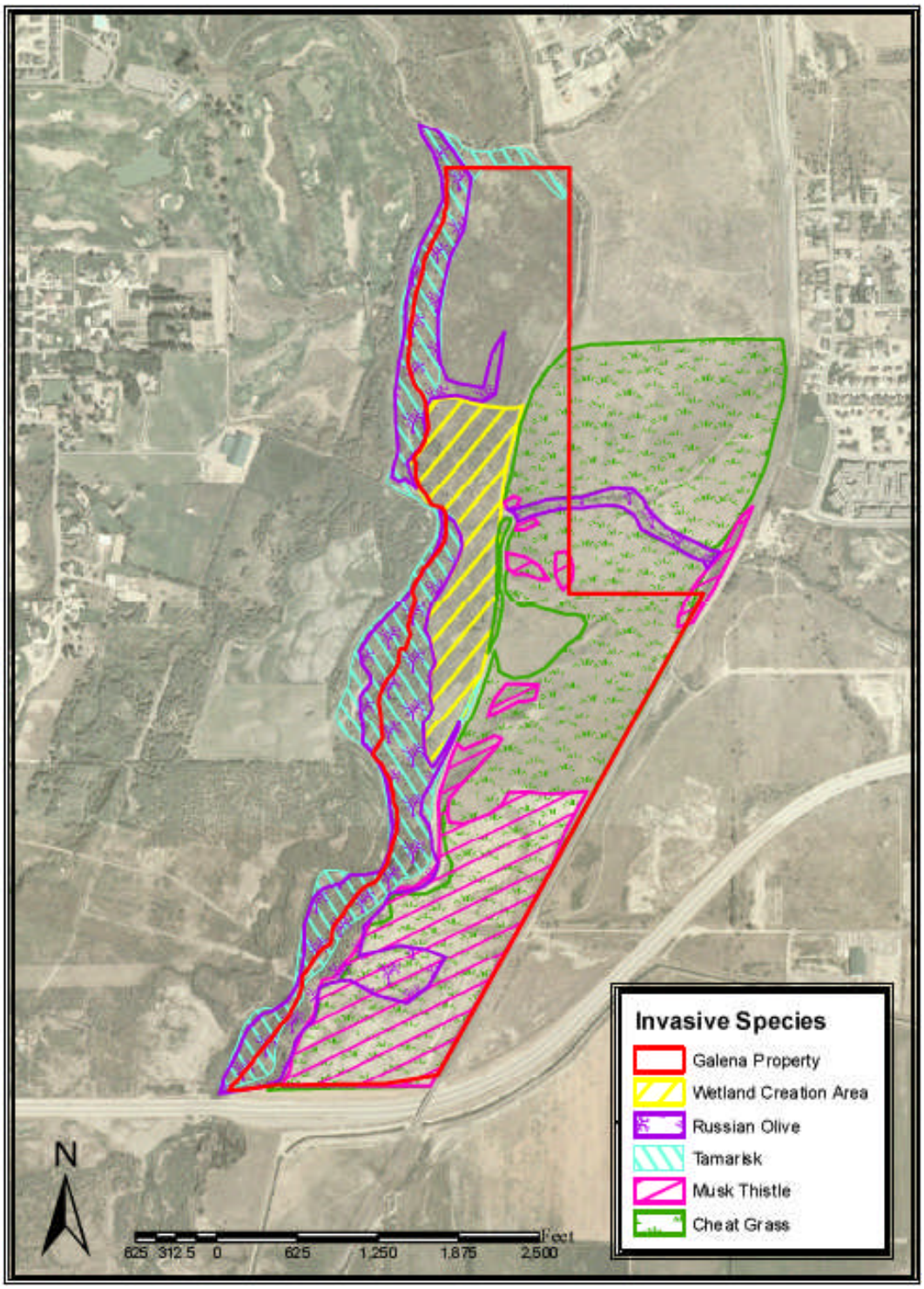


Figure 8: Primary invasive species onsite. Polygons indicate areas of heavy cover.

It is believed that shortly after 1900 ornamental planting of Russian olive began in the Salt Lake Valley. Although uncommon outside of cultivation for many years, the tree began to spread rapidly in the 1940's, following fence lines, streams, and ditches (NAS 2000). By the 1960's it was abundant (DuBois 1994) and the spread seems to coincide with a dramatic increase in European starling (*Sturnus vulgaris*) populations around the same time (NAS 2000).

Exotic invasives along Jordan River Parkway trail in central part of property. Species include Russian olive, tamarisk, and Siberian elm.

Russian olive is currently the dominant tree species on the Galena property, occurring prolifically in the riparian habitat and on sections of the spoil material in the range habitat.

Tamarisk is also a significant vegetative component on the property. In the early 1900's it was widely planted throughout Utah. By 1926, wild populations were established along Utah Lake and had become a major component of riparian systems throughout the Utah Lake and Salt Lake valleys by 1961 (DuBois 1994). On sections of the Galena property it is co-dominant with Russian olive and is common throughout the Jordan River corridor from Bluffdale to Riverton. There are also areas in the upland portions of the property with stands of Siberian elm (*Ulmus pumila*) and various exotic fruit trees (NAS 2000).

As previously described, the grasslands and range communities have also been highly impacted by noxious weed species, including musk thistle (picture on right). Most of the Salt Lake County listed weed species can be found onsite, including Russian knapweed (*Centaurea repens*) and hoary cress or whitetop (*Cardaria draba*). The area that is now the creation site previously supported a significant population of white top. It is hoped that the removal of topsoil for the wetland creation project also removed the presence of this very aggressive weed species.

Wildlife

Terrestrial Wildlife

Before the arrival of pioneers, the Salt Lake valley supported a tremendous mammal population. Early hunting records reported the removal of hundreds of wolves (*Canis lupus*) and coyotes (*Canis latrans*), as well as bears (*Ursus americanus*), cougars (*Puma concolor*), and wolverines (*Gulo gulo*) in a single season (NAS 2000). Numerous other mammals used the lowland riparian habitats in the valley, including bighorn sheep (*Ovis canadensis),* mule deer (*Odocoileus hemionus*), beaver (*Castor canadensis*), red fox (*Vulpes vulpes*), black-tailed jackrabbit (*Lepus californicus*), and muskrat (*Ondatra zibethicus*).

Housing developments, roads and highways, and commercial and industrial facilities have intercepted many of the historical migration routes. As a result, mule deer and some elk (*Cervus canadensis*) have become permanent residents of the open space along the Jordan River. The presence of these populations in the highly urbanized valley has led to vehicle collisions and poaching. People often enjoy seeing the wildlife but may consider them a nuisance when encountered on golf courses or found feeding on landscape plants.

Today, even with the increased pressures of urbanization, many mammals still inhabit the Jordan River corridor. Habitat is available for more than 50 mammals that could potentially occur onsite, including 11 species of bats and 25 rodents (Smith and Greenwood 1984). A few species known to occur in the valley include beaver, muskrat, coyote, red fox, striped skunk (*Mephitis mephitis*), and several small rodents. Herds of deer and scattered elk have also been observed, along with an occasional cougar. Continual development in the corridor will negatively impact these remaining animals, affecting dispersal and habitat availability.

Avian Wildlife

Historically the Jordan River corridor has provided habitat for numerous waterfowl, wading birds, shorebirds, and passerines. Its landscape position, connecting Great Salt Lake and Utah Lake, makes it a key area for breeding, wintering, and migratory birds.

Lowland riparian habitat is considered the single most important habitat type in the state for avian species (Parrish et al. 1999). Almost 42% of avian species in the state use lowland riparian areas for either breeding or wintering habitat. However, this habitat type covers only 0.2% of the total area of the state (Parrish et al. 1999). The rarity of riparian areas, not only in Utah but across the West, combined with their significance to breeding birds, makes the Jordan River corridor extremely important to avian species. This value is magnified for migrants using the Great Salt Lake flyway (NAS 2000).

The Jordan River offers high quality riparian areas for almost 200 species of birds (Smith and Greenwood 1984). Wintering birds, dropping down in either elevation or latitude, utilize the

Jordan River for food and shelter. The river's greatest use by birds probably is during migration, as hundreds of thousands of birds use this corridor as stopover habitat (Bio/West, Inc. 1998). However, the corridor has become fragmented and urbanized to an extent that previously common or abundant breeders are now rarely seen. The Jordan River corridor is also important breeding habitat for riparian specialists such as the yellow warbler (*Dendroica petechia*), and Bullock's oriole (*Icterus bullockii*) (Norvell 1997). Species that once used the area extensively are no longer breeding and do not regularly occur, including gray catbirds (*Dumetella carolinensis*), warbling vireos (*Vireo gilvus*), and the willow flycatcher (*Empidonax traillii*). A few previously common breeding species are no longer present in the valley, including American redstarts (*Setophaga ruticilla*), black terns (*Sterna nigra*), and yellow-billed cuckoos (*Coccyzus americanus occidentalis*) (NAS 2000).

As a result of the loss of available habitat, avian assemblages have shifted from riparian specialists to more generalist species. The black-billed magpie (*Pica pica*), red-winged blackbird (*Agelaius phoeniceus*), song sparrow (*Melospiza melodia*), killdeer (*Charadrius vociferus*), and American robin (*Turdus migratorius*) are now among the most abundantly observed species in the corridor (NAS 2000). There are also high numbers of non-native bird species, such as ring-necked pheasant (*Phasianus colchicus*), house sparrow (*Passer domensticus*), European starling (*Sturnus vulgaris*,) and brown-headed cowbirds (*Molothrus ater*) (Norvell 1997, Howe et al.1999). None of these now common species are riparian specialists.

Fisheries

Historically, the Jordan River supported a cold-water fishery, at least as far downstream as 1700 South in Salt Lake City. In the 1890s, Charlie Lockerbie reported catching several trout 18 inches or greater, weighing two to three pounds (Lockerbie 1949). However, due partially to anthropogenic changes in the natural flows of the river, natural populations of trout are no longer present. The damming of the river at its head (the outflow of Utah Lake), combined with the periodic removal of water for irrigation, has led to dramatic changes in water chemistry. The most apparent of these has been an increase in the average water temperature, contributing to a change in the suite of fish species currently present. This has been exacerbated by changes in riparian vegetation and the denuding of native species that previously shaded the river (NAS 2000). Many non-native fishes introduced into the state, have adapted better to the altered conditions, out-competing natives in the warmer water and changing the suite of fishes found in the river (Doug Sakaguchi, pers. comm.).

While as many as 24 species of fish have been recorded in the Jordan River (CHES 1975), more recent sampling data (1992 & 2002) from the Division of Wildlife Resources (DWR) suggest that there are currently about a dozen species present (Don Wiley, pers. comm.). The most commonly occurring species are the Utah sucker (*Catostomus ardens*) and the common carp (*Cyprinus carpio*). Of the species sampled, only the Utah sucker, mountain sucker

(*Catostomus platyrhynchus*), Utah chub (*Gila atraria*), and possibly cutthroat trout (*Oncorhynchus clarki)*, depending on subspecies, are native to the Jordan River (Doug Sakaguchi, pers. comm.).

The Jordan River is currently a marginal coldwater fishery, supporting both warm (e.g. channel catfish (*Ictalurus punctatus*), walleye (*Sander vitreus*)) and coldwater (e.g. trout species) game fish. At this point in time, DWR stocks channel catfish on a put-and-take basis in the Bluffdale and Riverton areas. The intention of these stockings is to increase angler productivity and enjoyment, not to establish a sustainable population (NAS 2000, Don Wiley pers. comm.).

Reptiles and Amphibians

The bullfrog (*Rana catesbeiana*), a non-native amphibian, has become fairly common along some reaches of the Jordan River close to the Galena property and may be displacing and predating upon native herptiles (DWR 2005). Garter snakes (*Thamnophis* spp.) are also common along the river and in the project area. While Utah Natural Heritage Program data shows that there were historic populations of the Columbia spotted frog (*Rana luteiventris*) within two miles of the property, these records are decades old and there is currently no appropriate habitat onsite for the spotted frog (Lenora Sullivan, pers. comm.). Several common amphibian species are probably present on the property including the Great Basin spadefoot (*Spea intermontana*), striped (or western) chorus frog (*Pseudacris triseriata*), and Woodhouse's toad (*Bufo woodhousii*) (George Oliver, pers. comm.). There is also appropriate habitat for the state's only salamander species, the tiger salamander (*Ambystoma tigrinum*), and this species may even become more abundant as the wetland creation area matures.

There are several other herptiles that may be present on the Galena property, but no sampling efforts have targeted this group in the Jordan River corridor. A vertebrate survey was conducted by DWR at the Jordan River State Park, but the timing of sampling efforts (early spring) was not appropriate for herptiles (DWR 2003). A more extensive inventory was carried out in a study for the Lampton Reservoir area, which encompassed the Galena property (Smith and Greenwood 1984). The suite of vertebrates therein is a comprehensive listing of all animals that might occur on the Galena property. See Appendix D for this inventory of all vertebrates observed or potentially occurring in the Jordan River study area.

Invertebrates

There are probably millions of invertebrates representing hundreds of species on the Galena property. The only available inventory of macro-invertebrates in the area catalogs mostly aquatic species and was conducted in 1967 (Hinshaw). This listing contains more than 70 species of arthropods as well as two classes of mollusks. This study was initiated in 1967 to determine the effects of pollutants on aquatic macro-invertebrates and it is probable that these communities have changed over the past 40 years as levels and types of pollutants have changed.

There are probably numerous mollusk species in the Jordan River adjacent to the Galena property, including *Physella* spp. or *Anodonta* spp., but no comprehensive inventories or cataloging efforts are available at this time.

MANAGEMENT OPPORTUNITIES

The Jordan River Corridor is a unique and valuable resource in the Salt Lake Valley, which impacts a much larger geographic area. In 1998 the State Legislature passed SB37 "Open Space Near State Prison" which designated the Galena property as "critical land". This bill states that the land is to be "preserved in or restored to a predominately natural, open, and undeveloped condition". Opportunities exist to rehabilitate and enhance this natural resource for the benefit of the many living organisms that utilize this property, including humans. The success of management endeavors will be optimized through partnerships, advocacy, investments, and participation in planning, funding, and implementation. The Division of Forestry, Fire, and State Lands will seek out opportunities to collaborate on the management of the Galena property. The following is a brief summary of management opportunities and direction identified by the Utah Division of Forestry, Fire, and State Lands.

OBJECTIVES

1. Preservation and enhancement of natural resources,
2. Eradication, control, and management of noxious vegetation.
3. Development of a recreational and educational trail system.
4. Preservation of a continuous corridor of open space along the Jordan River.
5. Preservation of a significant archaeological site and development of an interpretive center.
6. Preservation and enhancement of wildlife habitat.
7. Provision of information on attributes of public trust lands and encouragement of the use of State sovereign lands.
8. Rehabilitation of the previously used dumpsite.
9. Creation of additional wetlands to offset the loss of such through construction in the Salt Lake Valley.
10. Establish conservation easement for preservation in perpetuity.
11. Cooperate with all stakeholders, including county and city governments, as well as all State departments and divisions, and any interested federal agencies, in order to best manage the Galena property.

Management of Natural Resources

The establishment of the Galena property as a site to be managed by the Division of Forestry, Fire, and State Lands assured its preservation for the public good. Legislation also requires that the Division put the land under a conservation easement as soon as is practicable. It is preferred that this easement be held by a third party familiar with handling conservation easements for the enhancement of natural areas. Priority should be given to obtaining a willing party to hold the easement yet allow for the property to be managed by the State.

It is now the responsibility of the Division to manage the land in a manner that leads to the enhancement of its natural resources. In order to manage for all resources onsite, the Division must consider functions relating to vegetation, wildlife, water quality, and cultural resources. Consideration must also be made for the public's access to, and enjoyment of, these resources. Where appropriate, the Division should work with other divisions, departments, or agencies in

order to develop the best possible management strategies from the greatest knowledge pool available. The following strategies should therefore be considered comprehensive in scope but preliminary in design and approach.

As noted earlier, riparian habitats are increasingly rare in the west and are disproportionately important to many species of birds when compared to other upland habitats. Due to its association with the Great Salt Lake flyway and its function as a corridor between Utah Lake and the Great Salt Lake, the Jordan River has tremendously important riparian areas. However, due to alterations in hydrology and subsequent changes to vegetative community structure, these areas have lost much of their value to riparian dependent species. This presents a great opportunity for the enhancement of these areas on the Galena property, some of which are associated with the newly created wetland site, but others lie along the river for the length of the western boundary. While hydrologic considerations are necessary in restoring these areas and a plan should be developed to account for them, the most critical and changeable factor is that of invasive plant species.

Implementation of A Program to Manage Invasive Plants

The biggest management issue onsite is that of invasive plant species. As funding allows, efforts should be made to inventory, suppress, and control these plants on the property. Eventual elimination of invasive species on the Galena property would be ideal, but is probably not realistic. Russian olive, tamarisk, cheat grass, white top, musk thistle, and phragmites are extremely aggressive species that are already a primary vegetative component on the property. These species could easily supplant ongoing efforts to establish native phreatophytes in the wetland creation area. Thus, priority will be given to areas immediately surrounding the creation area, and to areas acting as a direct seed bank (i.e. upstream banks of Corner Canyon Creek). The riparian and lower terrace areas are to be targeted before the rangeland on the upper terrace. While cheat grass on the upper terrace is pervasive, the major component of native desirable species (rabbitbrush and sagebrush) will prove problematic when developing an eradication plan.

Invasives along creation area boundary

Invasive species removal and native re-vegetation plans will be developed on a per-species or per-area basis. An appropriate combination of mechanical, chemical, and biological treatments need to be applied to reduce the populations of undesirable grasses, weeds, and trees (Williams 2003, Lankford 2003). Products, protocols, and application rates for chemical control will be

coordinated with the Salt Lake County weed supervisor, who is familiar with eradication techniques in this area. Replanting with native plant species will follow treatments and will be based on site-specific hydrologic and edaphic conditions (Peterson 2003). Monitoring the results of these treatments and plantings is a critical factor in adaptive management, guiding the establishment of future protocols. Consideration will also be given to alternative methods of weed control, such as using cattle, goats (Lamming 2001), or prescribed fire where applicable.

Outside of the wetland creation buffer area, the emphasis on invasives removal and control is on weeds listed as noxious in the state or county. Law requires removal of these species.

Public Access and Safety

Public access is to be limited to trail ingress and egress points throughout the site. Public access will be non-motorized and may include foot traffic, bicycles, and horses. Existing roadbeds are to be maintained for maintenance and emergency crew access

.

Geothermal creek

Public use of the wetland creation area, the Galena Canal, and the newly realigned bed of Corner Canyon Creek will be discouraged by signage and fencing if necessary. The previously constructed "hot tub" onsite suggests that the public may use the naturally warm waters filling the Galena canal as familiarity with the site grows. At some point in the future a determination of the most appropriate way to handle this situation needs to be made. However, access to the geothermal waters of the remnant 'cooling pond', as well as the newly constructed creek flowing to the wetland creation area, needs to be addressed immediately to insure public safety. At a minimum, signage needs to be installed, and fencing may be prudent. The historic structures onsite also present hazards. The old concrete silo near the Jordan River Parkway Trail is in extreme disrepair, but the ladder scaling it presents a strong temptation for the public to climb. The silo is not considered to be historically significant and could be removed, but does lend to the rural characteristics of the property (GOPB 1998). Some determent of public access needs to be implemented if the structure remains in place. The old head-gate located at the southern end of the Galena canal is considered historically significant, but is also in poor structural condition.

Old silo

A rotting footbridge across it provides access to the wetland creation area and is occasionally used by the public for such purpose. This structure may require fencing to ensure public safety. A risk management professional should address issues relating to public safety and the liability of the State.

Development of A System of Trails

Urbanization in the southern part of Salt Lake County has put tremendous pressure on existing recreational facilities. The demand for more trails to accommodate cyclists, hikers, and horseback riders has increased. The statute guiding the management of the Galena property encourages the development of a system of trails that is compatible with the preservation of the land as open space.

Jordan River Parkway through property.

Presently the Jordan River Parkway Trail bisects the property from 12300 to 14600 South. An equestrian trail maintained by Salt Lake County Parks and Recreation is adjacent to the parkway from Corner Canyon Creek to 12300 South. The City of Draper also has easements across the property for the development of an equestrian trail, and they are the easement holders for the Parkway trail. These easements require Draper to construct, maintain, operate, inspect, protect, and repair or replace the trails as necessary. Draper City is also responsible for signage to keep users on the trails, and for public liability issues related to trail use (TEC 1998).

Unimproved roads and trails exist throughout the property, many of which are currently being used by off-highway vehicles (OHV). The State already manages facilities along the Jordan River specifically for OHV use and the provision of trails for such use at the Galena site is counter to the legislative directive of enhancing natural resources and wildlife habitat. Signage and possibly fencing will be installed to prevent the use of trails by motorized vehicles (except in the case of maintenance).

Concurrent with available funding, and in cooperation with the City of Draper and Salt Lake County, a system of trails may be developed to connect the scenic, biological, and cultural attributes of the property while providing educational opportunities. Interpretive signage

focused on educating the public about wetlands, mitigation, sovereign lands, water development, wildlife, and the anthropological uses of the site will be critical in a comprehensive educational trails system.

With public access come many issues. A major concern is that new trails and access may bring unwanted litter, dumping, or even vagrancy. While the City of Draper is responsible for cleaning and maintaining trails according to their easement with the State, the State may be required to periodically police the property to ensure that dumping sites are not being established and to avoid problems with "squatters" that have plagued other mitigation sites on the Jordan River (Betsy Herrmann FWS, pers. comm.). Signage and trash receptacles should be installed along all trails on the property and potential issues arising with vagrants should be expected.

Archaeological Site

In conjunction with the trails system, an interpretive center related to the archaeological site should be constructed. Though dependent on funding, its construction is mandated by statute. At present it is unclear whether this might be an informational kiosk, a series of trailside signs, or something more structurally significant. Before decisions relating to an interpretive center may be made, a determination of the future of the prehistoric site itself needs to be made.

As previously discussed, the 3,000-year old site is partially buried beneath spoil materials from the Bangerter Highway project. While removing the overburden to allow access to the site is possible, the archaeological consultants determined that additional damage to the site would be minimized if the soil were left in place (GOPB 1998). Exactly how to deal with the prehistoric site needs to be determined in conjunction with the development of plans for the interpretive center. The appropriate vested agencies will be involved in these processes.

Wildlife

Photo by Barry Tripp

There is incredible potential for enhancing wildlife habitat on the property. The Division is in a unique position that allows for management and rehabilitation of a fully connected ecosystem, spanning the range from river bottom to upland terrace. Not only is the Division responsible for the management of the 250-acre parcel, but for the bed of the Jordan River adjacent to it. Thus, broader goals for restoring wildlife habitat may be established than would typically be attainable for the average landowner. It is even possible

that as a holder of the public trust the Division may find in the future that it is plausible to require the maintenance of certain minimum instream flows for the overall public good. Whether or not this is even reasonable can at least be considered because of the Division's unique management role at the Galena site.

The enhancement of wildlife habitat on the Galena property should coincide with the removal of noxious and invasive vegetation. As invasive species are removed, the Division will work with DWR and FWS to determine the plant species best suited for long-term sustainability. Rehabilitation of the riparian areas in this fairly large tract could help establish local breeding populations of avian species that are struggling to find appropriate habitat within the Jordan River corridor. Norvell (1997) found that bird species richness in riparian areas was greater when adjacent to grasslands. With grasslands stretching across the upper and lower terraces and abutting the newly created wetland and extant riparian areas onsite, the Galena property is prime for returning the riparian corridor along the Jordan River to a more natural (and native) condition. Considerations will have to be made concerning water budget, since the driving hydrologic factors onsite will not change and over-bank flooding is still absent. But a coordinated effort could produce significant results and set a good example for other landowners and managers.

Maintenance of the grassland and a possible push towards replacing non-native grasses with native species could add significantly to the property's value to wildlife. Small mammal populations, and thus the larger predators that depend on them, could benefit significantly from more native grass and forb communities. Reasonably attainable goals should be set on a per species basis in order to best use available funds to benefit the most critical needs.

It would also be wise to develop a plan to deal with invasive or "problem" vertebrate and invertebrate species, such as the bullfrog, carp, and beaver. However, as these, and other species move throughout the Jordan River itself, their eradication will be impossible and just maintaining a level of low impact to native species may be the goal. As beaver can be devastating to new plantings, a specific plan may need to be developed to deal with beaver, and at minimum anti-beaver methods should be considered (Doug Sakaguchi, pers. comm.).

Public Trust Education

Once rehabilitation of the site has begun in earnest, the section of Galena property legislation concerning encouraging the use of state and sovereign lands could be dealt with in various ways. The simplest way would be the installation of educational signage along sections of the trail, as previously discussed. A greater public outreach would be to have an information fair or festival onsite. An event could be locally advertised inviting members of the public to come out and enjoy their land. Information concerning wetlands, mitigation, and sovereign and state lands could be distributed and if funds were available food and beverages could be provided. The timing of such an event could be set to coincide with an international clean-up day that

targets public waterways (e.g. ICC, International Coastal Cleanup). Trash bags and cleanup paraphernalia could be distributed and the public could be encouraged to lend a hand in cleaning their land. With a little thought and creativity there are definitely opportunities for public outreach and education available.

Rehabilitation of Old Prison Dump Site
Efforts will be made to work closely with Salt Lake County, Department of Corrections, and Division of Facilities Construction and Management to remove all visible trash. Past attempts at seeding the scarp have failed. Consideration will be given to new techniques employing vegetative mats infused with seed. These mats will allow germination while maintaining slope stability.

Full rehabilitation of the site is not expected. In March of 2000 the spoil material that had been placed over the site was partially removed (from the edge of the bluff), and the entire area was recontoured and reseeded (Birnie 2000). The work was monitored to ensure that the archaeological site was not further damaged in any way. It is thus expected that much of the revegetated site will remain unchanged and only areas near the slope with visible trash will be rehabilitated. It is likely that disturbance of the entire site would result in future problems associated with erosion and sedimentation.

Creation Of Wetlands
The UDOT wetland creation onsite should be considered a fulfillment of statutory guidance for creating wetlands on the Galena property. Topographic and hydrologic limitations on the remaining acreage would make further creation efforts difficult, if not futile. While future conditions onsite may allow for additional wetland creation, resources at this time should be focused more on the rehabilitation of existing degraded habitats than the creation of new ones.

Other Issues of Concern

Groundwater Quality Issues
As previously noted, there is groundwater contamination onsite due to elevated levels of heavy metals, particularly arsenic. Rob Herbert, manager of the Ground Water Protection Section of the Division of Water Quality (DWQ), made recommendations to the Division relating to this problem. As the source of the arsenic in the shallow aquifer is unknown at this time, it is probably not practical to actively remediate the contamination. Even if the source were known, economical constraints might prevent full restoration of the groundwater. He recommended that institutional controls be implemented to "ensure that access to contaminated ground water on state property is restricted". This would include determining existing water rights on the property, gaining legal descriptions that are property-specific, and working with the State Engineer to provide technical justification and maps of the areas affected. These actions could lead to minimal mitigation efforts, such as putting legal limitations on water withdrawal to

prevent future litigation, or to more direct efforts, such as signage or fencing to assure the safety of the public, livestock, and wildlife.

Easements and Property Issues

There are four easements across the site, and one issue of property ownership. There is a small triangular-shaped private in-holding on the southern portion of the property. The owner has contacted the Division about any possible problems arising from her ownership of said parcel, and seems content to just let the situation remain as it is for the present. This could provide a future opportunity for land acquisition if the legislature makes funds available to do so.

Two of the easements on the Galena property are with the City of Draper for trails. One of these is for the section of the Jordan River Parkway that crosses the site, and the other is for an equestrian trail paralleling the Parkway from Corner Canyon Creek north to the property line. The equestrian trail was never constructed as set forth in the easement and horseback riders tend to just stay near the Parkway. Both of these easements put the responsibilities of inspection, maintenance, repair, or replacement on the City of Draper.

The other two easements on the property are with the South Valley Sewer District for sewer lines across the property. Both of the lines crossing the property are 24" or greater metal pipes within a 20' right-of-way. If reachable by truck the lines are power flushed on an 18-month rotation, while if accessible only by foot they are inspected once a year. The southernmost line runs west across the property about 13800 S, cuts south down the scarp, and crosses over the river adjacent to the Jordan River Parkway trail. The other line follows along Corner Canyon Creek before crossing into the wetland creation area in the northern third of the property and crossing the Jordan River. There is a high manhole visible in the creation area. These easements will be left open for maintenance access.

Upper terrace looking south

*Unless otherwise noted, all pictures were taken by Ben Bloodworth.

Proposed Implementation Schedule for Management Responsibilities on Galena Property

Public safety: (short term) Spring/Summer 2006

– Meet with UDOT, AG's office and contract a risk management professional to assess the site. Their recommendations should be immediately instituted, but at minimum installation of signage (and fencing) as soon as possible to prevent the public from entering the hot water in the creek and Galena canal during the cold winter months should be implemented. Also need to discuss issues concerning the silo and headgate.

– Install signage to keep public off silo and headgate.

Development of Conservation Easement: (short term) Spring/Summer 2006

– Meet with TNC, USFWS, DNR Div. of Wildlife Resources, and any other parties knowledgeable of conservation easement holders to decide on potential candidates for holding the easement. By statute the State needs to maintain management control, which may not work with some potential holders. A conservation easement needs to be in place as soon as practicable.

Invasive species: (long term) Spring 2006 - (indef)

– State law requires landowner to remove listed noxious weeds
– Meet with Salt Lake Co., UDOT, DWR, and USFWS to develop strategy for mechanical and chemical control, as well as a system of monitoring techniques for vegetative response, and proposals for revegetation.
– Priority to mitigation site and immediate area
– Riparian corridor
– Uplands
– Establish monitoring protocol

Annual meeting should be held every February to discuss monitoring and vegetative response, and to establish the coming year's strategy for weed removal. All aspects of mechanical, chemical, and biological control should be covered. Revegetation needs to be addressed in each phase of eradication as appropriate habitat for native species becomes available.

Rehabilitation of dump: (short term) Spring- Fall 2006

– Meet with Dept. of Corrections, UDOT, DFCM, NRCS, SHPO, and any other stakeholders about the dump situation. Decisions have been made in the past that were not subsequently carried out. So whatever is decided needs to be implemented *immediately*.

– Dump site cleaned up* – at minimum visible refuse removed and slopes along bluff revegetated.

*Needs to be completed before trails are constructed.

Groundwater quality: (long term) 2006/2007

– Division leadership should meet and discuss (possibly with input from the Div. of Water Quality) the best way to implement some of the institutional controls recommended by Rob Herbert. Though this is a priority, the condition has existed for years without visible detrimental effects. Liability may be the biggest concern at the present.

Wildlife: (long term) Summer 2006 - (indef)

– Immediately after, or in conjunction with, the decision on handling noxious weeds on the property, a meeting should be set with DWR, USFWS, USU, and any other knowledgeable or concerned parties to discuss the rehabilitation of wildlife habitat onsite. This meeting should be the driving factor behind species selection for revegetation of the site.

– Implementation of wildlife habitat rehabilitation recommendations.
– Establish monitoring protocol

Trails: (long term) 2006/2007

– Meet with City of Draper, Salt Lake Co., Jordan River Parkway Foundation, SHPO, DNR Division of Wildlife Resources, USFWS, TNC, and any other interested parties concerning construction of an interpretive center (or signage) and trail development on the Galena property. Discussion concerning the archaeological site should also be conducted at this time.

– Depending on funding and recommendations, begin trail construction

– Depending on funding and recommendations, begin signage or interpretive center construction.

Public education: (long term) ongoing

– A specific day should be chosen to draw the public out to the Galena property for the purpose of environmental cleanup and education concerning public lands. This day could also involve education on, and removal of, invasive species. The Division leaders should meet in January to decide when such an event might be appropriate and how to publicize and successfully carry it out.

CITATIONS

Birnie, Robert I. 2000. Monitoring of recontouring activities at archaeological site 42SL186. Letter report 5135-02-20006 for State Historical Preservation Office (SHPO), state project #U99PD06815.

Bio/West, Inc. 1998. State Prison Property: Wetlands Inventory and Mitigation Bank Feasibility Study. Report prepared for UDOT Region 2.

Center for Health and Environmental Studies. 1975. Environmental studies of: Proposed Jordanelle Reservoir site – Provo River, Utah Lake, Jordan River – Proposed Lampton Reservoir site. Final phase I report prepared for Bureau of Reclamation. Brigham Young University, Provo, Utah.

Dahl, T.E. 1990. Wetlands Losses in the United States 1780's to 1980's. U.S. Department of the Interior, Fish and Wildlife Service, Washington D.C.

Department of Zoology, University of Utah. 1957-58. Report on limnological and sanitary characteristics of Jordan, Price, Provo and Weber Rivers.

DuBois, K. 1994. The Jordan River in Utah: impacts of 100 years of human-induced changes on a riparian landscape. Unpublished paper prepared for a Landscape Ecology class.

The Governor's Office of Planning and Budget (GOPB) and The Utah Critical Land Conservation Committee. 1998. Jordan River Critical Land: a Report to the Governor and Legislature.

Herbert, Robert. October 2005. Manager, Ground Water Protection Section, Division of Water Quality, Utah Department of Natural Resources. Personal communication.

Herrmann, Betsy. September 2005. Ecologist, U.S. Fish and Wildlife Service. Personal communication.

Hooper, Virginia H. 2003. Pre-settlement vegetation along the Jordan River corridor. *In:* Resource planning reports for specific restoration and management issues along the Jordan River in Murray, Utah. Utah State University, Logan, Utah. Prepared for Draper City Parks and Trails committee and city planning department.

Hooton, LeRoy W. Jr. 1996. Utah Lake and Jordan River: water rights and management plan. Salt Lake City Public Utilities. Available online at: http://www.slcgov.com/utilities/PDF%20Files/utah&jordan.PDF

Howe, F. P., J. R. Parrish, and R. E. Norvell. 1999. Utah Partners in Flight 1999 Progress Report. UDWR Publication Number 99-34. Utah Division of Wildlife Resources, Salt Lake City, Utah.

IHI Environmental. 2000. Groundwater Investigation Report for Utah State Prison property & former landfill, Draper, Utah. DFCM Project #98040030. October 20, 2000.

IHI Environmental(2). 2000. Phase II Environmental Site Assessment for Utah State Prison Property & former landfill Draper, Utah. DFCM Project #98040030. May 26, 2000.

Lamming, Lani. 2001. *Successfully controlling noxious weeds with goats.* Pesticides and You. Beyond pesticides/National coalition against the misuse of pesticides. Vol. 21, no. 4.

Lankford, Adam H. 2003. *Elaeagnus angustifolia L.* Russian-olive. *In:* Resource planning reports for specific restoration and management issues along the Jordan River in Murray, Utah. Utah State University, Logan, Utah. Prepared for Draper City Parks and Trails committee and city planning department.

Lockerbie, C.W. 1949. Our Changing World. Utah Audubon News. Charles W. Lockerbie Papers, Accession Number 992, Box 5. Manuscript Division, Special Collections, University of Utah Marriot Library, Salt Lake City, Utah.

Lovejoy, Vaughn. 2003. Students help restore riparian bird habitat through service learning program. *Ecological Restoration.* March 2003. Available online at: http://www.treeutah.org/eco-article.htm

Madsen, David B. 1989. *Exploring the Fremont.* Utah Museum of Natural History/University of Utah, Salt Lake City, Utah.

National Audubon Society (NAS) for the Mitigation Commission and the U.S. Fish and Wildlife Service. 2000. The Jordan River natural conservation corridor report. Available online at: http://137.77.133.41/wetlands/pdf/wetlands_jornac.pdf

Norvell, R.E. 1997. Avian Use of Riparian Habitats in an Urban to Rural Gradient, Salt Lake Valley, Utah. Master of Science Thesis prepared for the Graduate School at the University of Wyoming.

Oliver, George. November 2005. Wildlife Biologist, Division of Wildlife Resources, Utah Department of Natural Resources.

Parrish, J. R., F. P. Howe, and R. E. Norvell. 1999. Utah Partners in Flight Draft Avian Conservation Strategy. UDWR Publication Number 99-40. Utah Partners in Flight Program, Utah Division of Wildlife Resources, Salt Lake City, Utah.

Personius, S.F., and Scott, W.E. 1992. Surficial geologic map of the Salt Lake City segment and parts of adjacent segments of the Wasatch fault zone, Davis, Salt Lake, and Utah Counties, Utah: U.S. Geological Survey Miscellaneous Investigations Series Map I-2106, scale 1:50,000.

Powell, A. K. ed. 1994. *Utah History Encyclopedia*. University Press. University of Utah, Salt Lake City, Utah. Available online at: http://www.onlineutah.com/indianhistory.shtml

Sakaguchi, Doug. November 2005. Wildlife Biologist, Division of Wildlife Resources, Utah Department of Natural Resources. Personal communication.

Smith, R. and C. Greenwood. 1984. Jordan River Terrestrial Wildlife Inventory, Proposed Lampton Reservoir Area, Bonneville Unit, Central Utah Project, prepared for Dept. Interior, Bureau of Reclamation, Contract No. 2-07-40-S2096.

Sullivan, Lenora. November 2005. Information Manager, Utah Natural Heritage Program, Division of Wildlife Resources, Utah Department of Natural Resources. Personal communication.

Trail Easement and Contract (TEC). 1998. State of Utah Division of Facilities, Construction, and Management and the City of Draper, Utah. Salt Lake County, Utah.

U. S. Department of Agriculture - Soil Conservation Service (USDA-SCS). 1974. Soil Survey of Salt Lake Area, Utah.

U.S. Department of Agriculture – Soil Conservation Service (USDA-SCS). 1991. Hydric Soils of the United States, in cooperation with the National Technical Committee for Hydric Soils. Misc. Publication #1491.

Utah Department of Environmental Quality, Division of Water Quality (DWQ). 2004. Utah's 2004 303(d) list of waters. Available online at: http://www.waterquality.utah.gov/documents/2004303dlistFINALall-11-04-04.pdf

Utah Department of Environmental Quality, Division of Water Quality (DWQ). 2004. Utah 2004 water quality assessment report to Congress. Available online at: http://www.waterquality.utah.gov/documents/2004305b-1-20-05rep.pdf

Utah Department of Natural Resources, Division of Wildlife Resources (DWR). 2003. Plant and vertebrate inventories of Jordan River State Park. Prepared for the Division of Parks and Recreation under cooperative agreement #030423, May 2003.

Utah Department of Natural Resources, Division of Wildlife Resources (DWR(2)). 2003. Utah Conservation Data Center. Available online at: http://dwrcdc.nr.utah.gov/ucdc/

Utah Department of Transportation. 2005. UDOT Region 2 wetland mitigation bank: final banking instrument. UDOT Project No. SP-0201(5)13

Waddel, R.M., R.L. Seiler, & Others. 1984. Ground-water condition in Salt Lake Valley, Utah 1969-83. U.S. Geological Survery.

Wiley, Don. November 2005. Fisheries Biologist, Division of Wildlife Resources, Utah Department of Natural Resources. Personal communication.

Williams, Ann. 2003. Tamarisk (Saltcedar). *In:* Resource planning reports for specific restoration and management issues along the Jordan River in Murray, Utah. Utah State University, Logan, Utah. Prepared for Draper City Parks and Trails committee and city planning department.

APPENDIX A
Utah Code 63A-5-222

63A-5-222. Critical land near state prison -- Definitions -- Preservation as open land -- Management and use of land -- Restrictions on transfer -- Wetlands development -- Conservation easement.

(1) For purposes of this section:

(a) "Corrections" means the Department of Corrections created under Section 64-13-2.

(b) "Critical land" means a parcel of approximately 250 acres of land owned by the division and located on the east edge of the Jordan River between about 12300 South and 14600 South in Salt Lake County, approximately the southern half of whose eastern boundary abuts the Denver and Rio Grande Western Railroad right of way.

(c) (i) "Open land" means land that is:

(A) preserved in or restored to a predominantly natural, open, and undeveloped condition; and

(B) used for:

(I) wildlife habitat;

(II) cultural or recreational use;

(III) watershed protection; or

(IV) another use consistent with the preservation of the land in or restoration of the land to a predominantly natural, open, and undeveloped condition.

(ii) (A) "Open land" does not include land whose predominant use is as a developed facility for active recreational activities, including baseball, tennis, soccer, golf, or other sporting or similar activity.

(B) The condition of land does not change from a natural, open, and undeveloped condition because of the development or presence on the land of facilities, including trails, waterways, and grassy areas, that:

(I) enhance the natural, scenic, or aesthetic qualities of the land; or

(II) facilitate the public's access to or use of the land for the enjoyment of its natural, scenic, or aesthetic qualities and for compatible recreational activities.

(2) (a) (i) The critical land shall be preserved in perpetuity as open land.

(ii) The long-term ownership and management of the critical land should eventually be turned over to the Department of Natural Resources created under Section 63-34-3 or another agency or entity that is able to accomplish the purposes and intent of this section.

(b) Notwithstanding Subsection (2)(a)(i) and as funding is available, certain actions should be taken on or with respect to the critical land, including:

(i) the development and implementation of a program to eliminate noxious vegetation and restore and facilitate the return of natural vegetation on the critical land;

(ii) the development of a system of trails through the critical land that is compatible with the preservation of the critical land as open land;

(iii) the development and implementation of a program to restore the natural features of and improve the flows of the Jordan River as it crosses the critical land;

(iv) the preservation of the archeological site discovered on the critical land and the development of an interpretive site in connection with the archeological discovery;

(v) in restoring features on the critical land, the adoption of methods and plans that will enhance the critical land's function as a wildlife habitat;

(vi) taking measures to reduce safety risks on the critical land; and

(vii) the elimination or rehabilitation of a prison dump site on the critical land.

---

(3) (a) Except as provided in Subsection (3)(b), no interest in the critical land may be sold, assigned, leased, or otherwise transferred unless measures are taken to ensure that the critical land that is transferred will be preserved as open land in perpetuity.

(b) Notwithstanding Subsection (3)(a), exchanges of property may be undertaken to resolve boundary disputes with adjacent property owners and easements may be granted for trails and other purposes consistent with Subsection (2)(b) and with the preservation of the critical land as open land.

(4) The division shall use the funds remaining from the appropriation under Chapter 399, Laws of Utah 1998, for the purposes of:

(a) determining the boundaries and legal description of the critical land;

(b) determining the boundaries and legal description of the adjacent property owned by the division;

(c) fencing the critical land and adjacent land owned by the division where appropriate and needed; and

(d) assisting to carry out the intent of this section.

(5) (a) Notwithstanding Subsection (2)(a)(i), the division or its successor in title to the critical land may develop or allow a public agency or private entity to develop more wetlands on the critical land than exist naturally or existed previously.

(b) (i) Subject to Subsections (3)(a) and (5)(b)(ii), the division or its successor in title may transfer jurisdiction of all or a portion of the critical land to a public agency or private entity to provide for the development and management of wetlands and designated wetland buffer areas.

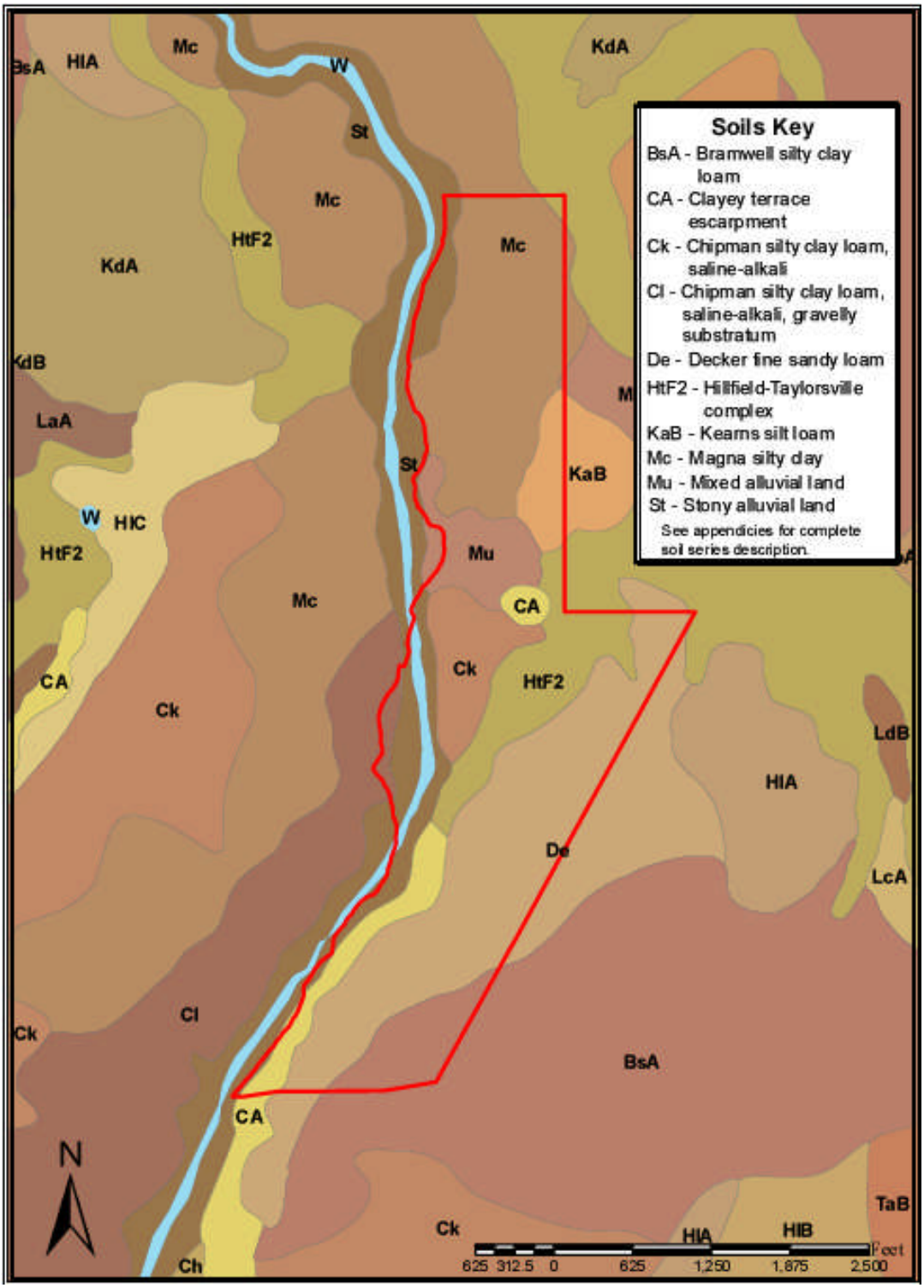
(ii) Before transferring jurisdiction of any part of the critical land under Subsection (5)(b)(i), the division or its successor in title shall assure that reasonable efforts are made to obtain approval from the appropriate federal agency to allow mitigation credits in connection with the critical land to be used for impacts occurring anywhere along the Wasatch Front.

(6) Notwithstanding any other provision of this section, corrections shall have access to the cooling pond located on the critical land as long as that access to and use of the cooling pond are not inconsistent with the preservation of the critical land as open land.

(7) The Department of Corrections, the division, and all other state departments, divisions, or agencies shall cooperate together to carry out the intent of this section.

(8) In order to ensure that the land referred to in this section is preserved as open land, the division shall, as soon as practicable, place the land under a perpetual conservation easement in favor of an independent party such as a reputable land conservation organization or a state or local government agency with experience in conservation easements.

APPENDIX B
NRCS County Soils Survey Data


Soils Key
BsA - Bramwell silty clay loam
CA - Clayey terrace escarpment
Ck - Chipman silty clay loam, saline-alkali
Cl - Chipman silty clay loam, saline-alkali, gravelly substratum
De - Decker fine sandy loam
HtF2 - Hillfield-Taylorsville complex
KaB - Kearns silt loam
Mc - Magna silty clay
Mu - Mixed alluvial land
St - Stony alluvial land
See appendicies for complete soil series description.
BsA
HlA
Mc
W
St
KdA
HtF2
KdB
LaA
HlC
Mu
CA
Ck
Cl
Ch
De
KaB
LdB
LcA
TaB
HlB
N
625 312.5 0 625 1,250 1,875 2,500
Feet

The following is a description of soil classifications obtained from the USDA Natural Resource Conservation Service, soil survey.

BsA – Bramwell Silty Clay Loam

- This soil occurs adjacent to the Jordan River on the lake plains in the central part of the survey area.
- Runoff is slow, and the hazard of erosion is slight.
- Most areas of this Bramwell soil have been drained and are used for irrigated crops. Some are used for range.
- Irrigated crops are alfalfa, small grains, and pasture.
- Slope 1 to 3 percent

CA – Clayey Terrace Escarpment

- Consists of well-drained, stratified but mainly moderately fine textured lake sediments.
- This land type is sloping to very steep on terrace escarpments.
- The material ranges from sandy loam to silty clay in texture.

Ck – Chipman Silty Clay Loam, Saline-alkali

- This soil occurs on flood plains adjacent to the Jordan River.
- It is moderately affected by salts and alkali. The available water holding capacity is only about 6 to 8 inches to a depth of 5 feet because of the salt.
- This Chipman soil is used mainly for meadow pasture. It is well suited to irrigated pasture.

Cl – Chipman Silty Clay Loam, Saline-Alkali, Gravelly Substratum

- This soil occurs on flood plains adjacent to the Jordan River.
- The substratum is 50 to 80 percent coarse fragments, and fines are composed mainly of sandy loam or sand.
- This soil is moderately saline-alkali. The available water holding capacity is about 10 inches
- This Chipman soil is suited to irrigated pasture.
- It is used mainly for meadow pasture

De – Decker Fine Sandy Loam

- This soil is moderately saline-alkali and has a surface layer of fine sandy loam.
- The available water holding capacity is only 5 to 6 inches to a depth of 5 feet because of the salt content of the soil.
- Most of this Decker soil is used for range.

HtF2 – Hillfield – Taylorsville Complex

- This complex is mainly on terrace breaks along both sides of the Jordan River, adjacent to the river flood plain.
- It consists of about 60 percent Taylorsville silty clay loam.
- The Hillfield soil is on the upper part of the terrace breaks, and the Taylorsville soil generally is on the lower part.
- These soils are moderately eroded.
- Runoff is rapid, and the hazard of erosion is high.
- The available water holding capacity is about 12 inches.
- The soils are used for range.

KaB – Kearns Silt Loam

- This soil occurs on alluvial fans.
- Runoff is slow, and the hazard of erosion is slight.
- This soil is used for irrigated alfalfa, small grains, corn, sugar beets, tomatoes, and peas and for no irrigated small grains.
- 1 to 3 percent slope.

Mc – Magna Silty Clay

- This soil is on flood plains adjacent to the Jordan River.
- This soil is well suited to irrigated pasture.
- Included in mapping are areas of Ironton loam, Chipman silty clay loam, and Magna silty clay, peaty surface, all having slopes of 0 to 1 percent

Mu – Mixed Alluvial Land

- This is a miscellaneous land type that consists of somewhat poorly drained and highly stratified alluvium.
- It is undulating on recently deposited flood plains and stream meander belts adjacent to the Jordan River.
- Subject to frequent flooding.
- Texture ranges from clay to sand, and commonly there are gravelly strata.
- Mottles occur within 30 inches of the surface. This land type is moderately saline-alkali.
- Slopes are 0 to 3 percent.
- The organic-matter content is medium. Most roots are above a depth of 30 inches.

St-Stony Alluvial Land

- Miscellaneous land type that consists of deep, poorly drained or somewhat poorly drained, gravelly, cobbley, or stony alluvium.
- Occurs on flood plains of the major streams.
- The material is stratified, but it has cobblestones or stones on the surface in most places and generally contains cobblestones, stones, and gravel throughout. Slopes are 0 to 20 percent.

APPENDIX C

Vertebrate List
'Appendix A' of the
JORDAN RIVER TERRESTRIAL WILDLIFE INVENTORY
PROPOSED LAMPTON RESERVOIR AREA
BONNEVILLE UNIT, CENTRAL UTAH PROJECT

JORDAN RIVER TERRESTRIAL WILDLIFE INVENTORY
PROPOSED LAMPTON RESERVOIR AREA
BONNEVILLE UNIT, CENTRAL UTAH PROJECT

Randall B. Smith and Charles L. Greenwood
Utah Division of Wildlife Resources
1115 North Main Street
Springville, Utah 84663

January 13, 1984

Prepared for
U.S. Department of the Interior
Bureau of Reclamation
Upper Colorado Regional Office
P.O. Box 11568
Salt Lake City, Utah 84147

Contract No. 2-07-40-S2096

APPENDIX A

List of Wildlife Species Observed or Potentially Occurring in the Jordan River Study Area

Following is a list of vertebrate wildlife species that occur or are believed to occur in the study area, Species that we observed or could find a record of occurrence for are denoted with an asterisk (*). The following code letters are used to describe the status for each species. Status was based on general observations and knowledge, but was rather speculative in many cases.

C Common - These species are widespread and abundant.
U Uncommon - These species are widespread, but not abundant.
R Rare - These species are seldom identified during any one year.
0 Occasional - These species are periodically identified during a long term period (10-50 years).

A Accidental - Distribution for these species does not normally include this area. Sightings are as far between as 50 to 100 years.
E Endangered - These species are endangered with extinction or extirpation.
L Limited - These species are common but restricted to a particular area or habitat type in Utah.
P Protected - These species are protected by state or federal laws in Utah.
N Nonprotected - These species are not protected by any laws in Utah.
G Game or furbearer species.

Species	Status
AMPHIBIANS	
Family Ambystomidae	
Tiger salamander - Ambystoma tigrinum	C-P
Family Pelobatidae	
Great Basin spadefoot toad - Scaphiopus intermontanus	C-P
Family Bufonidae	
Woodhouse's toad - Bufo woodhousii	C-P
Western toad – Bufo boreas	C-P

APPENDIX A (Continued)

Species	Status
Family Ranidae	
Bullfrog - Rana catesbeiana	L-P
Leopard frog - Rana_pipiens	C-P
Family Hylidae	
Boreal chorus frog - Pseudacris triseriata	C-P
REPTILES	
Family Iguanidae	
Great Basin fence lizard - Sceloporus occidentalis_	C-P
*Northern sagebrush lizard - Sceloporus graciosus	C-P
Side-blotched lizard - Uta stansburiana	C-P
Family Scincidae	
Great Basin skink - Eumeces skiltonianus	L-P
Family Boidae	
Utah rubber boa - Charina bottae	C-P
Family Colubridae	
*Wandering garter snake - Thamnophis elegans	C-P
Valley garter snake - Thamnophis sirtalis	U-P
Regal ring-necked snake - Diadophis punctatus	U-P
*Western yellow-bellied racer - Coluber constrictor	C-P
Western smooth green snake - Opheodrys vernalis	U-P
*Gopher snake - Pituophia melanoleucus	C-P
Western milk snake - Lampropeltis triangulum	U-P
Western long-nosed snake - Rhinocheilus lecontei	C-P
Family Viperidae	
Great Basin rattlesnake - Crotalus viridis	C-P
MAMMALS	
Order Insectivora	
Family Soricidae	
Merriam shrew - Sorex merriami	U-N
Vagrant shrew - Sorex vagrans	C-N
Dusky shrew - Sorex obscurus	C-N
Northern water shrew - Sorex palustris	
Family Vespertilionidae	
*Silver-haired bat - Lasionycteris noctivagans	
*Hoary bat - Lasiurus cinereus	
*Spotted bat - Euderma maculata	
Pallid bat - Antrozous pailidus	
*Small footed bat - Myotis leibii	C-N
*Little brown bat - Myotis lucifugus	C-N

APPENDIX A (Continued)

Species	Status
MAMMALS (Cont^{t}d.)	
Family Zapodidae	
W. jumping mouse - Zapus princeps	C-N
Family Erethizontidae	
Porcupine - Erethizon dorsatum	C-N
Family Canidae	
Coyote - Canis latrans	C-N
*Red fox - Vulpes vulpes	L-N
Family Procyonidae	
*Raccoon - Procyon lotor	C-N
Family Mustelidae	
Long-tailed weasel - Mustela frenata	C-P-C
Mink - Mustela vison	L-P-G
Badger - Taxidea taxes	C-P-G
*Striped skunk - Mephitis mephitis	C-P-G
Spotted skunk - Spilogale putorius	C-P-G
Family Felidae	
Bobcat - Lynx rufus	C-P-C
Family Cervidae	
*Mule deer - Odocoileus hemionus	C-P-C
BIRDS	
Order Popicipediformes	
Family Podicipedidae	
*Eared grebe - Podiceps nigricollis	C-P
*Western grebe - Aechnophorus occidentalis	C-P
*Pied-billed grebe - Podilymbus podiceps	C-P
Order Pelecaniformes	
Family Pelcanidae	
White pelican -- Pelecanus erythrorhynchos	C-P
Family Phalacrocoracidae	
*Double-crested cormorant - Phalacrocorax auritus	U-P
Order Ciconiiformes	
Family Ardeidae	
*Great blue heron – Ardea herodias	C-P
Cattle egret - Bubulcus ibis	U-P
*Snowy egret - Egretta thula	C-P
*Black-crowned night heron - Nycticorax nycticorax	C-P

APPENDIX A (Continued)

Species	Status
BIRDS (Cont'd.)	
Family Threskiornithidae	
*White-faced ibis - Plegadis chihi	C-P
Order Anseriforms	
Family Anatidae	
Whistling swan - Olor columbianus	C-P-T
*Canada goose - Branta canadensis	C-P-C
White-fronted goose - Anser albifrons	0-P-G
Snow goose - Chen caerulescens	C-P-G
*Mallard - Anas platyrhynchos	C-P-G
*Gadwall - Anas strepera	C-P-G
*Pintail - Anas acuta	C-P-G
*Green-winged teal - Anas crecca	C-P-G
*Blue-winged teal - Anas discors	U-P-G
*Cinnamon teal - Anas cyanoptera	C-P-G
*American widgeon - Anas americana	C-P-G
*Northern shoveler - Anas clypeata	C-P-G
*Redhead -- Aythya americana	C-P-C
*Ring-necked duck - Aythya collaris	U-P-G
Canvasback - Aythya valisineria	C-P-G
*Lesser scaup - Aythya affinis	C-P-G
Common goldeneye - Bucephala clangula	C-P-C
Bufflehead - Bucephala albeola	C-P-G
*Ruddy duck -- Oxyura jamaicensis	C-P-G
*Common merganser - Mergus merganser	C-P-C
*Red-breasted merganser - Mergus serrator	C-P-C
Order Falconiformes	
Family Cathartidae-	
*Turkey vulture - Cathartes aura	C-P
Family Accipitridae	
*Sharp-shinned hawk - Accipiter striatus	C-P
Cooper's hawk - Accipites cooperii	C-P
*Red-tailed hawk - Buteo jamaicensis	C-P
Swainson's hawk - Buteo swainsoni	C-P
*Rough-legged hawk -- Buteo lagopus	C-P
Ferruginous hawk - Buteo regalia	C-P
*Golden eagle - Aquila chrysaetos	C-P
Bald eagle - Haliaeetus leucocephalus	E-P
*Marsh hawk - Circus cyaneus	C-P
Family Pandionidae	
Osprey - Pandion haliaetus	U-P

APPENDIX A (Continued)

Species	Status
BIRDS (Cont'd.)	
Family Falconidae	
*Prairie falcon - Falco mexicanus	C-P
Peregrine falcon - Falco peregrinus	E-P
*Merlin - Falco columbarius	U-P
*American kestrel - Falco sparverius	C-P
Order Galliformes	
Family Phasianidae	
*California quail - Lophortyx californicus	C-P-G
*Ring-necked pheasant - Phasianus colchicus	C-P-G
Order Gruiformes	
Family Gruidae	
Sandill crane - Grus canadensis	L-P
Family Rallidae	
*Virginia rail - Rallus limicola	C-P
*Sara rail - Porxaaa carolina	C-P
*American coot - Fulica americans	C-P
Purple gallinule - Prophyrula martinica	A-P
Order Charadriiformes	
Family Charadriidae	
*Killdeer - Charadrius vociferus	C-P
Black-bellied plover - Pluvialis squatarola	C-P
Family Scolopacidae	
*Common snipe - Capella gallinago	C-P-G
Long-billed curlew - Numenius americanus	C-P
Willet - Catoptrophorus semipalmatus	U-P
*Spotted sandpiper - Actitis macularia	C-P
Marbled godwit - Limosa fedoa	C-P
Solitary sandpiper - Tringa solitaria	U-P
Greater yellowlegs - Tringa Melanoleuca	C-P
Lesser yellowlegs - Tringa flavipes	C-P
Semipalmated sandpiper - Calidris pusilla	R-P
Western sandpiper - Calidris mauri	C-P
Long-billed dowitcher - Limnodromus scolopaceus	C-P
Family Recurvirostridae	
*American avocet - Recurvirostra americans	C-P
*Black-necked stilt - Himantopus mexicanus	C-P
Family Phalaropodidae	
*Wilson's phalarope - Steganopus tricolor	C-P

APPENDIX A (Continued)

Species	Status
Family Laridae	
*California gull - Larus californicus	C-P
Ring-billed gull -- Larus delarwarensis	C-P
Franklin's gull - Lanus pipixcan	C-P
Bonaparte's gull - Lanus philidelphia	U-P
*Forster's tern - Sterna forsteri	C-P
Caspian tern - Sterna caspia	U-P
Black tern - Chilidonias niger	C-P
Order Columbiformes	
Family Columbidae	
*Rock dove - Columba livia	C-P
Mourning dove - Zenaida macroura	C-P
Order Cuculiformes	
Family Cucuidae	
Yellow-billed cuckoo - Coccyzus americanus	U-P
Black-billed cuckoo - Coccyzus erythropthalmus	A-P
Order Strigiformes	
Family Tytonidae	
*Barn owl - Tyto alba	L-P
Family Strigidae	
Screech owl - Otus asio	C-P
*Great-horned owl - Bubo virginianus	C-P
Pygmy owl - Glaucidium gnoma	U-P
Burrowing owl - Athene cunicularia	L-P
Long eared owl - Asio otus	C-P
Short-eared owl - Asio flammeus	C-P
Saw-whet owl - Aegolius acadicus	C-P
Order Caprimulgiformes	
Family Caprimulgidae	
Poor-will - Phalaenoptilus nuttallii	C-P
*Common nighthawk - Chordeiles minor	C-P
Order Apodiformes	
Family Apodidae	
White-throated swift - Aeronautes saxatalis	C-P
Family Trochilidae	
Black-chinned hummingbird - Archilochus alexandri	C-P
*Broad-tailed hummingbird - Selasphorus platycercus	C-P

APPENDIX A (Continued)

Species	Status
BIRDS (Cont'd.)	
Order Coraciiformes	
Family Alcedinidae	
*Belted kingfisher - Megaceryle alcyon	U-P
Order Piciformes	
Family Picidae	
*Common flicker - Colaptes auratus	C-P
Lewis' woodpecker - Melanerpes lewis	U-P
Yellow-bellied sapsucker – Sphyrapicus varius	C-P
varius Hairy woodpecker -- Picoides villosus	C-P
*Downy woodpecker - Picoides pubescens	C-P
Order Passeriformes	
Family Alaudidae	
*Horned lark - Eremophila alpestris	C-P
Family Hirundinidae	
*Violet-green swallow - Tachycineta thalassina	C-P
*Tree swallow - Iridoprocne bicolor	C-P
*Bank swallow - Riparia riparia	C-P
*Rough-winged swallow - Stelgidopteryx ruficollis	C-P
*Barn swallow - Hirundo rustica	C-P
*Cliff swallow – Petrochelidon pyrrhonota	C-P
Family Corvidae	
Scrub jay - Aphelocoma coerulescens	C-P
*Black-billed magpie - Pica pica	C-P
*Common raven - Corvus corax	C-P
Common crow - Corvus brachyrhynchos	U-P
Family Tyrannidae	
*Eastern kingbird - Tyrannus tyrannus	C-P
*Western kingbird - Tyrannus verticalis	C - P
Eastern phoebe - Sayornis phoebe	R-P
Say's phoebe - Sayornis saya	C-P
Willow flycatcher -Empidonax traillii	C-P
Gray flycatcher - Empidonax wrightii	C-P
Western flycatcher - Empidonax difficilis	C-P
Western wood pewee – Contopus sordidulus	C-P
Family Paridae	
*Black-capped chickadee - Parus atricapillus	C-P
Bushtit - Psaltriparus minimus	C-P
Family Sittidae	
White-breasted nuthatch - Sitta carolinensis	C-P

APPENDIX A (Continued)

Species	Status
BIRDS (cont'd.)	
Family Certhiidae--	
Brown creeper - Certhia familiaris	C-P
Family Cinclidae	
Dipper - Cinclus mexicanus	C-P
Family Troglodytidae	
House wren - Troglodytes aedon	C-P
Bewick's wren - Thryomanes bewickii	C-P
*Long-billed marsh wren - Cistohorus palustris	C-P
Family Mimidae	
Mockingbird - Mimus polyglottos	U-P
Gray catbird - Dumetella carolinensis	U-P
Sage thrasher - Oreoscoptes montanus	C-P
Family Turdidae	
*American robin - Turdus migratorius	C-P
Hermit thrush - Catharus guttatus	C-P
Veery - Catharus fuscescens	U-P
Western bluebird - Sialia mexicana	U-P
*Mountain bluebird - Sialia currucoides	C-P
Family Motacillidae	
Water pipet - Anthus spinoletta	C-P
Family Bombycillidae	
Bohemian waxwing - Bombycilla garrulus	C-P
Cedar waxwing - Bombycilla cedrorum	U-P
Family Laniidae	
*Northern shrike - Lanius excubitor	U-P
*Loggerhead shrike - Lanius ludovicianus	C-P
Family Sturnidae	
*Starling - Sturnus vulgaris	C-P
Family Vireonidae	
Solitary vireo - Vireo solitarius	U-P
Red-eyed vireo - Vireo olivaceus	A-P
Warbling vireo - Vireo gilvus	C-P

APPENDIX A (Continued)

Species	Status
BIRDS (Cont'd.)	
Family Parulidae	
Orange-crowned warbler - Vermivora celata	C-P
*Yellow warbler - Dendroica petechia	C-P
Black-throated blue warbler - Dendroica caerulescens	A-P
*Yellow-rumped warbler - Dendroica coronata	C-P
Black-throated gray warbler - Dendroica nigrescens	C-P
*Common yellowthroat - Geothlypis trichas	C-P
*Yellow-breasted chat - Icteria virens	C-P
Wilson's warbler - Wilsonia pusilla	C-P
American redstart - Setophaga ruticilla	U-P
Family Ploceidae	
*House sparrow - Passer domesticus	C-P
Family Icteridae	
Bobolink - Dolichonyx oryzivorus	L-P
*Western meadowlark - Sturnella neglecta	C-P
*Yellow-headed blackbird - Xanthocephalus xanthocephalus	C-P
*Red-winged blackbird - Agelaius phoeniceus	C-P
*Northern oriole - Icterus galbula	C-P
*Brewer's blackbird - Euphagus cyanoceyhalus	C-P
*Brown-headed cowbird - Molothrus ater	C-P
Family Thraupidae	
Western tanager - Piranga ludoviciana	C-P
Family Fringillidae	
Black-headed grosbeak - Pheucticus melanocephalus	C-P
Blue grosbeak - Guiraca caerulea	C-P
*Lazuli bunting - Passerina amoena	C-P
Lapland longspur - Calcarius lapponicus	U-P
Lark bunting - Calamospiza melanocorys	U-P
Fox sparrow - Passerella iliaca	U-P
*Song sparrow - Melospiza melodia	C-P
Lincoln sparrow - Melospiza lincolnii	C-P
*White-crowned sparrow - Zonotrichia leucophrys	C-p
White-throated sparrow - Zonotrichia albicollis	R-P
*Dark-eyed junco - Junco hyemalis	C-P
*Gray-headed junco - Junco caniceps	C-P
*Savannah sparrow - Passercules sandwichensis	C-P
Grasshopper sparrow - Ammodramus savannarum	0-P
Tree sparrow - Spizella arborea	U-P
Chipping sparrow - Spizella passerina	C-P
Brewer's sparrow - Spizella brewers	C-P
*Vesper sparrow - Pooecetes gramineus	C-P
*Lark sparrow - Chondestes grammacus	C-P

APPENDIX A (Continued)

Species	Status
BIRDS (Contd.)	
Black-throated sparrow -- Amphispiza bilineata	C-P
Green-tailed towhee,- Pipilo_chiorurus	C-P
Rufous-sided towhee - Pipilo erythrophthalmus	C-P
Evening-grosbeak - Hesperiphona vespertina	C-P
Cassin's finch - Carpodacus cassinii	C-P
*House finch - Carpodacus mexicanus	C-P
Black rosy finch - Leucosticte atrata	U-P
Common redpoll - Carduelis flammea	U-P
*American goldfinch - Carduelis tristis	C-P
Lesser goldfinch - Carduelis psaltria	U-P