SOUTH JORDAN CITY

JORDAN RIVER CORRIDOR
OPEN SPACE AND HABITAT CONSERVATION
MASTER PLAN
and
MANAGEMENT GUIDELINES

K.A. SMITH CONSULTING, INC.

2011

Parks and Recreation Department

SOUTH JORDAN CITY

JORDAN RIVER CORRIDOR
OPEN SPACE AND HABITAT CONSERVATION
MASTER PLAN
and
MANAGEMENT GUIDELINES

Prepared for

The City of South Jordan
Parks and Recreation Department
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2011

Executive Summary

The Jordan River Corridor Open Space and Habitat Conservation Master Plan (Jordan River Corridor Master Plan), adopted as part of the South Jordan City General Plan, provides comprehensive guidance and instruction for long-term preservation and management of open space natural areas and parks along the approximately four miles of Jordan River corridor within the City of South Jordan. The Jordan River Corridor Master Plan also designates land use zoning and ordinances for the river corridor to ensure that open space will be preserved for its wildlife habitat and recreation values, with a consistent intent, regardless of whether changes occur within South Jordan City's managing and planning personnel. The Jordan River Corridor Master Plan adopts and incorporates the principals and methodologies specified in the *South Jordan City Jordan River Parkway Corridor Vegetation Enhancement Plan* (K.A. Smith Consulting, Inc. 2009) to ensure that vegetation management practices implemented within the Jordan River corridor are based upon scientifically proven and ecologically sound measures. The Jordan River Corridor Master Plan conforms to Resolution 2009-02 - "*A Resolution of South Jordan City in Support of Goals and Initiative of Blueprint Jordan River*". The Jordan River Corridor Master Plan is also in accordance with general conservation policy resolutions of the Great Salt Lake Audubon Society to "preserve natural areas, farmland, and critical habitats" and supports the specific goals of the "Jordan River Ecosystem" policy resolution to "maintain buffer lands between the river and development to reduce water quality impacts and preserve wildlife habitat".

The Jordan River Corridor Master Plan was developed according to the expressed needs of South Jordan City citizens for more "natural area" open space and the needs of the wildlife species that depend upon the Jordan River and its associated habitat for their continued survival. "Protecting rivers, creeks, and canal corridors" ranked as the highest value for the City's open space program and was rated as the most important "natural area" open space value (Greenplay 2007). Other regional studies surveying the importance of open space to Salt Lake Valley citizens found that preserving the Jordan River corridor for wildlife habitat, floodplain values, and community health is the highest or one of the highest priorities (Envision Utah et. al. 2008, Toth et. a. 2002, Swaner Design 2001).

The Jordan River corridor flyway is also an inherent component of the internationally recognized "Pacific Flyway" and a main tributary to Great Salt Lake which is designated as a formal "hemisphere site" as part of the Western Hemisphere Shorebird Reserve Network. On a local and regional level, the Jordan River connects Great Salt Lake and Utah Lake ecosystems. In addition to providing critical habitat for resident wildlife and migrant neo-tropical bird species, the Jordan River, within Salt Lake County, provides critical habitat for four species listed as "endangered", "threatened" or "candidate" under the Federal Endangered Species Act of 1973 and twenty-two species listed as a state of Utah "species of concern" or "candidate species".

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- **Passive Recreation**

The Jordan River Corridor Open Space and Habitat Conservation Master Plan (Jordan River Corridor Master Plan), adopted as part of the South Jordan City General Plan, provides comprehensive guidance and instruction for long-term preservation and management of open space natural areas and parks along the approximately four miles of Jordan River corridor within the City of South Jordan (Exhibit 1 and Appendix J). The Jordan River Corridor Master Plan also designates land use zoning and ordinance recommendations for the river corridor to ensure that open space will be preserved for its wildlife habitat and recreation values, with a consistent intent, regardless of whether changes occur within South Jordan City's managing and planning personnel. The Jordan River Corridor Master Plan adopts and incorporates the principals and methodologies specified in the *South Jordan City Jordan River Parkway Corridor Vegetation Enhancement Plan* (K.A. Smith Consulting, Inc. 2009) to ensure that vegetation management practices implemented within the Jordan River corridor are based upon scientifically proven and ecologically sound measures. The Jordan River Corridor Master Plan conforms to Resolution 2009-02 - "*A Resolution of South Jordan City in Support of Goals and Initiative of Blueprint Jordan River*" (Appendix A). The Jordan River Corridor Master Plan is also in accordance with general conservation policy resolutions of the Great Salt Lake Audubon Society to "preserve natural areas, farmland, and critical habitats" and supports the specific goals of the "Jordan

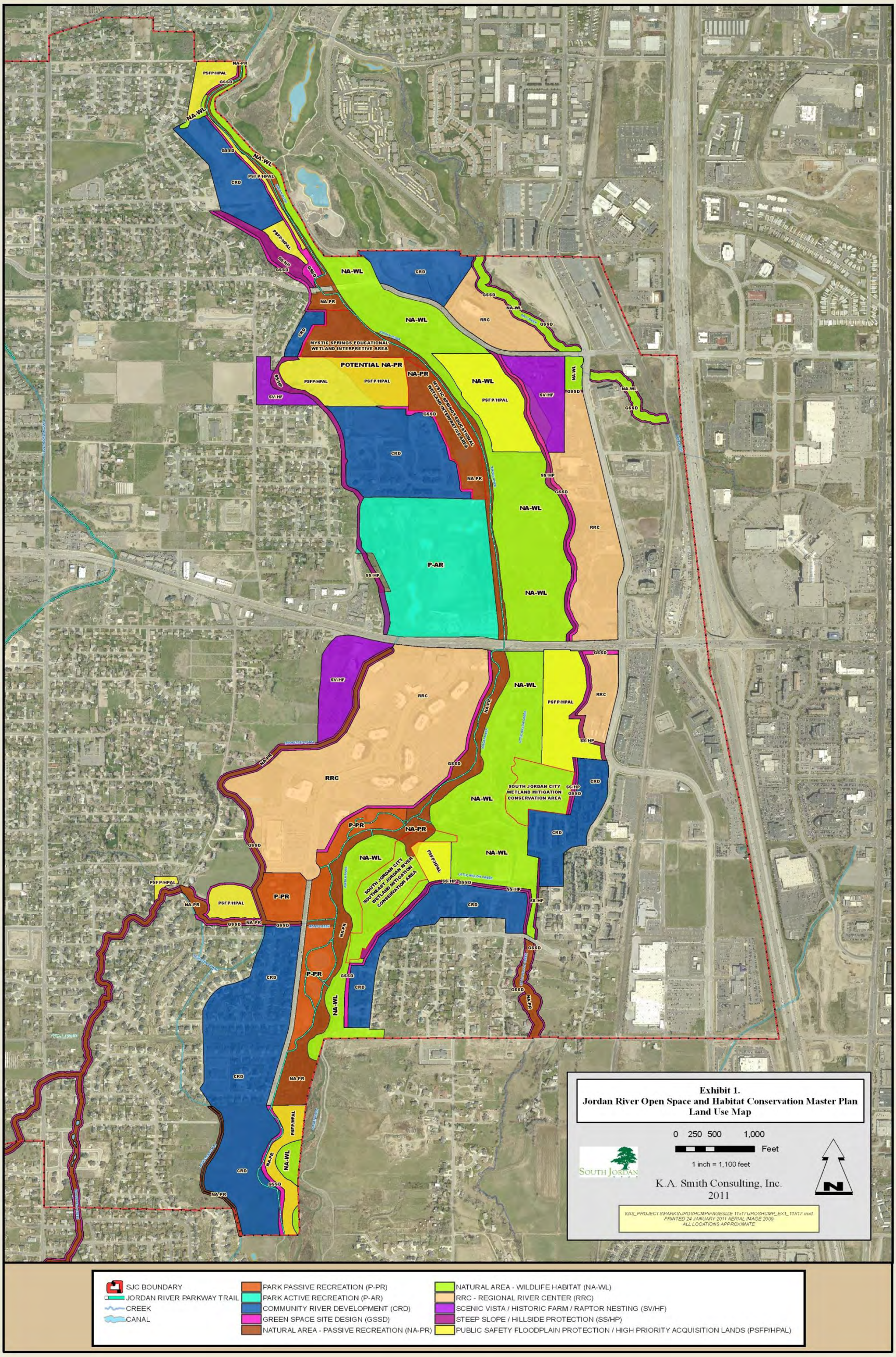
River Ecosystem" policy resolution to "maintain buffer lands between the river and development to reduce water quality impacts and preserve wildlife habitat" (Appendix B).

The Jordan River Corridor Master Plan was developed according to the expressed needs of South Jordan City citizens for more "natural area" open space and the needs of the wildlife species that depend upon the Jordan River and its associated habitat for their continued survival. Population survey data presented in the *City of South Jordan Parks, Recreation, Trails, and Open Space Master Plan* (Greenplay 2007) indicated the community would like fifty-two percent (52%) of available funding for the City's parks and facilities program to be allocated to open space preservation, walking and biking trails, and undeveloped parks. "Protecting rivers, creeks, and canal corridors" ranked as the highest value for the City's open space program and was rated as the most important "natural area" open space value.

"Inherent" natural open space values provided by the Jordan River corridor and smaller tributary creeks such as Cottonwood Creek, Little Willow Creek, Midas Creek, Dry Creek and Bingham Creek were recognized as being important by survey respondents. Educational nature trails with interpretive signage were also identified as being needed in the community. Walking and biking trails ranked highest in activity importance with ball and athletic fields such as soccer, baseball, basketball, and football ranking as the least important.

Other regional studies surveying the importance of open space to Salt Lake Valley citizens found that preserving the Jordan River corridor for wildlife habitat, floodplain values, and community health is the highest or one of the highest priorities (Envision Utah et. al. 2008, Toth et. a. 2002, Swaner Design 2001). Priority strategies recommended to city leaders for securing "natural area" open space included obtaining matching funds for land acquisition, establishing a sales tax, developing natural area open space zoning ordinances, and requiring conservation design standards for developments within or near high priority open space natural areas such as the Jordan River corridor.

The Jordan River Corridor Master Plan addresses community and regional needs by formally designating open space within the Jordan River corridor as "parks" or "natural areas". Open space parks are designated as "park - passive recreation" or "park - active recreation". Open space natural areas are designated as "natural area - passive recreation" or "natural area - wildlife habitat". Park open space is provided for within the west Jordan River corridor. "Park - active recreation" use may be


NA-PR
PSFP/HPAL
GSSD
NA-WL
CRD
SS/HP
SV/HF
RRC
P-AR
P-PR
MYSTIC SPRINGS EDUCATIONAL WETLAND INTERPRETIVE AREA
POTENTIAL NA-PR
SOUTH JORDAN CITY WETLAND MITIGATION CONSERVATION AREA
SOUTH JORDAN CITY SOUTHEAST JORDAN RIVER WETLAND MITIGATION CONSERVATION AREA
Exhibit 1.
Jordan River Open Space and Habitat Conservation Master Plan
Land Use Map
0 250 500 1,000
Feet
1 inch = 1,100 feet
K.A. Smith Consulting, Inc.
2011
SJC BOUNDARY
JORDAN RIVER PARKWAY TRAIL
CREEK
CANAL
PARK PASSIVE RECREATION (P-PR)
PARK ACTIVE RECREATION (P-AR)
COMMUNITY RIVER DEVELOPMENT (CRD)
GREEN SPACE SITE DESIGN (GSSD)
NATURAL AREA - PASSIVE RECREATION (NA-PR)
NATURAL AREA - WILDLIFE HABITAT (NA-WL)
RRC - REGIONAL RIVER CENTER (RRC)
SCENIC VISTA / HISTORIC FARM / RAPTOR NESTING (SV/HF)
STEEP SLOPE / HILLSIDE PROTECTION (SS/HP)
PUBLIC SAFETY FLOODPLAIN PROTECTION / HIGH PRIORITY ACQUISITION LANDS (PSFP/HPAL)

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experienced at Mulligan's golf course while "park - passive recreation" use may be experienced at Riverfront Park. Community fishing ponds constructed at Riverfront Park provide a "park - passive recreation" experience.

South Jordan City recognizes the importance of the Jordan River Parkway Trail as a regional river amenity which unites citizens of connected communities, within a preserved natural environment, to sustain a higher quality of life. As such, the entire Jordan River Parkway Trail within the west river corridor is zoned "natural area - passive recreation". "Natural area - passive recreation" includes activities such as walking, bird watching, wildlife photography, cycling, and equestrian riding. Regional and community river amenities are provided through interpretive signage, picnic tables, restroom facilities, and other accommodations. The Mystic Springs Educational Wetland Interpretive Area is also zoned "natural area - passive recreation" and provides "place-based" educational opportunities with a special needs accessible trail connected to the Jordan River Parkway Trail in a natural environment.

South Jordan City acknowledges the Jordan River flyway corridor as a unique, inherent component of the internationally recognized "Pacific Flyway" used by neo-tropical migrants and other migratory bird species. The Jordan River is also a main tributary to Great Salt Lake which is designated as a formal "hemisphere site" as part of the Western Hemisphere Shorebird Reserve Network. On a community and regional level, the Jordan River connects Great Salt Lake and Utah Lake ecosystems.

In addition to providing critical habitat for resident wildlife species, the Jordan River corridor, within Salt Lake County, provides critical habitat for four species listed as "endangered", "threatened" or "candidate" under the federal Endangered Species Act of 1973 (ESA) and twenty-two species are listed as a state of Utah "species of concern" or "candidate Species". The Jordan River is an important migration corridor for wintering bald eagles, a species listed as endangered under the federal ESA for many decades and which remains a state of Utah "species of concern". The Jordan River corridor also provides critical habitat for the Utah Lake June sucker a federally listed ESA "endangered" species; the yellow-billed cuckoo, a federally listed ESA "candidate" species; and the Ute Ladies'-Tresses Orchid, a federally listed ESA "threatened" species.

South Jordan City recognizes the importance of preserving and protecting quality open space and wildlife habitat within the Jordan River corridor into perpetuity. As such, the entire east Jordan River corridor is designated as open space "natural area – wildlife habitat" to provide for the needs of resident and migratory wildlife species and to maintain effective public safety floodplain functional values. A majority of the east river corridor floodplain is in designated wildlife habitat conservation easements and federally permitted wetland mitigation conservation areas owned and managed by the City of South Jordan, various state and federal government agencies, and the Great Salt Lake Audubon Society (GSLA). Wildlife conservation easement lands are secured as protected habitat into perpetuity. Establishment of trails and human and domestic animal use of wildlife conservation easement lands and federally permitted wetland mitigation areas is prohibited.

The Jordan River Corridor Master Plan recommends stream setback "no-build" zones for the Jordan River and its tributary streams and identities high priority undeveloped private properties which should be considered by the City of South Jordan, and other open space organizations, for acquisition in order to preserve community and regionally important public safety flood control, stormwater pollutant removal, wildlife habitat, and passive recreation functional values. Properties located within Federal Emergency Management Agency (FEMA) 100- and 500-year floodplain zones and those within lowlands of the Jordan River and its tributary streams are high priority acquisition properties due to their importance in providing floodwater attenuation, groundwater recharge and discharge, and wildlife functional values. Preservation of land adjacent to the Jordan River and its tributary streams is important to allow natural lateral migration of channels across connected floodplains to produce healthy riparian vegetation which reduces erosion and stabilizes stream banks. Land adjacent to streams also provides critical riparian nesting and foraging habitat for resident and neo-tropical migratory birds and important wildlife migration corridors. Private lands located within the Jordan River floodplain corridor adjoining wildlife conservation easements and federally permitted wetland mitigation areas are high priority acquisition properties which also provide important migration corridor "links".

Bullock's Oriole Nest in Old Growth Russian Olive Tree along Jordan River Parkway Trail

Acquiring undeveloped floodplain land and requiring development setbacks along the paved Jordan River Parkway Trail is important to preserve a natural and serene, riverine environment for quality community and regional human experiences.

The Jordan River Corridor Master Plan provides general "green space site design" guidelines for private property owners, homeowners, and developments adjacent to or near the Jordan River, Jordan River tributary streams, and the Jordan River Parkway Trail. Green space site designs incorporate the use of native vegetation buffer zones within development setback areas to reduce wildlife habitat disturbances and preserve quality recreational experiences for trail users. Green space site design measures increase home values and reduce landscape maintenance and water use by creating privacy zones comprised of adapted, native riparian trees and woody shrubs and drought-tolerant native grasses and forbs.

Migrating Snowy Egrets Roosting on Dead Branches of Old Growth Russian Olive Tree along Jordan River

The Jordan River Corridor Master Plan adopts and incorporates the principals and methodologies specified in the *South Jordan City Jordan River Parkway Corridor Vegetation Enhancement Plan* (K.A. Smith Consulting, Inc. 2009) to maintain the river corridor as a healthy, self-sustaining balanced ecosystem which provides quality wildlife habitat and human experiences. Management practices include the use of native species for riparian enhancement plantings and disturbed area revegetation, "wildlife-aquatic-safe" invasive plant species control, cottonwood herbivory protection, and other ecologically sound measures which minimize maintenance costs and the use of toxic herbicides and pesticides.

The *South Jordan City Jordan River Parkway Corridor Vegetation Enhancement Plan* (K.A. Smith Consulting, Inc. 2009) recognizes Russian olive (*Elaeagnus angustifolia*) as an invasive plant species and provides for the use of "*selective*" removal of young recolonizing Russian olive trees and saplings to prevent competition with more desirable native riparian plants. However, intensive studies of the Jordan River corridor riparian habitat indicates that many key resident and neo-tropical migratory bird species have become highly dependent upon the mature woody structure of old growth Russian olive trees for critical nesting, resting, and rearing habitat as old growth cottonwood forests have diminished along the Jordan River. Winter field observations also indicate Russian olive seeds have become the primary food source for many resident avian and wildlife species and neo-tropical migrants. Protected avian species such as egrets, herons, and large birds of prey use exposed dead branches of old growth Russian olive trees for roosting and hunting perches. As such, old growth Russian olive trees and old growth groves existing within the Jordan River corridor have been identified and mapped to ensure long-term preservation of this important mature riparian habitat type. During 2009-2010 K.A. Smith Consulting Inc. and the City of South Jordan implemented an intensive Russian olive and salt cedar "selective" removal program and planted nearly 500 cottonwood and willow poles in areas where these invasive species were removed. When cottonwood pole plantings mature and provide adequate replacement habitat for old growth Russian olive a new "selective" removal program may be initiated to remove Russian olive plants that no longer provide key habitat support, if necessary.

The Jordan River Corridor Master Plan is in accordance with general conservation policy resolutions of the Great Salt Lake Audubon Society to "preserve natural areas, farmland, and critical habitats" and supports the specific goals of the "Jordan River Ecosystem" policy resolution to "maintain buffer lands between the river and development to reduce water quality impacts and to preserve wildlife habitat and to use state, federal, and local funding for land acquisition and conservation easements" (Appendix B).

Finally, the South Jordan City Council on January 6, 2009 passed Resolution 2009-02 - "*A Resolution of South Jordan City in Support of Goals and Initiative of Blueprint Jordan River*" as "a commitment to protect and rehabilitate the Jordan River's natural environment for the benefit of the wildlife species that depend upon it for their survival and for the benefit of human enjoyment" (Appendix A). In supporting the goals and visions of Blueprint Jordan River (Envision Utah et. al. 2008) South Jordan City encourages all municipalities of Salt Lake County to become active participants of Blueprint Jordan River by:

> 1) Permanently preserving as open space all land within the Jordan River corridor currently zoned as open space; 2) Enacting or modifying zoning ordinances to assure that any development within the Jordan River corridor is compatible with Blueprint recommendations; 3) Considering participation in cooperative efforts to fund open space acquisition, trail development, habitat restoration, etc. where practical; and 4) Selecting representatives to serve as members of a commission or board to oversee continued progress toward realization of all goals and visions of Blueprint Jordan River.

Concepts outlined in the Blueprint Jordan River plan may be used by the City of South Jordan to promote responsible planning and development within one-half mile of the Jordan River corridor and to incorporate "green" home construction, on-site sediment retention basins, and permeable pavements for developments near the Jordan River, Jordan River tributary streams, and the Jordan River Parkway Trail. The Jordan River Corridor Master Plan identifies regional and community river recreation access hubs, a regional and community river education area, regional river recreation centers, regional river centers, community river developments, and community fishing ponds which are consistent with the Blueprint Jordan River public vision.

Great Blue Heron Resting along Jordan River on Instream Woody Debris

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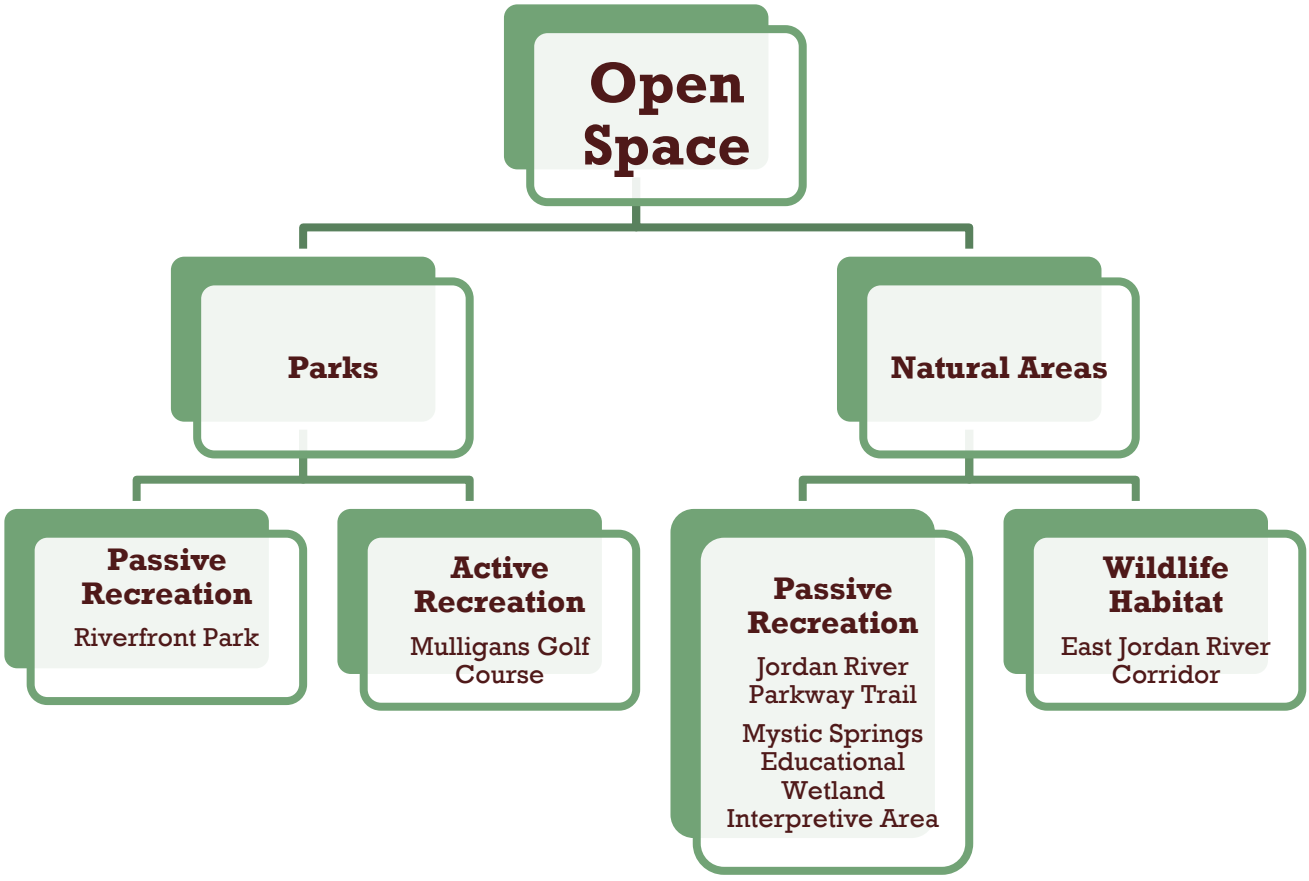
II. Jordan River Corridor Open Space Land Use Zone Designators

The Jordan River Corridor Master Plan identifies land use zone designators for open space within the Jordan River corridor and its tributary streams and protects areas valued for active and passive recreation and wildlife habitat (Exhibit 2 and Appendix J). The Jordan River Corridor Master Plan classifies open space as either "open space - parks" or "open space - natural areas". Open space park use is further designated as "park - passive recreation" or "park - active recreation". Open space natural area use is further designated as "natural area - passive recreation" or "natural area - wildlife habitat".



East Riverfront Park "Passive-Recreation" Open Space

1. Open Space "Park-Passive Recreation" and "Park-Active Recreation"

The west Jordan River corridor provides open space "park-passive recreation" and "park-active recreation" land use zoning (Exhibit 2 and Appendix J). Open space "park-passive recreation" areas are relatively undeveloped and provide a more open, natural environment without developed ball fields (i.e., soccer, baseball, basketball, football) or track and field facilities. Open space "park-passive recreation" can be experienced at Riverfront Park where community fish ponds, covered pavilions, picnic benches, and pleasant open grass fields provide quality leisure outdoor enjoyment for all. Open space "park-active recreation" land use zoning within the Jordan River corridor differs from other South Jordan City parks as "active" use is for more passive activities such as golf, miniature golf, and batting cages. Daytime and evening active recreation park use can be experienced at Mulligan's golf course year round.

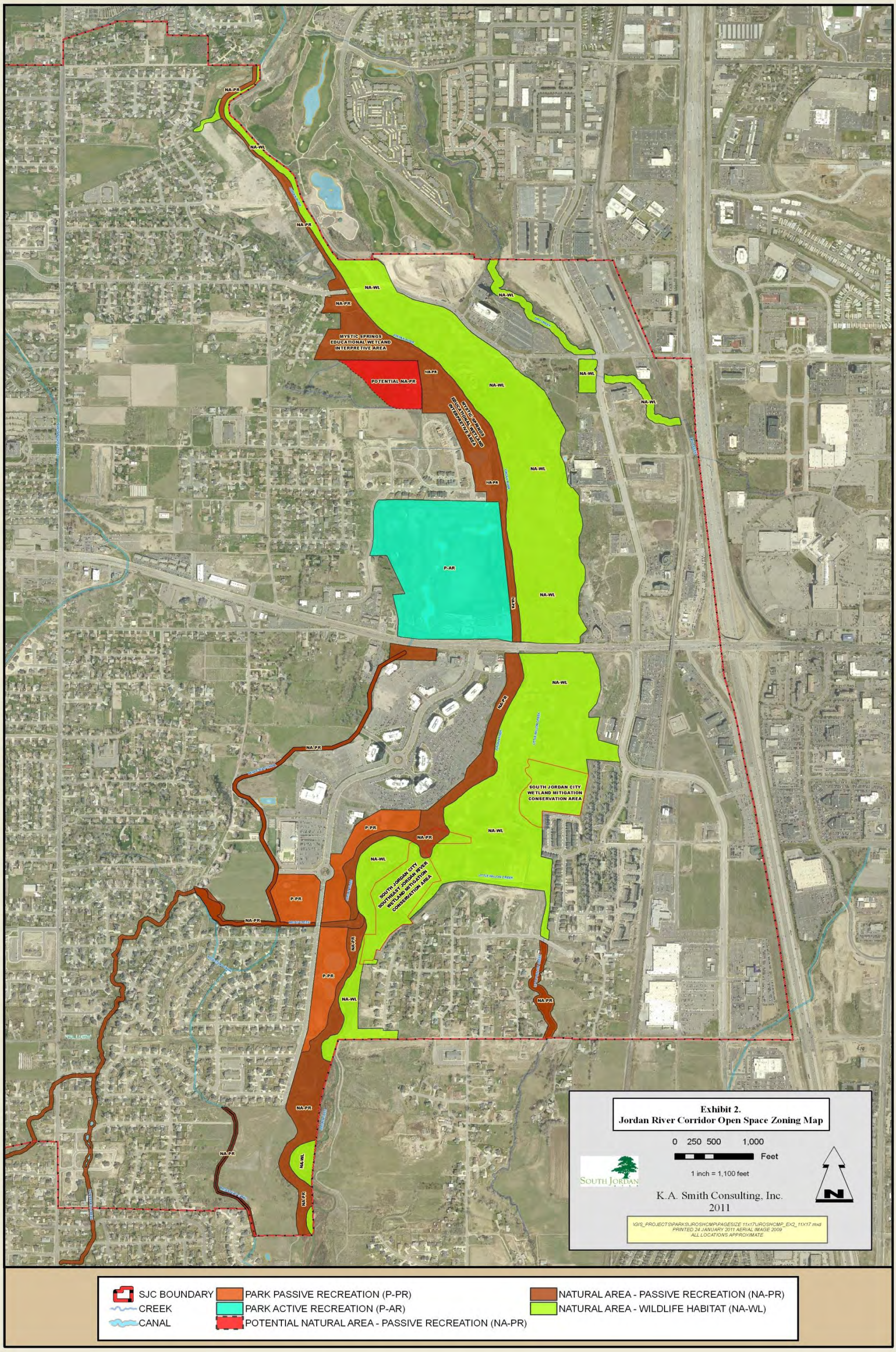
Jordan River Corridor Open Space Types

1) **Park – Passive Recreation**
   - Riverfront Park

2) **Park – Active Recreation**
   - Mulligan's Golf Course

3) **Natural Area –Passive Recreation**
   - Jordan River Parkway Trail
   - Mystic Springs Educational Wetland Interpretive Area

4) **Natural Area – Wildlife Habitat**
   - Clean Water Act Riverine and Wetland Habitat
   - South Jordan City Federally Permitted Wetland Mitigation Conservation Easements
   - URMCC Wildlife Conservation Easements
   - Utah State Lands and Forestry
   - Utah Department of Natural Resources
   - Great Salt Lake Audubon Society
   - Private Property Managed for Wildlife Habitat and Grazing


NA-PR
NA-WL
MYSTIC SPRINGS EDUCATIONAL WETLAND INTERPRETIVE AREA
POTENTIAL NA-PR
P-AR
SOUTH JORDAN CITY WETLAND MITIGATION CONSERVATION AREA
SOUTH JORDAN CITY SOUTHEAST JORDAN RIVER WETLAND MITIGATION CONSERVATION AREA
P-PR
Exhibit 2.
Jordan River Corridor Open Space Zoning Map
0 250 500 1,000
Feet
1 inch = 1,100 feet
K.A. Smith Consulting, Inc.
2011
SJC BOUNDARY
CREEK
CANAL
PARK PASSIVE RECREATION (P-PR)
PARK ACTIVE RECREATION (P-AR)
POTENTIAL NATURAL AREA - PASSIVE RECREATION (NA-PR)
NATURAL AREA - PASSIVE RECREATION (NA-PR)
NATURAL AREA - WILDLIFE HABITAT (NA-WL)

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2. Open Space "Natural Area-Passive Recreation" and "Natural Area-Wildlife Habitat"

"Natural area" open space is primarily defined as land which exists in a relatively undeveloped state with inherent ecological, biological, and environmental attributes retained in a natural character. Within urban areas, natural open space commonly exists in a somewhat degraded or impacted condition while continuing to provide important ecological functional values and critical wildlife habitat. Natural areas, whether in a pristine condition or compromised condition, are highly valued for their ecological importance, natural landscapes, scenic vistas, wildlife habitat, floodplain and wetland functions, and human pleasure. Because a significant amount of the Jordan River's natural floodplain corridor and associated wildlife habitat has been altered and/or developed any remaining land within the river corridor provides critical wildlife habitat and food chain support. River corridor and associated upland natural area open space also contributes to urban community health and safety by providing flood water attenuation and groundwater recharge and discharge functional values, nutrient and pollutant removal, passive recreational values, and scenic vistas and view sheds.

"Natural area" open space land use zoning within the Jordan River corridor includes areas preserved and managed solely as protected wildlife habitat (i.e., "natural area-wildlife habitat") and areas managed for wildlife habitat and passive recreation (i.e., "natural area-passive recreation"). In general, Jordan River corridor "natural area" open space areas include Clean Water Act of 1977 federally-protected Jordan River open water channel and associated riparian vegetation and floodplain wetlands; Clean Water Act of 1977 federally-permitted South Jordan City wetland mitigation conservation easement properties managed for protected wildlife habitat; South Jordan City properties under conservation easements with the Utah Reclamation Mitigation Conservation Commission

"Natural Area-Wildlife Habitat" Open Space within East Jordan River Corridor

(URMCC); federally-owned URMCC conservation easements managed by the U.S. Fish and Wildlife Service (USFWS) and the Great Salt Lake Audubon Society (GSLA); the Jordan River Parkway Trail and associated riparian and upland habitat to the west Jordan River channel; South Jordan City's Mystic Springs Educational Wetland Interpretive Area; and private property managed for wildlife habitat and horse grazing within the east Jordan River corridor (Exhibit 2 and Appendix J).

The "natural area-passive recreation" land use zone consists of all natural areas within the west Jordan River corridor adjacent to the Jordan River Parkway Trail east to the Jordan River from 9400 South to 11800 South. The "natural area-passive recreation" land use zone also includes the Mystic Springs Educational Wetland Interpretive Area between 9800 South and Mulligan's golf course (Exhibit 2 and Appendix J). "Natural area-passive recreation" includes activities such as walking, cycling, bird watching, and wildlife photography generally experienced from the Jordan River Parkway paved trail. An informal equestrian trail also exists parallel to the paved parkway trail with designated single-track backcountry spurs located along the Jordan River in some areas. The Mystic Springs Educational Wetland Interpretive Area provides "place-based" wetland and riverine educational opportunities along a primitive trail system. The interpretive trail area is connected to the Jordan River Parkway Trail system to serve as a community and regional nature preserve amenity. Portions of the area are special needs accessible to allow users of all ages and abilities to enjoy learning about wildlife, wildlife habitat needs, and important wetland and riverine functional values associated with a dynamic, living river ecosystem. Primitive trails with educational signage circumnavigate restored wetlands and enhanced tributary streams, uplands, and riparian habitat naturally occurring within the Jordan River corridor. Trails and educational signage also flank a functioning constructed stormwater detention basin which serves as an educational tool to teach visitors about urban stormwater runoff pollutant and sediment detention to improve receiving stream, wetland, and aquifer water quality.

Jordan River Parkway Trail and the Mystic Springs Educational Wetland Interpretive Area Provide Special Needs Access within "Natural Area-Passive Recreation" Land Use Zones of the West Jordan River Corridor

The “natural area-wildlife habitat” land use zone consists of the entire east Jordan River corridor (Exhibit 2 and Appendix J). A majority of the Jordan River east floodplain land, from approximately 9600 South to 11400 South, is owned and managed as protected wildlife habitat conservation easements by the City of South Jordan, various state and federal government agencies, and the Great Salt Lake Audubon Society. The City of South Jordan also owns and manages several properties dedicated as protected wildlife habitat within wetland mitigation conservation easements regulated by the U.S. Army Corp of Engineers (USACE) under Section 404 of the Clean Water Act of 1977. Federally permitted wetland mitigation conservation easement areas provide compensatory mitigation habitat for unavoidable impacts to jurisdictional wetlands and “waters of the United States.” associated with road construction, bridge expansion, and other municipal needs which serve the citizens of South Jordan City. Wetland mitigation areas may also provide mitigation bank credits for future unavoidable permitted impacts associated with South Jordan City projects if maintained as quality functional wetland habitat, into perpetuity.

3. Natural Area and Park Open Space Permitted Use

Acceptable, permitted use of natural area and park open space varies within the Jordan River corridor (Table 1). In general, development and infrastructure support including transportation and utility corridors, motorized use, and hunting and wildlife trapping are not permitted uses within park or natural area open space land use zones. Recreation centers and competitive sports fields are not permitted uses within “park-passive recreation”, “natural area-passive recreation”, or “natural area-wildlife habitat” open space land use zones. Permanent building structures to support low impact use are permitted within the “park-active recreation” open space land use zone. Pavilions and restrooms are permitted in “park-passive recreation” open space land use zones.

Human and domestic animal use is prohibited in the “natural area-wildlife habitat” open space land use zone. “Natural area-wildlife habitat” open space areas are relatively self-sustaining contiguous open space riverine, wetland, and upland areas which provide unmanaged and undisturbed habitat with a privacy level sufficient for not only resting and foraging activities but also for resident and migratory wildlife breeding *and* rearing of young.

Table 1. Natural Area and Park Open Space Permitted Use

Activity	Parks Passive Recreation	Parks Active Recreation	Natural Area Passive Recreation	Natural Area Wildlife Habitat
Commercial Development, Residential Development, Industrial Development, Schools	No	No	No	No
Roads (i.e., Arterial, Collector, or Maintenance)	No	No	No	No
Utility Corridor/Above Ground or Below Ground Utility Development (i.e., Sewer Effluent Treatment Ponds, Sewer, Electrical, or Telephone Lines, Satellite Towers, etc.)	No	No	No	No
Railway Tracks, Bus Stations, Parking Areas, or Other Transportation Infrastructure Support	No	No	No	No
Recreation Centers, Pools, Water Parks	No	No	No	No
Competitive Sports Fields (i.e., Soccer and Football Fields, Basketball Courts, Baseball Diamonds) or Motocross Parks	No	No	No	No
Permanent Building Structures to Support Low-Impact Limited Uses	No	Yes	No	No
Miniature Golf Course, Golf Course, Batting Center	No	Yes	No	No
Nature Center Building/Wildlife Viewing Areas	Yes	Yes	Yes	No
Conservation Easement Areas/Nature Preserves	Yes	Yes	Yes	Yes
Urban Forestry Practices (i.e., Ornamental and Non-Native Tree and Woody Shrub Plantings)	No[1]	No[1]	No	No
Pavilions and Full Restroom Facilities	Yes	Yes	No	No
Compact Trail Restroom Facilities	Yes	Yes	Yes	No
Human Use	Yes	Yes	Yes	No
Domestic Animal Use	Yes	Yes	Yes	No
Motorized Paved or Single-Track Backcountry Trail Use	No	No	No	No
Hiking Paved Trails/Single-Track Backcountry Trails	Yes	Yes	Yes	No
Hunting, Wildlife Trapping, Wildlife Collecting	No	No	No	No
Release of Pet Store Fish, Frogs, Turtles etc.	No	No	No	No
Herbicides	Yes[2]	Yes[2]	Yes[2]	Yes[2]
Pesticides	No	No	No	No

1. Landscaping with native, adapted riparian and upland species is recommended to prevent invasion of/degradation of Jordan River corridor native plant communities by non-native ornamental or invasive plant species.
2. Only "wildlife-aquatic-safe" low doses applied on an "as needed" basis by a state-certified weed control expert are allowed.

III. South Jordan City Natural Area Open Space Land Use Zoning and Ordinance Assessment

A thorough review of South Jordan City's "*Parks, Recreation, Trails, and Open Space Master Plan*" (Greenplay 2007) and the City's municipal code zoning and ordinances was conducted to determine whether sufficient provisions exist to preserve and protect "park-passive recreation", "park-passive recreation", "natural area-passive recreation", and "natural area-wildlife habitat" open space within South Jordan City limits. Population survey data summarized in the *Parks, Recreation, Trails, and Open Space Master Plan* (Greenplay 2007) indicated funding for open space preservation was important to the community and the development of walking and biking trails had the highest importance rating. Inherent "natural" open space values were recognized as being important by survey respondents. Protecting the Jordan River corridor and smaller tributary creeks was rated as the most important "natural" open space value. However, the *Parks, Recreation, Trails, and Open Space Master Plan* (Greenplay 2007) did not provide any preservation or protection measures for "natural area" open space. Likewise, assessment of South Jordan City's municipal code zoning and ordinances also indicated that "natural area" open space preservation and/or protection provisions are non-existent. Some development area open space values (i.e., grass strips, stormwater detention basins) are recognized through general development provisions; however, zoning and ordinances which provide specific protection for "natural area" open space within the Jordan River corridor or its tributary streams do not exist.

Unprotected Soil Placed in Jordan River FEMA 100-and 500-Year Floodplain Adjacent to Wildlife Conservation Easement Areas

Unregulated Floodplain Activities Result in Significant Land Disturbance, Water Quality, and Wildlife Habitat Impacts

1. Open Space Land Use Zoning and Ordinance Assessment

South Jordan City municipal code zoning and ordinances specified in Chapter 16.04 – General Development Provisions "*Parks, Park Strips, Trails, and Open Space*" (Zoning Code 16.04.190) provides for "common area easements of park strips, trails, or grassy areas designed into subdivisions or development projects in association with flood detention and retention areas". These areas have been loosely expanded to include city parks, golf courses, historic farms, and sports and recreational facilities used for active or passive recreation. "*Preservation of Natural Features*" (Zoning Code 16.04.150) provides for the "preservation of existing trees and vegetation as required by the city" and also states that "the existing topography shall be preserved where possible with minimal excavation and scarring of the land".

Chapter 16.04 - General Development Provisions (Zoning Code 16.04.400) "*Dedication of Real Property*" Subsection A1 – "*Protection of the Public Trust*" recognizes the importance of dedicated property for "providing for circulation, access, utilities, light, air, open space and views". Chapter 16.44 - Land Disturbance "*Purpose*" (Zoning Code 16.44.030) generally acknowledges the importance of minimizing land disturbances to "protect against erosion and sedimentation, to maintain the natural environment, and to provide for restoration of the land through revegetation and landscaping". It also recognizes the importance of "minimizing land disturbances to protect downstream properties from runoff, flooding, erosion, air pollution, and sedimentation". Zoning Code 16.44.040 "*Definitions*" defines the term "best management practices" or (BMP's) as "a means for controlling nonpoint sources of pollution through erosion and sediment control measures". The term "landmark trees" is defined as trees that measure over three inch (3") caliper.

Chapter 16.44 – "*Permit Required*" (Zoning Code 16.44.070) specifies the requirement of a land use permit approved by the city engineer which includes plans and specifications (Zoning Code 16.44.100), "*Required Plans and Reports*" (Zoning Code 16.44.070) specifies grading plans, drainage plans, swales, erosion and sediment control plan, and soils and geologic reports and a slope length report (Zoning Code 16.44.120). "*Cuts and Fills*" (Zoning Code 16.44.360) specifies that "fills toeing out on natural slopes steeper than 2:1 is not permitted" and requires "unspecified fill setback distances from the top of a steep slope (steeper than 3:1)".

Ordinance Enforcement Inadequacies: A majority of development projects within the Jordan River corridor are generally not in accordance with existing zoning or ordinance requirements and BMP's are not enforced. Large trees and floodplain and steep terrace slope/hillside vegetation is being removed during large-scale development grading activities. Large quantities of fill materials are being imported into the Jordan River floodplain lowlands to raise floodplain elevation grades and/or to meet steep terrace slope grades in visually sensitive areas such as along South Jordan Gateway and Shields Lane. In violation of existing ordinances, private landowners are depositing large quantities of loose fill

Waste Soil and Trash Disposed on Jordan River Upper Terrace Steep Slope on Private Property and South Jordan City Property

Terrace is Immediately Adjacent to a formal South Jordan City Wildlife Conservation Area and Easily Viewed from the Jordan River Parkway Trail

Materials and debris waste on steep terrace slopes and hillsides immediately adjacent to the Jordan River floodplain to expand terrace benches and to dispose of waste soil and trash. These land use violations adversely affect Jordan River corridor human quality of life values by impacting visual aesthetics and degrading community and regional recreation experiences along the Jordan River Parkway Trail. Public safety floodplain and wildlife habitat functional values are also significantly affected by increasing off-site sediment into floodplain wetlands and the Jordan River, reducing long-term flood attenuation and pollutant removal functions, and impacting steep slope/hillside upland wildlife habitat.

Chapter 17.20 – "*Locations of Zone Boundaries*" (Zoning Code 17.20.030), with regard to the Jordan River corridor and it's tributary streams, inappropriately specifies "where zone boundaries are approximately watercourses or natural features, they shall be construed to be the centerlines of said watercourses or natural features".

Ordinance Inadequacies: The Jordan River and all of its associated tributary perennial and intermittent streams, springs, and wetlands are regulated under Section 404 of the Clean Water Act of 1977 as "jurisdictional wetlands and waters of the United States". Streams, wetlands, and other special aquatic sites are federally protected to provide water quality, flood control, and wildlife habitat functional values. Proposed unavoidable impacts to jurisdictional wetlands and "waters of the United States" require a U.S. Army Corp of Engineers permit. Non-permitted activities are a violation of the Clean Water Act of 1977 and can result in fines and penalties. The State of Utah Division of Water Resources also regulates stream channel use and alteration. A "Stream Channel Alteration Permit" is required for any activities associated with the Jordan River or its tributary stream channels.

Jordan River Tributary Streams in Highly Altered Condition due to Unsuitable Private Property Boundaries and Inadequate "Natural Area Open Space" Stream and Riparian Protection Ordinances

Property boundaries located through the center of a stream corridor or natural area result in fragmentation and degradation of resident and migratory wildlife natural area open space habitat. In addition, zone boundaries through the middle of tributary creeks of the Jordan River (i.e., Cottonwood Creek, Little Willow Creek, Midas Creek, Dry Creek, Bingham Creek) significantly reduces the ability of the community as a whole to benefit from and enjoy neighborhood stream corridors for passive recreation such as walking and bird watching. Unregulated alteration of tributary stream corridor environment, stream channelization, and removal of riparian vegetation by adjacent property owners has altered public safety flood control and wildlife habitat functional values. Many homeowners adjacent to Cottonwood Creek and Midas Creek have incorporated these rare aridland streams as part of private back yard landscaping significantly altering the natural stream ecology.

Encroachment of and alteration of tributary stream corridors has adversely affected use of these areas by resident and migrating neo-tropical bird species, birds of prey, and other wildlife species which historically used these waterways as migration corridors connecting the Jordan River valley, Oquirrh Mountains, and Wasatch Mountains. Homeowner installed fencing across many Jordan River tributary stream corridors has significantly affected the ability of deer and Rocky Mountain elk to access critical breeding and spring rearing floodplain habitat. Barbed wire fencing across stream channels is common throughout the City of South Jordan.

Artificial landscaping and rock terracing of stream banks has resulted in the loss of important native riparian plant communities and biodiversity. Fertilizers, herbicides, pesticides, and oil and grease originating from adjacent residential and commercial developments enters tributary streams as untreated urban runoff contaminating instream aquatic species habitat, downstream wildlife habitat, and Jordan River and Great Salt Lake water quality.

Midas Creek, Cottonwood Creek and Bingham Creek, all natural streams and drainages originating from the Oquirrh Mountain range, have also been channelized and are traversed by roadways, utility lines, and man-made canals. Dry Creek, a tributary stream of the Jordan River originating from the Wasatch Mountains which once supported dense riparian habitat, has been converted into a high-voltage utility line corridor. These once pristine, mature riparian stream environments which provided high quality wildlife habitat and human enjoyment have all been converted into confined narrow channels with minimal recreation or wildlife value.

Dry Creek, a Jordan River Tributary Stream, was Converted into a High Voltage Utility Line Corridor in 2010. At One Time, this Stream was Flanked by Large Cottonwood Trees and Provided High Quality Riparian Habitat and Regional and Community Visual Aesthetic Values at 9800 South (Shields Lane)

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IV. Jordan River Corridor Land Use Zoning and Ordinances

Zoning and land use ordinances specific to the Jordan River corridor and its tributary streams were developed following an extensive review of the South Jordan City municipal code, as discussed in Chapter III. *South Jordan City Natural Area Open Space Land Use Zoning and Ordinance Assessment*. In general, South Jordan City land use zones and ordinances were expanded to differentiate "natural area" open space from "park" open space to ensure adequate preservation and protection provisions for natural areas which provide critical wildlife habitat values (i.e., Jordan River corridor) and natural areas which provide community and regionally important passive recreation experiences within natural area open space (i.e., Jordan River Parkway Trail and Mystic Springs Educational Wetland Interpretive Area).

The Jordan River corridor zoning and land use ordinances are consistent with U.S. Environmental Protection Agency (EPA), State of Utah Department of Environmental Quality (DEQ), National Pollutant Discharge Elimination System (NPDES), Great Salt Lake Audubon Society, and Blueprint Jordan River (Envision Utah et. al. 2008) policies and regulations protecting regional and federal water quality, wetlands and "waters of the United States, and overall community and environmental health.

The Jordan River corridor zoning and land use ordinances are also consistent with the Salt Lake Countywide Water Quality Stewardship Plan (WaQSP) (Salt Lake County 2008) and the WAQSP Stream Function Index Main Report Addendum (Salt Lake County 2009) recommendations to improve stream health and water quality, preserve riparian buffers and public safety

Jordan River Corridor Land Use Zoning and Ordinances

1. Natural Area Open Space Zoning and Ordinance

2. Public Safety FEMA 100- and 500-year Floodplain Zone No-Build Ordinance

3. Stream Setback No-Build Zoning and Ordinance

4. Wetland, Special Aquatic Site, Perennial and Intermittent Stream Channel, and Terrace Slope Drainage Channel Protection Ordinance

5. Green Space Site Design Ordinance

6. Steep Slope/Hillside Protection No Disturbance Setback Ordinance

7. No Wildlife Hunting or Trapping Ordinance

floodplain areas, preserve wildlife habitat, and to provide educational/passive recreation opportunities.

Zoning and land use ordinances specific to the Jordan River corridor and its tributary streams provide for quality human and wildlife values by: 1) preserving Jordan River wetland and floodplain lands; 2) identifying stream setback zones and green space site design buffer zones to maintain quality riparian habitat and recreation experiences; 3) reducing erosion and water quality impacts through steep slope/hillside protection setbacks; and 4) protecting wildlife species diversity and a balanced ecosystem by prohibiting wildlife hunting and trapping (Exhibits 1 and 2, and Appendix J).

Zoning and land use ordinances developed specifically for the Jordan River corridor and its tributary streams include: 1) Natural Area Open Space Zoning and Ordinance, 2) Public Safety Federal Emergency Management Agency (FEMA) 100-and 500-year Floodplain Zone No-Build Ordinance, 3) Stream Setback No-Build Zoning and Ordinance, 4) Wetland, Special Aquatic Site (i.e., Seeps and Springs), Perennial and Intermittent Stream Channel, and Terrace Slope Drainage Channel Protection Ordinance, 5) Green Space Site Design Ordinance, 6) Steep Slope/Hillside Protection No Disturbance Setback Zoning and Ordinance, and 7) No wildlife Hunting or Trapping Ordinance.

Development or Land Disturbance Pre-Application Meeting

A pre-application meeting with the City of South Jordan Parks and Recreation Department and planning and engineering departments is recommended prior to approval of any development or land disturbance activities within the Jordan River corridor and its tributary stream environments to inform proponents of the Jordan River Corridor Master Plan special conditions and zoning and ordinance provisions. Pre-application meetings during preliminary design phases will ensure final development plans address federal, state, and city environmental protection concerns and preserve community and regionally important park and natural area open space quality of life and wildlife values.

Federal and state environmental protection permits required by the U.S. Environmental Protection Agency (EPA) and the State of Utah Department of Environmental Quality (DEQ) should be discussed during the pre-application meeting to ensure that best management practice (BMP) erosion and sediment control measures are designed into projects to avoid or minimize water quality and wildlife habitat impacts. National Pollutant Discharge Elimination System (NPDES) point source pollution permits, State of Utah Department of Water Quality permits, and City of South Jordan engineering and

land use permits should be acquired prior to initiation of any development activities in or near the Jordan River corridor or its tributary stream environments. Additionally, a floodplain and geotechnical analysis should be submitted to the City for approval.

A proponent pre-application meeting with the U.S. Army Corp of Engineers will also be necessary to determine whether proposed development activities will impact jurisdictional wetlands or "waters of the U.S." regulated under Section 404 of the Clean Water Act of 1977. In accordance with Clean Water Act Section 404(b)(1) guidelines, development proponents must provide to the U.S. Army Corp of Engineers Utah regulatory office a wetland delineation, conducted by a qualified wetland scientist, prior to preparing final design plans. Preliminary development plans should be designed such that impacts to jurisdictional wetlands and "waters of the U.S." are avoided or minimized to the greatest degree possible. The U.S. Army Corp of Engineers will require an alternatives analysis to determine the "least environmentally damaging and practicable" alternative which may be permitted under Clean Water Act Section 404(b) (1) guidelines. The project proponent will be asked to provide an analysis of *viable* project alternatives to demonstrate that the preferred alternative is the most practicable in terms of costs and avoiding and minimizing impacts to jurisdictional wetlands, "waters of the U.S.", and Jordan River or tributary stream riparian habitat. A mitigation and monitoring plan to fully compensate for unavoidable direct and indirect impacts will be required as part of the U.S. Army Corp of Engineers permit application process.

The development proponent should also provide a natural resource inventory which includes a detailed site evaluation and mapping of the property natural features (i.e., native and non-native large tree locations, steep slopes and hillsides, rock outcrops, and soils). Field studies should be conducted to determine whether any sensitive or endangered species, protected under the federal Endangered Species Act (ESA), or State of Utah "species of concern" or "candidate" species exist within proposed development areas. State of Utah "species of concern" or "candidate" species receive special management under conservation agreements to ease the need for federal ESA listing. Federal and state protected species occurring within Salt Lake County which use or may occur within the Jordan River corridor are listed in Table 10 ("*Chapter VIII. Jordan River Corridor Federal and State listed Endangered, Candidate, and Species of Concern")*. Many federal and state sensitive species have confirmed occurrence within or depend upon the Jordan River ecosystem for its continued survival.

Consistent with the Migratory Bird Treaty Act of 1918 (Appendix C) and Bald and Golden Eagle Protection Act of 1940 (Appendix D) development proponents should also conduct surveys of large trees and large groves of mature trees (including non-native tree species) located within the Jordan River floodplain corridor and on upper terrace slopes to ensure that birds of prey nests and nest sites are preserved. Additionally, construction activities should take place outside of the nesting and fledgling time frames.

1. "Natural Area Open Space" Zoning and Ordinance

The Jordan River corridor "Natural Area Open Space" zoning and ordinance is differentiated from "open space", as provided for under South Jordan City Municipal Code Chapter 16.04 – General Development Provisions "*Parks, Park Strips, Trails, and Open Space*" (Zoning Code 16.04.190), which mainly pertains to open space grass strips and stormwater detention basins incorporated into development projects. The Jordan River corridor "Natural Area Open Space" ordinance applies to "natural area-wildlife habitat" and "natural area-passive recreation" land use zones as shown in Exhibit 2 (and Appendix J) and as described in Chapter II. *Jordan River Corridor Open Space Land Use Zone Designators*.

The Jordan River corridor "Natural Area Open Space" ordinance preserves and protects natural areas which are of community, regional, federal, and international importance. "Natural area" open space is primarily defined as land which exists in a relatively undeveloped state with inherent ecological, biological, and environmental attributes retained in a natural character. Within urban areas, natural open space commonly exists in a somewhat degraded or impacted condition while continuing to provide important ecological functional values and critical wildlife habitat. Natural areas, whether in a pristine condition or compromised condition, are highly appreciated and valued for their ecological importance, natural landscapes, scenic vistas, wildlife habitat, floodplain and wetland functions, and human pleasure.

The Jordan River Offers "Natural Area-Passive Recreation" Uses Such as Bird Watching and Wildlife Photography

"American Coot"

"Natural area" open space provides large, contiguous areas of wildlife habitat and connected tributary stream corridors. "Natural area" open space lands include, but are not limited to, stream channels and floodplain corridors; riparian, wetland, and upland habitat; seeps and springs including those associated with upper terrace slope drainages; upper terrace slopes and associated upland habitat; and groves of large trees along upper terrace slopes providing raptor and resident and neo-tropical migratory bird nesting, feeding, and resting habitat. The "Natural Area Open Space" ordinance also recognizes the need to preserve community and regionally important historic farms, scenic vistas, and view sheds within the Jordan River corridor.

As discussed in Chapter II. *Jordan River Corridor Open Space Land Use Zone Designators*, a majority of existing natural area open space lands within the Jordan River east corridor are within designated federal, state, or city conservation easements or are owned and managed by the Great Salt Lake Audubon Society as protected wildlife habitat. "Natural area" open space zoning and ordinance provisions pertain to the entire east Jordan River corridor, the entire west Jordan River corridor along the Jordan River Parkway Trail, and along Jordan River tributary stream corridors (Exhibit 2 and Appendix J). Jordan River tributary stream corridors include Little Willow Creek, Midas Creek, Cottonwood Creek, Bingham Creek, and Dry Creek. "Natural area" open space within South Jordan City limits includes areas which are preserved and managed solely as protected wildlife habitat (i.e., east Jordan River corridor) and areas that are managed for passive recreation within important wildlife habitat areas (i.e., Jordan River Parkway Trail and Mystic Springs Educational Wetland Interpretive Area).

Permitted uses of natural area open space include wildlife habitat conservation, ecosystem preservation and management, and passive recreational use (Table 1, Chapter II). Stream corridor restoration or enhancement measures within any areas zoned "natural area-wildlife habitat" or "natural area-passive recreation" will be implemented in accordance with the *South Jordan City Jordan River Parkway Corridor Vegetation Enhancement Plan* (K.A. Smith Consulting, Inc. 2009) and as specified in Chapter IX. *Jordan River Corridor Long-Term Management and Maintenance Measures*.

Special restrictions for areas zoned "natural area-wildlife habitat" (i.e., the east Jordan River corridor include: 1) Buildings, roadways, railways, utility corridors, sewer effluent treatment ponds, paved areas, parking lots, bridges, observation towers, boardwalks, foot or bike trail systems, and any other miscellaneous infrastructure support facilities are prohibited; 2) Human and domestic animal use is prohibited; 3) Hunting or trapping of any avian, mammalian, or reptilian species is prohibited; 4) Foot or vehicle bridges across the Jordan River to access open space areas zoned as "natural area-wildlife habitat" are prohibited; 5) Hiking, biking, boating, plant collecting, insect collecting or other "active or passive" recreation activities are prohibited; 6) Urban forestry practices which include planting of ornamental and non-native Utah trees or shrubs, trimming/pruning, and mowing are prohibited; 7) Pesticides and fertilizers are prohibited; 8) Non-"wildlife-aquatic-safe" herbicides and other invasive

plant species control measures (i.e., non-selective removal of Russian olive and salt cedar) are prohibited 9) Nest egg or wildlife antler collecting is prohibited; 10) Release of pet store purchased wildlife species including turtles, frogs, fishes and other invasive species is prohibited; and 11) Constructed birdhouses or any other artificial structures are prohibited to prevent wasp inhabitation, infestation, and predation on native insects and bird eggs.

Special restrictions for areas zoned as "natural area-passive recreation (i.e., the west Jordan River corridor Jordan River Parkway Trail Area and Mystic Springs Educational Wetland Interpretive Area) include: 1) Buildings, roadways, railways, utility corridors, and any other miscellaneous infrastructure support facilities are prohibited except for amenity support associated with the Mystic Springs Educational Wetlands Interpretive Area; 2) Hunting or trapping of any avian, mammalian, or reptilian species is prohibited; 3) Urban forestry practices which include planting of ornamental and non-native Utah trees or shrubs, trimming/pruning, and mowing are prohibited; 4) Pesticides and fertilizers are prohibited; 5) Non-"wildlife-aquatic-safe" herbicides and other invasive plant species control measures (i.e., non-selective removal of Russian olive and salt cedar) are prohibited; 6) Nest egg or wildlife antler collecting is prohibited; and 7) Release of pet store purchased wildlife species including turtles, frogs, fishes and other invasive species is prohibited.

View of the Jordan River from the Jordan River Parkway Trail
"Natural Area-Passive Recreation" Land Use Zone

2. "Public Safety Federal Emergency Management Agency (FEMA) 100- and 500-year Floodplain Zone No-Build" Ordinance

A "Public Safety Federal Emergency Management Agency (FEMA) 100- and 500-year Floodplain Zone No-Build" ordinance applies to all FEMA 100- and 500-year floodplain zones and non-FEMA zoned historic floodplain lowlands within the Jordan River corridor and its tributary stream environments to: 1) protect the public from catastrophic flooding events and flood disaster costs; 2) preserve flood attenuation and groundwater recharge functional values; and 3) preserve critical floodplain wetland and riparian wildlife habitat (Exhibit 3 and Appendix J). The "Public Safety Federal Emergency Management Agency (FEMA) 100- and 500-year Floodplain Zone No-Build" ordinance is consistent with U.S. Environmental Protection Agency (EPA), National Pollutant Discharge Elimination System (NPDES), State of Utah Department of Environmental Quality (DEQ), Great Salt Lake Audubon Society, Blueprint Jordan River (Envision Utah 2008) policies and regulations and Salt Lake Countywide Water Quality Stewardship Plan (WaQSP) (Salt Lake County 2008) and WAQSP Stream Function Index Main Report Addendum (Salt Lake County 2009) recommendations to improve stream health and water quality, preserve riparian buffers and public safety floodplain areas, and preserve wildlife habitat.

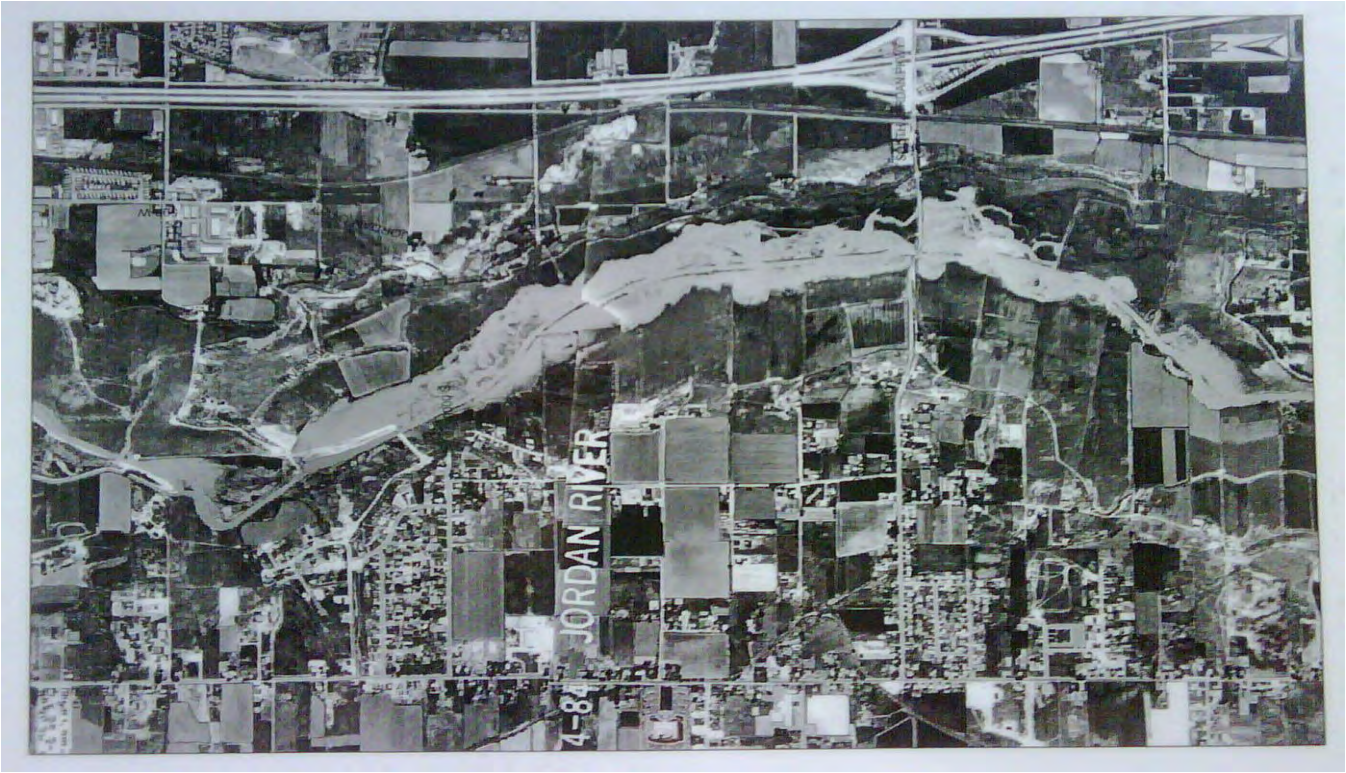
Extensive and rapid development of floodplain and upland properties within and near the Jordan River corridor is augmenting urban stormwater runoff rates and peak stream flow volume. Sediment laden stormwater runoff originating from development areas is commonly conveyed untreated into the Jordan River. Development sites adjacent to the Jordan River and on upper terraces are often graded, stripped of native vegetation, and left in an unprotected state with no erosion and sediment control best management practices (BMP's) employed. Channelization of the Jordan River has also increased stream flow velocity and volume resulting in increased erosive forces on streambanks and riparian vegetation.

Jordan River Corridor FEMA 100-and 500-Year Floodplain Development

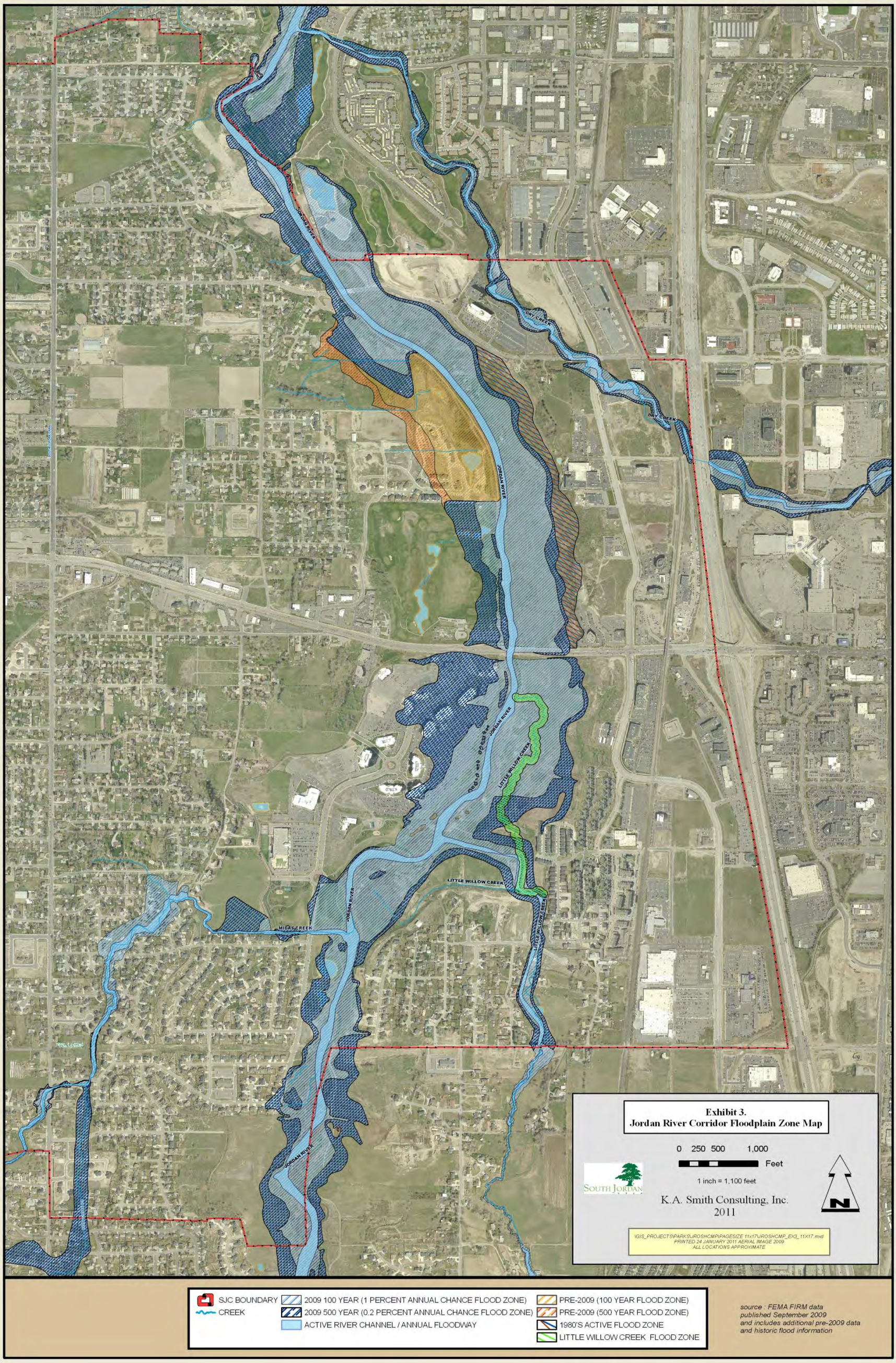
The effects of channelization are readily apparent along many areas of the Jordan River where streambank instability and loss of riparian habitat is problematic. As such, it is important to preserve and protect any remaining undeveloped lands within the Jordan River floodplain corridor for public floodplain safety and to allow the river to meander more naturally across its floodplain.

All land owned by the City of South Jordan within the Jordan River corridor FEMA 100- and 500-year floodplain zones is recommended for dedication as conservation easement land. Additionally, lands in private property ownership within FEMA 100- and 500-year floodplain zones are considered high priority acquisition properties or land which is also recommended for dedication as conservation easement land. High priority acquisition lands within the Jordan River corridor are identified in Chapter V. *High Priority Acquisition Lands and Development Setback Properties within the Jordan River Corridor*.

The "Public Safety Federal Emergency Management Agency (FEMA) 100- and 500-year Floodplain Zone No-Build" ordinance applies to: 1) undeveloped properties from 9400 South to 11800 South along the west Jordan River corridor, 2) undeveloped properties from approximately 9600 South to 11400 South along the east Jordan River corridor, 3) properties adjacent to Little Willow Creek and Dry Creek (east Jordan River tributaries), and 4) undeveloped properties adjacent to Midas Creek, Cottonwood Creek, and Bingham Creek (west Jordan River tributaries).



South Jordan City - Jordan River Corridor Flooding (1984)


JORDAN RIVER
DRY CREEK
LITTLE WILLOW CREEK
MIDAS CREEK
Exhibit 3.
Jordan River Corridor Floodplain Zone Map
0 250 500 1,000
Feet
1 inch = 1,100 feet
SOUTH JORDAN
K.A. Smith Consulting, Inc.
2011
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ALL LOCATIONS APPROXIMATE
SJC BOUNDARY
CREEK
2009 100 YEAR (1 PERCENT ANNUAL CHANCE FLOOD ZONE)
2009 500 YEAR (0.2 PERCENT ANNUAL CHANCE FLOOD ZONE)
ACTIVE RIVER CHANNEL / ANNUAL FLOODWAY
PRE-2009 (100 YEAR FLOOD ZONE)
PRE-2009 (500 YEAR FLOOD ZONE)
1980'S ACTIVE FLOOD ZONE
LITTLE WILLOW CREEK FLOOD ZONE
source : FEMA FIRM data
published September 2009
and includes additional pre-2009 data
and historic flood information

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3. "Stream Setback No-Build" Zoning and Ordinance

A "Stream Setback No-Build" zone and ordinance pertains to the Jordan River, Midas Creek, Little Willow Creek, Dry Creek, Cottonwood Creek, Bingham Creek, and inner city canals (Exhibit 4 and Appendix J). The "stream setback no-build" ordinance is consistent with U.S. Environmental Protection Agency (EPA), National Pollutant Discharge Elimination System (NPDES), State of Utah Department of Environmental Quality (DEQ), South Jordan City municipal codes (Zoning Code 16.44.070, Zoning Code 16.44.100, and Zoning Code 16.44.070), Great Salt Lake Audubon Society, Blueprint Jordan River (Envision Utah 2008) policies and regulations and Salt Lake Countywide Water Quality Stewardship Plan (WaQSP) (Salt Lake County 2008), and WAQSP Stream Function Index Main Report Addendum (Salt Lake County 2009) recommendations to improve stream health and water quality, preserve riparian buffers and public safety floodplain areas, and preserve wildlife habitat.

A "stream setback no-build" zone is recommended to: 1) provide public safety flood protection and to reduce flood liability costs, 2) preserve flood attenuation functional values, 3) reduce stream sediment input and water quality impacts, 4) preserve streambank vegetation, and 5) minimize adverse impacts to critical Jordan River floodplain riparian and wetland habitat. Stream setbacks also allow for quality community and regional user passive recreation experiences along the Jordan River Parkway Trail, tributary stream trails, and canal trails by reducing residential visual and noise disturbance impacts. Stream setbacks also reduce nighttime light impacts on foraging wildlife and avian species.

Jordan River FEMA 100-and 500-Year Floodplain Development Immediately Adjacent to the Jordan River Parkway Trail

Large Quantities of Fill Material Imported to Elevate Floodplain Grade are Not Protected by Erosion and Sediment Control BMP's

Significant Old Growth Riparian Habitat Removed with Historic Wildlife Migration Corridor Significantly Fragmented

The “stream setback no-build” zone initiates at the top of the channel bank on each side of a stream or canal. The “stream setback no-build” zoning and ordinance provisions include a minimum 150-foot setback along the Jordan River; a 50-foot setback along Midas Creek, Little Willow Creek, Dry Creek, Bingham Creek, and unnamed streams and drainages; and a 25- foot setback along Cottonwood Creek. The “stream setback no-build” zoning and ordinance provisions also include a 25-foot setback for Beckstead Canal, South Jordan Canal, Utah-Salt Lake Canal, Utah Distributing Canal and the Welby-Jacob Canal (Table 2).

Unregulated Grading of Jordan River Upper Terrace Private Property

Soil Pushed Over Steep Terrace Slope into Little Willow Creek Channel Significantly Impacting Riparian Habitat and Increasing Sediment Loading of Downstream Wetland Conservation Easement Area

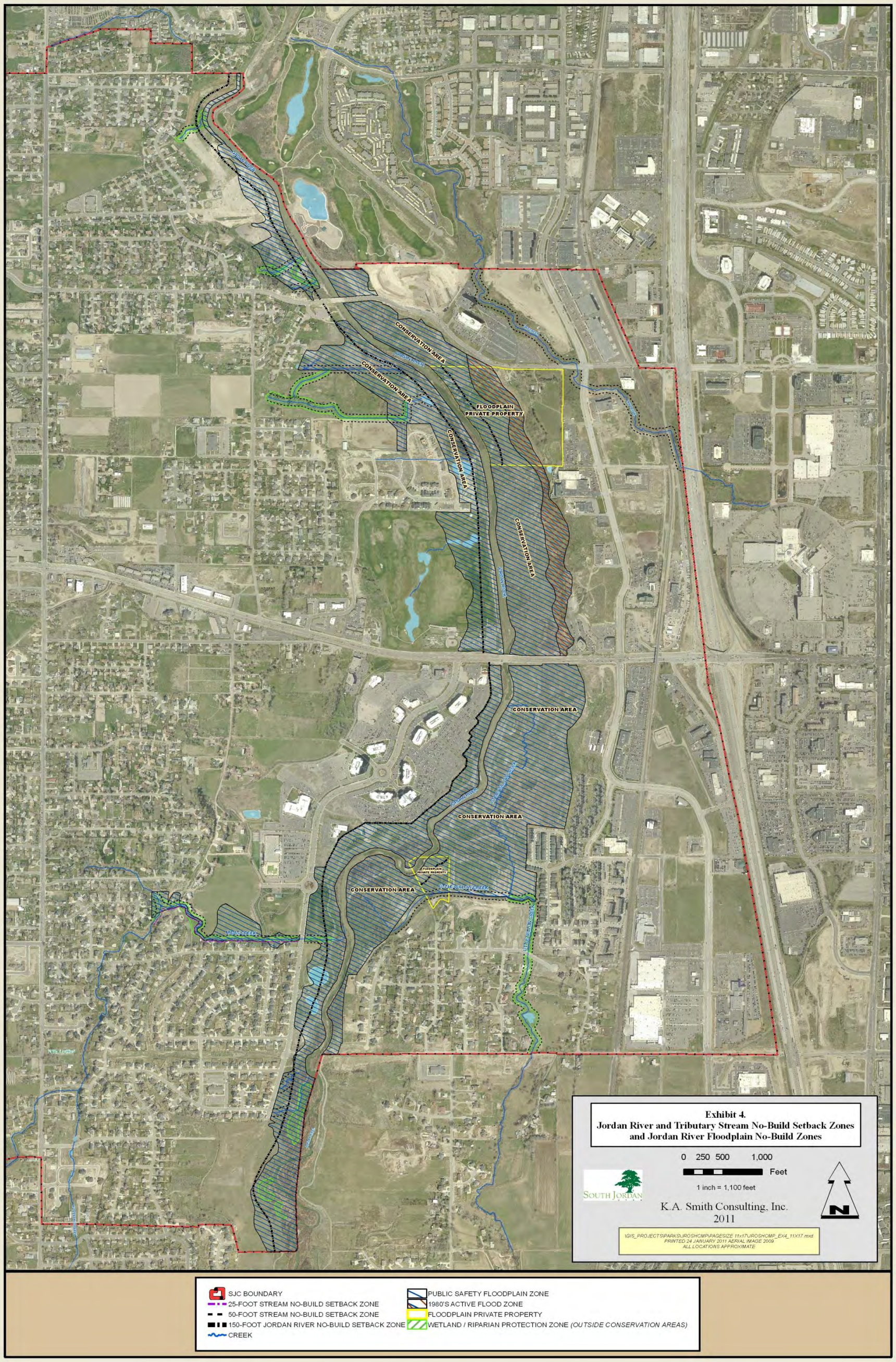

Exhibit 4.
Jordan River and Tributary Stream No-Build Setback Zones and Jordan River Floodplain No-Build Zones

0 250 500 1,000 Feet

1 inch = 1,100 feet

SOUTH JORDAN

K.A. Smith Consulting, Inc.
2011

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Table 2. Jordan River, Tributary Stream, and Canal[1] Setback Distances to Preserve Public Floodplain Safety, Water Quality, and Wildlife Habitat Open Space Values

Water Body	Floodplain Protection	Critical Wildlife Habitat	Stream Setback Distances[2]
Jordan River	Yes (100-and 500-year)	Yes	150 Feet
Little Willow Creek	Yes (100-and 500-year)	Yes	50 Feet
Midas Creek	Yes (100-and 500-year)	Yes	50 Feet
Cottonwood Creek	Yes (100-and 500-year)	Yes	25 Feet
Bingham Creek	Yes (100-and 500-year)	Yes	50 Feet
Dry Creek	Yes (100-and 500-year)	Yes	50 Feet
Beckstead Canal	No	Yes	25 Feet
South Jordan Canal	No	Yes	25 Feet
Utah-Salt Lake Canal	No	Yes	25 Feet
Utah Distributing Canal	No	Yes	25 Feet
Welby-Jacob Canal	No	Yes	25 Feet
Welby-Jacob Canal Open Water And Wetland at 11000 South And Bangerter Highway	No	Yes[3]	50 Feet

1. North–south distributing canals provide important inner city wildlife habitat and community passive recreation values and as such, are designated "natural area-passive recreation".
2. Stream setback distances are from the top of bank on each side of channel.
3. The Welby-Jacob Canal open water and wetland area is designated as "natural area–wildlife habitat" as it is an isolated wetland providing critical wildlife habitat within a highly developed urban area.

4. "Wetland, Special Aquatic Site (i.e., Seeps and Springs), Perennial and Intermittent Stream Channel, and Terrace Slope Ephemeral Drainage Channel Protection" Ordinance

A "Wetland, Special Aquatic site (i.e., Seeps and Springs), Perennial and Intermittent Stream Channel, and Terrace Slope Ephemeral Drainage Channel Protection" ordinance pertains to the Jordan River corridor and its tributary streams (i.e., Midas Creek, Little Willow Creek, Cottonwood Creek, Dry Creek, and Bingham Creek) and associated upper terrace slope drainage channels. The "Wetland, Special Aquatic site (i.e., Seeps and Springs), Perennial and Intermittent Stream Channel, and Terrace Slope Ephemeral Drainage Channel Protection" ordinance is consistent with Environmental Protection Agency (EPA) Clean Water Act of 1977 Section 404/401 guidelines regulated by the U.S. Army Corp of Engineers (USACE) to protect: 1) jurisdictional wetlands, 2) "waters of the United States", 3) special aquatic sites such as springs and seeps, and 4) intermittent, perennial, and ephemeral drainages with a nexus to a "waters of the United States".

The ordinance is also consistent with Great Salt Lake Audubon Society and Blueprint Jordan River (Envision Utah et. al. 2008) policies, the Salt Lake Countywide Water Quality Stewardship Plan (WaQSP) (Salt Lake County 2008), and the WAQSP Stream Function Index Main Report Addendum (Salt Lake County 2009).The ordinance was established to minimize impacts to water quality and to preserve community and regionally important flood attenuation, groundwater recharge and discharge, and wildlife habitat functional values. Seeps and springs originating from upper terrace slopes and hillsides within the Jordan River corridor are shielded from development impacts such as piping and culinary water supply development. Water diversions from the Jordan River, Midas Creek, Little Willow Creek, Dry Creek, Cottonwood Creek, and Bingham Creek are disallowed. "Underground piping" of the Jordan River or its tributary streams are disallowed. "Daylighting" of existing piped streams within South Jordan City limits is encouraged and supported.

South Jordan City Federally Permitted Wetland Mitigation Area Providing High Quality Resident and Migratory Wildlife Floodplain Habitat

East Jordan River Conservation Area

"Natural Area-Wildlife Habitat" Land Use Zone

Jordan River
Cutoff Oxbow Meander Channel
Provides
Floodplain Emergent Marsh
and
Seasonal Open Water
Aquatic Species
and
Wildlife Habitat

The U.S. Army Corp of Engineers (USACE) and the Environmental Protection Agency (EPA) define jurisdictional wetlands as:

> "Those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas".

"Waters of the U.S." typically include special aquatic sites such as seeps, springs, open water bodies, natural stream channels, intermittent and perennial drainages, and cutoff meanders and abandoned oxbow channels.

5. "Green Space Site Design" Ordinance

A "Green Space Site Design" ordinance sustains community and regionally important natural area passive recreation experiences and wildlife habitat values. "Green space site design" provisions allow for community river developments, regional river centers, and parks with active recreation use to be designed near ecologically sensitive areas such that a feeling of "natural character" and "openness" is retained. The "Green Space Site Design" ordinance is consistent with U.S. Environmental Protection Agency (EPA), National Pollutant Discharge Elimination System (NPDES), State of Utah Department of Environmental Quality (DEQ), South Jordan City municipal codes (Zoning Code 16.44.070, Zoning Code 16.44.100, and Zoning Code 16.44.070), Great Salt Lake Audubon Society, Blueprint Jordan River (Envision Utah 2008) policies and regulations and Salt Lake Countywide Water Quality Stewardship Plan (WaQSP) (Salt Lake County 2008) and WAQSP Stream Function Index Main Report Addendum (Salt Lake County 2009) recommendations to improve stream health and water quality, preserve riparian buffers and public safety floodplain areas, and preserve wildlife habitat.

The "Green Space Site Design" ordinance establishes a minimum 25-foot vegetation buffer zone between: 1) the Jordan River Parkway Trail and adjacent developments, 2) the Mystic Springs Educational Wetland Interpretive Area and adjacent developments, 3) developments adjacent to tributary streams of the Jordan River (i.e., Midas Creek, Little Willow Creek, Cottonwood Creek, and Bingham Creek), and associated canal systems (Beckstead Canal, South Jordan Canal, Utah-Salt Lake Canal, Utah Distributing Canal and Welby-Jacob Canal), 4) upper terrace slopes adjacent to the Jordan River corridor, and 5) any other "natural area" open space lands where development or associated disturbances will adversely affect passive recreation visual aesthetics, community and regionally important view sheds, water quality, or wildlife habitat (Exhibit 1 and Appendix J) (Table 3). Green space site design measures are discussed in greater detail in Chapter VI. *Jordan River Corridor and Tributary Stream Green Space Site Design Specifications*.

Jordan River FEMA 100-Year Floodplain Development Immediately Adjacent to the Jordan River Parkway Trail on the Banks of the Jordan River

Stream Setback and Green Space Site Design Ordinances would have Preserved Critical Riparian Habitat and Maintained a "Quality of Life" Passive Recreation Experience for Trail Users Along this Large Floodplain Community River Development

Table 3. Jordan River, Tributary Stream, Trails, and Canals[1] Requiring Green Space Site Design Ordinance to Preserve Public Floodplain Safety, Water Quality, and Wildlife Habitat Open Space Values

Water Bodies and Trails	Floodplain Protection	Critical Wildlife Habitat	Native Vegetation Buffer Zone Width[2]
Jordan River Parkway Trail	Yes (100-and 500-year)	Yes	25 Feet
Mystic Springs Educational Wetland Interpretive Area	Yes (100-and 500-year)	Yes	25 Feet
Little Willow Creek	Yes (100-and 500-year)	Yes	25 Feet
Midas Creek	Yes (100-and 500-year)	Yes	25 Feet
Cottonwood Creek	Yes (100-and 500-year)	Yes	25 Feet
Bingham Creek	Yes (100-and 500-year)	Yes	25 Feet
Dry Creek	Yes (100-and 500-year)	Yes	25 Feet
Beckstead Canal	No	Yes	25 Feet
South Jordan Canal	No	Yes	25 Feet
Utah-Salt Lake Canal	No	Yes	25 Feet
Utah Distributing Canal	No	Yes	25 Feet
Welby-Jacob Canal	No	Yes	25 Feet
Welby-Jacob Canal Open Water And Wetland at 11000 South And Bangerter Highway	No	Yes[3]	25 Feet

1. North–south distributing canals provide important inner city wildlife habitat and community passive recreation values and as such, are designated "natural area-passive recreation".
2. Vegetation buffer zones are 25 feet wide between the Jordan River Parkway Trail and adjacent developments and 25 feet wide from the top of the bank on each side of a tributary stream channel or canal.
3. The Welby-Jacob Canal open water and wetland area is designated as "natural area–wildlife habitat" as it is an isolated wetland area providing critical habitat within a highly developed urban area.

The vegetation buffer zone may be comprised of existing riparian and upland vegetation or it may be a buffer zone planted with Utah native riparian trees and woody shrubs or drought-tolerant upland woody shrubs and grasses and forbs, if an existing 25-foot zone of vegetation does not exist or is not preserved. It is preferable that an existing riparian or upland buffer zone be retained during development activities to minimize visual and noise disturbances experienced by community and regional trail users during project construction, preserve critical wildlife habitat, and reduce migration corridor fragmentation. Maintaining existing riparian and upland habitat will also significantly reduce development landscaping, maintenance, and irrigation costs. Plant species lists for recommended native riparian tree and woody shrub transplants and a drought-tolerant custom upland seed mixture designed specifically for disturbed upland soils occurring within the Jordan River corridor are included in Tables 6-8 (Chapter VI. *Jordan River Corridor and Tributary Stream Green Space Site Design Specifications)*.

In order to retain a natural character within either preserved existing vegetation buffer zones or planted vegetation buffer zones, mowing and trimming of trees, shrubs, grasses, or forbs is prohibited. Additionally, fertilizers and pesticides are prohibited within the 25-foot vegetation buffer zone. "Wildlife-aquatic-safe" herbicide "spot treatment" of invasive herbaceous weedy species within the 25-foot vegetation buffer zone may be conducted on an "as needed" basis by a state-certified weed control expert (see Chapter VI*. Jordan River Corridor and Tributary Stream Green Space Site Design Specifications*).

The placement of permanent or temporary buildings, fencing, yard decorations, decks, gardens, and playground features (i.e., swing sets, trampolines, dog tethers, playhouses, etc.) within the 25-foot vegetation buffer zone is prohibited. Low lighting is recommended near the 25-foot vegetation buffer zone to reduce wildlife night-time foraging impacts.

Bingham Creek Trail Provides Minimal Passive Recreation Pleasure for Community Trail Users Due to Noise and Visual Impacts

Home Owners Have No Privacy while Enjoying Backyard Activities Without Green Space Site Design Measures

The "Green Space Site Design" ordinance requires implementation and enforcement of erosion and sediment control "best management practices" (BMP's) consistent with U.S. Environmental Protection Agency (EPA), National Pollutant Discharge Elimination System (NPDES), State of Utah Department of Environmental Quality (DEQ), South Jordan City municipal codes (Zoning Code 16.44.070, Zoning Code 16.44.100, and Zoning Code 16.44.070), Great Salt Lake Audubon Society, and Blueprint Jordan River (Envision Utah et. al. 2008) guidelines and policies which protect regional and federal water quality.

Properly installed and maintained erosion and sediment control BMP's reduce the adverse effects of stormwater runoff, soil erosion, and pollutant transport into nearby waterways. Erosion and sediment control BMP's reduce point source sediment production which adversely affect water quality, instream fish habitat, and aquatic organism life cycles. Erosion and sediment control BMP's include: 1) avoiding vegetation and soil impacts to the greatest degree possible and retaining a natural vegetation buffer zone between developments and stream channels, floodplains, and wetland areas; 2) installing biodegradable coir-fiber sediment logs at the toe of slopes, along drainages, and between developments and floodplain wetlands; 3) installing biodegradable erosion control blankets on slopes and other highly erodible exposed soils regardless of gradient; 4) protecting soils with hydromulch or certified "weed-free" straw or rice mulch if exposed during spring or winter seasons; and 5) seeding disturbed areas with the custom Jordan River native, adapted upland seed mixture specified in Table 8 (Chapter VI. *Jordan River Corridor and Tributary Stream Green Space Site Design Specifications*).

Jordan River FEMA 100-Year Floodplain Development Immediately Adjacent to "Jurisdictional Wetland"

Setbacks, Green Space Site Design, and Erosion and Sediment Control Best Management Practices Not Implemented or Enforced to Prevent Wetland, Wildlife, or Water Quality Impacts

The "Green Space Site Design" ordinance requires stormwater runoff measures to be in accordance with U.S. Environmental Protection Agency (EPA), State of Utah Department of Environmental Quality (DEQ) regulations, and Blueprint Jordan River (Envision Utah et. al. 2008) policies to effectively treat stormwater prior to being conveyed into the Jordan River, tributary streams, or floodplain wetlands. Permeable pavements, on-site bio-retention stormwater swales, stormwater inlet protectors, and stormwater outlet oil and trash separator collection measures are required to treat effluent prior to being discharged into the Jordan River, wetlands, or its tributary streams. Stormwater outlet oil and trash separators will be cleaned out on a regular basis to remove trapped sediment, trash, and other pollutants.

Sewer Plant Construction Site Point Source Sediment-Laden Effluent Entering Jordan River

6. "**Steep Slope/Hillside Protection No Disturbance Setback" Ordinance**

A "Steep Slope/Hillside Protection No Disturbance Setback" ordinance pertains to the entire Jordan River corridor and Bingham Creek. The "Steep Slope/Hillside Protection No Disturbance Setback" ordinance establishes a soil disturbance setback zone of a minimum of 50-feet from the top of any slope or hillside within the Jordan River corridor (Exhibit 1). The "Steep Slope/Hillside Protection No Disturbance Setback" ordinance is consistent with U.S. Environmental Protection Agency (EPA), State of Utah Department of Environmental Quality (DEQ), and National Pollutant Discharge Elimination System (NPDES), Great Salt lake Audubon Society, Blueprint Jordan River (Envision Utah et. al. 2008) policies and regulations and Salt Lake Countywide Water Quality Stewardship Plan (WaQSP) (Salt Lake County 2008) and WAQSP Stream Function Index Main Report Addendum (Salt Lake County 2009) recommendations.

The "Steep Slope/Hillside Protection No Disturbance Setback" ordinance requires that the natural topography of terrace slopes and hillsides be retained and that the natural side slope vegetation be preserved to 1) provide slope stabilization, 2) reduce erosion and sediment production, 3) preserve critical wildlife habitat, and 4) retain a vegetation buffer between terrace development projects and the Jordan River corridor. The "Steep Slope/Hillside Protection No Disturbance Setback" ordinance will reduce water quality impacts, preserve community and regionally important scenic vistas and view sheds, preserve important wildlife habitat vegetation ecotones transitioning from the river to the tops of upper terrace slopes, and preserve and protect critical wildlife nesting and foraging habitat.

The "Steep Slope/Hillside Protection No Disturbance Setback" ordinance prohibits: 1) disturbance of and recontouring of steep slopes and hillsides; 2) placement of fill or waste material on Jordan River upper terrace side slopes; 3) side slope soil and vegetation disturbance; and 4) fencing along the toe of a slope which prevents wildlife from accessing critical side slope upland habitat. Fencing associated with developments located on upper terrace slopes should be placed along the top of a steep slope/hillside rather than at the bottom of a slope, regardless of whether the property line boundary is at the toe of a steep terrace slope.

Waste Soil Material Disposed of on Private Property on Jordan River Upper Terrace Slope Adjacent to Little Willow Creek Diversion Ditch

Eroded Soils Sloughed into the Little Willow Creek Diversion and Entered a South Jordan City Federally Permitted Wetland Mitigation Conservation Area

Green space site design measures also pertain to Jordan River upper terrace developments, as specified in Chapter VI. *Jordan River Corridor and Tributary Stream Green Space Site Design Specifications.* Best management practices (BMP's) required for all terrace developments include engineered on-site stormwater treatment swales which retain sediment and pollutants to effectively minimize water quality impacts. Additionally, disturbed soils within the 50-foot setback buffer zone will be revegetated with the Jordan River corridor custom native drought-tolerant seed mixture, as specified in Chapter VI. *Jordan River Corridor and Tributary Stream Green Space Site Design Specifications* (Table 8) and covered with biodegradable erosion control blankets to reduce erosion, minimize off-site sediment, and protect wetlands and waterways within the Jordan River corridor.

7. "No Wildlife Hunting or Trapping" Ordinance

The "No Wildlife Hunting or Trapping" ordinance will be enforced along the entire Jordan River corridor and along its tributary streams and canals as these areas link critical wildlife habitat and support wildlife species survival within designated federal, regional, and private wildlife conservation areas including the Great Salt Lake Audubon Society properties. The "No Wildlife Hunting or Trapping" ordinance specifies hunting or trapping of any mammalian, avian, or reptilian species is prohibited within South Jordan City limits. Hunting or trapping within natural open space (i.e., "natural area-wildlife habitat" and "natural area-passive recreation") zones are prohibited and punishable by law. It is unlawful for any person to shoot firearms or use hunting bows to kill wildlife, set spring loaded traps or snares, or dispatch hunting dogs into "natural area-wildlife habitat" and "natural area-passive recreation" land use zones to kill and/or retrieve any wildlife species. Training of hunting dogs in "natural area-wildlife habitat" and "natural area-passive recreation" land use zones is prohibited. Trapping of, and/or release of personal reptilian species within Jordan River corridor wetlands is prohibited to prevent spread of infectious disease to native frogs, fishes, and other aquatic organisms.

V. High Priority Acquisition Lands and Development Setback Properties within the Jordan River Corridor

Population survey data presented in the City of South Jordan "*Parks, Recreation, Trails, and Open Space Master Plan*" (Greenplay 2007) indicated the community would like fifty-two percent (52%) of available funding for the City's parks and facilities program to be allocated to open space preservation and walking and biking trails. "Protecting rivers, creeks, and canal corridors" was rated as the most important "natural" open space value (i.e., protecting the Jordan River corridor and smaller tributary creeks such as Cottonwood Creek, Midas Creek, Dry Creek, and Bingham Creek) (Greenplay 2007). Other regional studies surveying Salt Lake Valley citizens regarding the importance of open space found that preserving the Jordan River corridor for wildlife habitat, floodplain values, and community health is the highest or one of the highest priorities (Envision Utah et. al. 2008, Toth et. a. 2002, Swaner Design 2001). Priority strategies recommended to city leaders for securing "natural area" open space included obtaining matching funds for land acquisition, establishing a sales tax, developing natural area open space zoning ordinances, and requiring conservation design standards for developments within or near high priority open space natural areas such as the Jordan River corridor.

A 2008 South Jordan City community survey indicated an increase in support of a property tax for open space funding from 2007 with fewer individuals "strongly opposing" a tax increase and more individuals "somewhat supporting" a tax increase.

Jordan River Corridor High Priority Acquisition Land Providing Public Safety Floodplain Values, Critical Wildlife Habitat, and Scenic Vistas

Based upon this survey data and the rapid rate at which open space is being developed along the Jordan River corridor within the Salt Lake Valley and South Jordan City limits, it is essential that remaining undeveloped parcels within the Jordan River corridor FEMA 100- and 500-year floodplain be secured in "natural area" open space conservation easements. Securing remaining floodplain parcels is important to preserve the river corridor as a fully functioning floodplain for public safety; protect critical wildlife habitat and connected migration corridors; and to preserve invaluable scenic vistas for human quality of life on a community and regional basis. Acquiring undeveloped lands and requiring stream setbacks and green space site design along the paved Jordan River Parkway Trail is also important to preserve a natural and serene, riverine environment for quality human experiences.

1. High Priority Acquisition Lands and Development Setback Properties

Jordan River corridor high priority acquisition lands are specified in Table 4 and identified in Exhibit 5 and Appendix J. Private properties within or near the Jordan River FEMA 100-and 500-year floodplain and properties adjacent to the Jordan River channel are high priority acquisition properties for their importance in: 1) maintaining an effective floodplain corridor able to absorb and dissipate flood flows and peak stormwater influxes, 2) providing groundwater recharge and discharge functional values, 3) filtering pollutants and sediment from urban stormwater runoff, 4) providing resident wildlife and neo-tropical migratory bird species habitat, and 5) preserving scenic vistas. Private properties within the east Jordan River floodplain corridor, contiguous with designated wildlife habitat conservation easements and federally permitted wetland mitigation areas, are particularly important acquisition properties as they are important migration corridor "links" used by resident and migratory wildlife to access year round floodplain habitat and spring rearing and winter feeding grounds.

Jordan River FEMA 100-Year Floodplain High Priority Acquisition Property in Private Ownership (right)

Located Between South Jordan City Wetland Mitigation Conservation Easement (left) and Great Salt Lake Audubon Wildlife Conservation Easement (right)

Zoned "Natural Area-Wildlife Habitat" Open Space

Table 4. Jordan River Corridor High Priority Acquisition Lands and Properties Requiring Floodplain Protection, Stream Setback, Green Space Site Design, Wetland, and/or Steep Slope/Hillside Zoning and Ordinances

Parcel	Public Safety Floodplain Protection	Critical Wildlife Habitat	Scenic Vista/ Steep Terrace Slopes
Harrison A,FP, SS, GSSD, SSHP, SVHF,W	Yes (100 and 500-year)	Yes	Yes
Ernest A,FP, SS, GSSD, SSHP, W	Yes (100-and 500-year)	Yes	No
Fullmer A, FP, SS, GSSD	Yes (100-and 500-year)	Yes	No
Chavez SS, GSSD	Yes (100-and 500-year)	Yes	No
Yergensen SS, GSSD	Yes (100-and 500-year)	Yes	No
Lambert A,SS, GSSD	Yes (100-and 500-year)	Yes	No
Mitchell A,FP, SS,GSSD, SVHF, W	Yes (100-and 500-year)	Yes	No
Jones A,FP, SS,GSSD, SVHF, W	Yes (100-and 500-year)	Yes	No
Mumford A,FP, SS,GSSD, SVHF, W	Yes (100-and 500-year)	Yes	No
Peters A,SS, GSSD, SVHF	Yes (100-and 500-year)	Yes	No
Wright A,FP, SS, GSSD, SSHP, SVHF, W	Yes (100-and 500-year)	Yes	No
Williams A,FP, SS, GSSD, SVHF, W	Yes (100-and 500-year)	Yes	No
Hickman A,FP, SS, GSSD, SSHP	Yes (100-and 500-year)	Yes	Yes
Ward A,SS, GSSD, W	Yes (100-and 500-year)	Yes	No
Coats A,SS, GSSD, W	Yes (100-and 500-year)	Yes	No
Schmidt SS, SSHP, GSSD, SVHF	No	No	Yes

A = Acquisition Priority; FP = Public Safety FEMA Floodplain No-Build Ordinance; SS = Stream Setback Ordinance; GSSD = Green Space Site Design Ordinance; SSHP = Steep Slope/Hillside Protection Ordinance; SVHF = Scenic Vista/Historic Farm Values; W = Wetland Ordinance.

South Jordan City Federally Permitted Wetland Mitigation Conservation Easement

Located within East Jordan River Corridor FEMA 100-Year Floodplain Zoned "Natural Area-Wildlife Habitat" Open Space

Further perpetuation of City or private property development within the Jordan River floodplain corridor poses a threat to maintaining public safety floodplain functions for future generations. Additionally, the ability to maintain wetland mitigation and conservation easement area hydrology into perpetuity may also be compromised. Reduction of wetland mitigation conservation area hydrology due to lowering of the water table or water diversions may result in the loss of wetland mitigation credits as wetland drying promotes the invasion of undesirable plant species such as common reed (*Phragmites australis*), Russian olive (*Elaeagnus angustifolia*), salt cedar (*Tamarix ramosissima*), and thistles. These aggressive and persistent undesirable plant species rapidly degrade wildlife habitat values and view sheds. Additionally, invasive species eradication is labor intensive and costly. Maintaining perennial hydrologic conditions of Jordan River floodplain wetlands allows for healthy, balanced ecosystem development and a diversity of habitat. The greater the diversity of habitat the greater the number of species it will support (Smith 2010).

Private properties adjacent to the Jordan River also contain important riparian nesting and winter foraging habitat for resident and neo-tropical migratory bird species and birds of prey.
Noise, nighttime lighting, and other disturbances associated with Jordan River floodplain development adversely affect wildlife sustainability and passive recreation experiences within an urban environment. Many resident and migratory avian species which nest and rear their young within the Jordan River corridor are very sensitive to human disturbance and will abandon their nests or fledglings if subjected to even minimal disturbance. Likewise, many avian species will avoid, or be displaced from, historic nesting or foraging habitat near residential or commercial developments and roadway and infrastructure corridors located near streams or wetlands.


Public Safety Floodplain Protection
Public Safety Floodplain Protection
Gateway Scenic Vista / Historic Farm / Raptor Nesting
Public Safety Floodplain Protection
Gateway Scenic Vista Historic Farm /Raptor Nesting
Public Safety Floodplain Protection
Gateway Scenic Vista
Public Safety Floodplain Protection
Scenic Vista Raptor Nesting
Public Safety Floodplain Protection
Public Safety Floodplain Protection
Public Safety Floodplain Protection
Public Safety Floodplain Protection
Exhibit 5.
Jordan River Corridor High Priority Private Property Acquisition Lands
0 250 500 1,000
Feet
1 inch = 1,100 feet
SOUTH JORDAN
K.A. Smith Consulting, Inc.
2011
\GIS_PROJECTS\PARKS\JROSHCMP\PAGESIZE 11x17\JROSHCMP_EX5_11X17.mxd
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N
SJC BOUNDARY
CREEK
PRIVATE PROPERTY HIGH PRIORITY ACQUISITION LAND
GATEWAY SCENIC VISTA / HISTORIC FARM / RAPTOR NESTING
GATEWAY SCENIC VISTA
PUBLIC SAFETY FLOODPLAIN PROTECTION
SCENIC VISTA / RAPTOR NESTING

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Jordan River Corridor High Priority Acquisition Property in Private Ownership Located within FEMA 100-Year Floodplain.

White Vinyl and Steel Post Fencing Installed Across the North and South Property Boundaries Significantly Affects Resident Wildlife Movement Across Historic Migration Corridors and Use of Adjacent Conservation Easement Lands

Fencing installed on private properties adjacent to wildlife conservation easements within the Jordan River corridor significantly affects the ability of resident wildlife to move across historic migration routes. Acquisition of Jordan River floodplain private property, or dedication of floodplain properties into private conservation easements, is important to ensure that public safety floodplain values are maintained and to ensure that wildlife access and year round use is perpetually sustained.

High priority Jordan River corridor acquisition lands requiring “Green Space Site Design” and “Steep Slope/Hillside Protection” zoning and ordinances include Jordan River corridor upper terrace land offering beautiful scenic vistas at principal gateway areas such as 11400 South, 10600 South, and 9800 South (Shields Lane) to minimize visual, vegetation, and wildlife habitat impacts (Exhibit 5 and Appendix J). Private properties adjacent to these principal gateways should be acquired as open space to preserve the unique vast Jordan River corridor and mountain view landscapes that impart a sense of “wellbeing” for citizens and visitors of the City of South Jordan as they enter the city from the east. Many of these gateway properties also contain historic farms, heritage tees, and groves of large trees with protected raptor nest sites. The Jordan River corridor north-south view shed also preserves a community and regionally important “rural riverine” character. Loss of Jordan River corridor wildlife habitat also degrades human quality of life experiences for community and regional visitors as passive recreation activities such as bird watching and wildlife photography are diminished.

Jordan River Corridor Scenic Vista/View Shed along 9800 South (Shields Lane) and Floodplain Properties Requiring Natural Area Open Space Zoning and Ordinances

High priority Jordan River corridor acquisition lands requiring "Public Safety FEMA Floodplain 100-and 500 Year Floodplain, "Wetland, Special Aquatic site (i.e., Seeps and Springs), Perennial and Intermittent Stream Channel, and Terrace Slope Ephemeral Drainage Channel Protection" stream setback" and "green space site design" zoning and ordinances include properties along the west boundary of the Mystic Springs Educational Wetland Interpretive Area from 9800 South to 10260 South (i.e., from Shields Lane to Mulligan's Golf Course) to preserve a buffer zone adjacent to the educational wetland interpretive area which will aid in providing high quality passive recreation experiences for community and regional users. Private properties adjacent to the Mystic Springs Educational Wetland Interpretive Area are also high priority Jordan River floodplain acquisition parcels.

Other high priority acquisition lands requiring "Public Safety FEMA Floodplain 100-and 500 Year Floodplain, "Wetland, Special Aquatic site (i.e., Seeps and Springs), Perennial and Intermittent Stream Channel, and Terrace Slope Ephemeral Drainage Channel Protection" stream setback" and "green space site design" zoning and ordinances include properties located within the east and west Jordan River corridor adjacent to the Jordan River and its tributary streams. Jordan River tributary streams (i.e., Midas Creek, Cottonwood Creek, Dry Creek, Little Willow Creek, and Bingham Creek) are greatly impacted by channelization and removal of important riparian vegetation, development, and residential disturbances.

Midas Creek Channelization at 3200 West.

Mature Riparian Vegetation and Wildlife Habitat Removed for Residential Development.

To preserve important floodplain functions, wildlife habitat, and passive recreation open space values "stream setback" and "green space site design" zoning and ordinances should be implemented along: 1) 1500 lineal feet of Midas Creek just west of the Jordan River at 11200 South; 2) Bingham Creek from Skye Drive to the west City limit through the entire Daybreak development area; 3) Dry Creek at 9800 South; and 4) Little Willow Creek from 11400 South to the Great Salt Lake Audubon property at approximately 11000 South (Exhibit 5 and Appendix J).

The Welby-Jacob Canal open water and wetland area located at 11000 South and Bangerter Highway is also a high priority acquisition area supporting isolated wetland/riverine habitat that provides a unique "oasis" for resident wildlife and neo-tropical migratory bird species within a highly developed urban setting. This area is designated "natural area-wildlife habitat" and requires a 50-foot minimum setback around the entire perimeter of the wetland and a 25-foot setback along the Welby-Jacob conveyance canal to preserve functional wildlife habitat.

White Vinyl Fencing Installed through Welby-Jacob Wetland and Riparian Area May be in Violation of the Clean Water Act of 1977.

2. Land Acquisition and Funding Options

Private property land acquisition strategies include measures such as transfer of development rights, donation of property title, and private property dedication of conservation easements. Land acquisition funding strategies include property tax or sales tax, general funds, special services taxing, impact fees, and matching funds from state and federal government grants and land trusts (Table 5).

Consistent with South Jordan City Resolution No. 2009-12 "*A Resolution of South Jordan City in Support of the Goals and Initiatives of Blueprint Jordan River*" (Appendix A), the City of South Jordan should secure a long-term general management fund for natural area open space to maintain and preserve high quality wildlife habitat and visually pleasing scenic vistas. General funds would be used to: 1) purchase high priority acquisition properties within the Jordan River corridor as specified in Table 4 and shown on Exhibit 5 of the Jordan River Corridor Master Plan; 2) control invasive plant species within the Jordan River corridor in a wildlife-aquatic-safe manner, 3) monitor wetland mitigation area hydrology and sediment loading, 4) maintain wetland mitigation area head gates and diversion ditches, 5) maintain Jordan River Parkway Trail, Mystic Springs Educational Wetland Interpretive Area, and conservation easement area interpretive and permitted use signage, and 6) maintain conservation easement area fencing. General funds would also support an open space management team guided by a professional Restoration Ecologist/Wetland Scientist to properly manage open space areas in a responsible and ecologically sound manner, as needed, into perpetuity.

Table 5. Jordan River Corridor Land Acquisition and Funding Options

Land Acquisition and Funding Options
Transfer of Development Rights
Private Property Conservation Easements
Private Donation or Land Trades (Exchanges)
Public Bonds/Sales Tax Revenue/Property Taxes and Special Service District/Impact Fees
General City Funds
Federal and State Grant Programs
LeRay McAllister Critical Lands Conservation Fund (Utah Quality Growth Commission)
Salt Lake County Open Space Trust Fund
SLC Open Space and Critical Lands Acquisition Funds
(Utah State Division of Forestry, Fire, and State Lands)
The Nature Conservancy of Utah
Environmental Protection Agency Wetlands Protection Development Grants
(administered by Utah Governor's Office of Planning and Budget)
Natural Resources Conservation Wetlands Reserve Program
Utah Department of Natural Resources Parks and Recreation– Riverway Enhancement Matching Grant Program
Utah Open Lands
U.S. Fish and Wildlife Service
U.S. D. A. Natural Resources Conservation Service
Condemnation – "Powers of Eminent Domain"
Wetland Mitigation Credits

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VI. Jordan River Corridor and Tributary Stream Green Space Site Design Specifications

The Jordan River Corridor Master Plan provides "green space site design" specifications for homeowners and developers with properties adjacent to the Jordan River and its tributary streams, the Jordan River Parkway Trail, the Mystic Springs Educational Wetland Interpretive Area, and on Jordan River upper terraces. Green space site design specifications include measures which reduce visual, water quality, wildlife, and passive recreation impacts. Green space site designs incorporating the use of native Jordan River riparian trees and shrubs and adapted upland drought-tolerant plant species increases home and business property values by creating natural, self-sustaining vegetation privacy buffers which reduce landscape maintenance and water use. Green space site designs can be creatively and inexpensively integrated into private, community, and business developments. Additionally, "green space" concepts outlined in the Blueprint Jordan River (Envision Utah et. al. 2008) plan may be used by the City of South Jordan to promote responsible planning and development within one-half mile of the Jordan River corridor and to incorporate "green" home construction, on-site sediment retention basins, and permeable pavements for developments near the Jordan River, Jordan River tributary streams, Jordan River Parkway Trail, and the Mystic Springs Education Wetland Interpretive Area.

The green space site design ordinance establishes a minimum 25-foot vegetation buffer zone between residential and commercial developments adjacent to the Jordan River Parkway Trail, the Mystic Springs Educational Wetland Interpretive Area, tributary streams of the Jordan River (i.e., Midas Creek, Little Willow Creek, Cottonwood Creek, and Bingham Creek), inner city canal systems (i.e., Beckstead Canal, South Jordan Canal, Utah-Salt Lake Canal, Utah Distributing Canal and Welby-Jacob Canal), and any other "natural area" open space lands where development or associated disturbances will adversely affect passive recreation visual aesthetics, community and regionally important view sheds, water quality, or wildlife habitat (Exhibit 1 and Appendix J)(*Chapter IV. Jordan River Corridor Land Use Zoning and Ordinances*).

1. Green Space Site Design Vegetation Buffer Zone Planting and Seeding Specifications

The green space site design vegetation buffer zone may be comprised of existing riparian and upland vegetation (comprised of existing native and nonnative plant species) or it may be a buffer zone planted with Utah native riparian trees and woody shrubs or drought-tolerant upland woody shrubs and grasses and forbs, if an existing 25-foot zone of vegetation does not exist or is not preserved during development activities. It is preferable that an existing riparian or upland buffer zone be retained during development grading activities to: 1) minimize soil disturbances near waterways, 2) reduce visual and noise disturbances experienced by community and regional trail users during project construction, 3) preserve critical wildlife habitat, and 4) reduce wildlife migration corridor and habitat fragmentation. Maintaining existing riparian and upland habitat will also significantly reduce development landscaping, maintenance, and irrigation costs. Native riparian tree and woody shrub transplant specifications and a custom upland drought-tolerant seed mixture designed specifically for disturbed upland soils occurring within the Jordan River corridor are included in Tables 6-8.

Drought-tolerant native upland landscaping transitioning from the 25-foot vegetation buffer zone into a development area will reduce mowing and fertilizer use and will provide a more pleasing, colorful landscape for residents to enjoy. Incorporating a diversity of native drought-tolerant woody shrubs, wildflowers, and grasses will also attract resident and migratory neo-tropical bird species and butterflies to the community. In order to retain a natural character within either preserved existing vegetation buffer zones or planted vegetation buffer zones, mowing and trimming of trees, shrubs, grasses, or forbs is prohibited. Fertilizers and pesticides are also prohibited within the 25-foot vegetation buffer zone to reduce weedy species proliferation and to prevent accidental poisoning of neighboring wildlife.

“Wildlife-aquatic-safe” herbicide “spot treatment” of invasive herbaceous weedy species within the 25-foot vegetation buffer zone may be conducted on an “as needed” basis by a state-certified weed control expert. Invasive weedy species management measures are discussed in *Ch. IX. Jordan River Corridor Long-Term Management and Maintenance Measures*. Photographs of common Jordan River corridor state of Utah listed noxious weeds and “weeds of concern” are included in Appendix G.

Table 6. Jordan River Corridor Green Space Site Design Riparian Native Tree and Woody Shrub Transplant Stock Specifications[1]

Tree Species	Transplant Stock[2]
Fremont cottonwood (*Populus fremontii*)	15-gal (20-feet On Center)
Narrowleaf cottonwood (*Populus angustifolia*)	15-gal (20-feet On Center)
River birch (*Betula occidentalis)*	15-gal (20-feet On Center)
Douglas hawthorne (*Crataegus douglasii*)	15-gal (20-feet On Center)
Chokecherry (*Prunus virginiana*)	15-gal (20-feet On Center)
Willow Species	
Whiplash willow (*Salix lasiandra*)	5-gal (20-feet On Center)
Yellow willow (*Salix lutea*)	5-gal (20-feet On Center)
Peachleaf willow (*Salix amygdaloides*)	15-gal (20-feet On Center)
Woody Shrub Species	
Red-osier dogwood (*Cornus sericea*)	5-gal (10-15 feet On Center)
Wood's rose (*Rosa woodsii*)	5-gal (10-15 feet On Center)
Golden currant (*Ribes aureum)*	5-gal (5-10 feet On Center)
Skunkbush sumac (*Rhus trilobata*)	5-gal (5-10feet On Center)

1. Planting specifications for 25-foot green space site design zone between open space and private property if existing vegetation buffer is not retained.
2. Cottonwood and willow poles may also be transplanted.

Table 7. Jordan River Corridor Green Space Site Design Upland Native Woody Shrub Transplant Stock Specifications[1]

Woody Shrub Species	Transplant Stock
Wood's rose (*Rosa woodsii*)	5-gal (10-15 feet On Center)
Golden currant (*Ribes aureum)*	5-gal (5-10 feet On Center)
Basin big sagebrush (*Artemisia tridentata*)	1-gal (5-10 feet On Center)
Rubber rabbitbrush (*Ericameria nauseosus*)	1-gal (5-10 feet On Center)

1. Planting specifications for 25-foot green space site design zone between open space and private property if existing vegetation buffer is not retained.

Table 8. Jordan River Corridor Green Space Site Design Custom Upland Native Seed Mixture Specifications[1]

Grasses	Broadcast Rate (PLS[2] lbs/Acre)
Great Basin wildrye (*Leymus cinereus*)	20
Western wheatgrass (*Pascopyrum smithii*)	20
Sandberg bluegrass (*Poa sandbergii*)	2.5
Sheep fescue (*Festuca ovina*)	10.0
Inland saltgrass (*Distichlis spicata*)	1.0
Total (PLS[2] lbs/Acre)	*53.5*
Shrubs	
Basin big sagebrush (*Artemisia tridentata*)	5.0
Rubber rabbitbrush (*Ericameria nauseosus*)	5.0
Fourwing saltbush (*Atriplex canescens*)	2.5
Garner's saltbush (*Atriplex garneri*)	1.0
Total (PLS[2] lbs/Acre)	*13.5*
Forbs	
Blanket flower (*Gaillardia aristata*)	2.0
Blue flax (*Linum lewisii*)	2.0
Total (PLS[2] lbs/Acre)	*4.0*

1. Custom native seed mixture for 25-foot green space site design vegetation buffer zone and other disturbed upland soils within the Jordan River corridor.
2. PLS lbs/Acre = Pure live seed pounds per acre (broadcast rate).

2. Green Space Site Design Vegetation Buffer Zone Planting and Seeding Time Frames

Green space site design vegetation buffer zone planting and seeding measures are discussed in detail in *Ch. IX. "Jordan River Corridor Long-Term Management and Maintenance Measures"*. Riparian tree and woody shrub transplants will be obtained from Utah or Colorado nurseries which provide adapted, native plant materials similar to those naturally occurring within the Jordan River corridor. Transplants will be installed while dormant (generally October 1 through December 15) to reduce transplant shock and improve transplant survival.

Native upland seed should be obtained from Utah seed companies which provide adapted species with source origins similar to the Jordan River corridor. Native seed origins should be similar in elevation and climate zones and should not be genetic varieties derived from horticultural engineering or hybridization practices which produce quick-growing road side or disturbance area revegetation seed types. The Jordan River corridor custom drought-tolerant upland native seed mixture (Table 8) will be broadcast applied during late fall or early winter just prior to snowfall (generally November 15-December 15). Seeding as late as possible prevents premature germination and allows for a natural winter stratification process to enhance spring-time germination. Native seed should be broadcast applied for 2-3 growing seasons to ensure adequate plant establishment.

3. Green Space Site Design Erosion and Sediment Control Best Management Practices (BMP's)

"Green space site design" erosion and sediment control best management practices (BMP's) include: 1) avoiding vegetation and soil impacts to the greatest degree possible and retaining a natural vegetation buffer zone between developments and stream channels, floodplains, and wetland areas; 2) installing biodegradable coir-fiber sediment logs at the toe of slopes, along drainages, and between developments and floodplain wetlands; 3) installing biodegradable erosion control blankets on slopes and other highly erodible exposed soils regardless of gradient; 4) protecting soils with hydromulch or certified "weed-free" straw or rice mulch if exposed during spring or winter seasons; and 5) seeding disturbed areas with the custom Jordan River native, adapted upland seed mixture specified in Table 8.

In accordance with Blueprint Jordan River (Envision Utah et. al. 2008) guidelines, "green space" BMP's also include the use of permeable pavements, construction of on-site bio-retention stormwater swales, and oil and trash separator collection measures to treat effluent prior to being discharged into the Jordan River or its tributary streams. Permeable pavements increase infiltration and reduce the entry of pollutant laden stormwater runoff into the Jordan River and its tributary streams. Additionally, reducing the total area covered by hardscapes such as sidewalks and roadways reduces the amount of runoff a development site will generate which can reduce stormwater detention facility costs. With smaller amounts of runoff on-site bio-retention swales can be designed as natural meandering stream channels and wetland habitat planted with native riparian trees and woody shrubs and native emergent marsh and wet meadow species. Bio-retention swales should be constructed just outside of the required 25-foot vegetation buffer zone. Properly designed and implemented bio-retention swale and vegetation buffer zone features will provide a more natural transition of riverine character to a community river development. "Green space site design" and erosion and sediment control best management practices for residential and commercial developments within or near the Jordan River corridor and along its tributary streams are specified in Table 9.

High Priority Community River Development along Jordan River Parkway Trail

Requiring Green Space Site Design and BMP Erosion Control Measures

Table 9. Jordan River Corridor and Tributary Stream Erosion and Sediment Control Best Management Practices (BMP's)

Erosion and Sediment Control Best Management Practices (BMP's)
1. Avoid vegetation and soil impacts to the greatest degree possible and retain a natural vegetation buffer zone between development and stream channels, floodplains, and wetlands.
2) Install coir-fiber sediment logs at the toe of slopes, along drainages, and between development and wetlands.
3) Install biodegradable erosion control blankest on slopes and other highly erodible exposed soils regardless of gradient.
4) Plant 25-foot vegetation buffer zone with native riparian trees and shrubs (Tables 6 and 7).
4) Protect disturbed soils with certified "weed free" straw or rice mulch if exposed during spring or winter.
5) Seed disturbed upland soils with drought-tolerant native adapted seed mixture (Table 8).
6) Install permeable pavements.
7) Install and maintain stormwater inlet sediment trapping devices.
8) Install and maintain stormwater outlet oil and trash separator collection devices.
8) Reduce hardscapes such as sidewalks and roadways.
9) Construct on-site bio-retention stormwater swales as natural meandering stream and wetland habitat planted with native riparian trees and woody shrubs and native emergent marsh and wet meadow plant species.
10) Implement "wildlife-aquatic-safe" herbicide "spot treatment" of invasive undesirable weedy herbaceous species within 25-foot vegetation buffer zone on an "as needed" basis by a state-certified weed control expert.
11) Use low lighting near 25-foot vegetation buffer zone to reduce glare and night-time wildlife impacts.

VII. Blueprint Jordan River Common Open Space Goals

South Jordan City Council on January 6, 2009 passed Resolution 2009-02 - "*A Resolution of South Jordan City in Support of Goals and Initiative of Blueprint Jordan River*" (Appendix A) as a "commitment to protect and rehabilitate the Jordan River's natural environment for the benefit of the wildlife species that depend upon it for their survival and for the benefit of human enjoyment". In supporting the goals and visions of Blueprint Jordan River (Envision Utah et. al. 2008) South Jordan City encourages all municipalities of Salt Lake County to become active participants of Blueprint Jordan River by:

> *1) Permanently preserving as open space all land within the Jordan River corridor currently zoned as open space; 2) Enacting or modifying zoning ordinances to assure that any development within the Jordan River corridor is compatible with Blueprint recommendations; 3) Considering participation in cooperative efforts to fund open space acquisition, trail development, habitat restoration, etc. where practical; and 4) Selecting representatives to serve as members of a commission or board to oversee continued progress toward realization of all goals and visions of Blueprint Jordan River.*

Blueprint Jordan River (Envision Utah et. al. 2008) is a public vision guiding document for the approximately 50-miles of Jordan River corridor from the Great Salt Lake to Utah Lake. Blueprint Jordan River outlines a public vision of the Jordan River corridor as a regional amenity which supports environmental, social, and economic considerations to connect communities within a unique, functioning natural environment. Blueprint Jordan River public surveys indicated that it was very important to preserve the Jordan River corridor as a natural area and that "natural habitat and environmental protection" within a "green corridor" was their vision for the future. Survey participants also expressed a "strong desire" to restore wildlife habitat and preserve the remaining undeveloped lands within the Jordan River corridor. They expressed concern about the Jordan River water quality, health of the natural ecosystem, and preferred large vegetation buffers between the river and development and between its tributary streams and development to protect wildlife habitat and maintain open migration corridors. Preserving the Jordan River corridor as a natural environment with trails, wildlife viewing areas, and nature centers was identified as the best long-term quality of life economic use (Envision Utah et. al. 2008).

1. Jordan River Corridor Zoning and Ordinance Provisions

The South Jordan City Jordan River corridor land use zoning and ordinance provisions (Chapter IV. "*Jordan River Corridor Land Use Zoning and Ordinances*) are consistent with South Jordan City Resolution 2009-02 - "*A Resolution of South Jordan City in Support of Goals and Initiative of Blueprint Jordan River*" (Appendix A) and support the regionally important Blueprint Jordan River goals and public vision. The "Natural Area Open Space" zoning and ordinance provides for "natural area-wildlife habitat", "natural area-passive recreation", "park-passive recreation" and "park-active recreation" open space preservation into perpetuity. The "Public Safety FEMA 100-and 500-year Floodplain No-Build" ordinance advocates preservation of any remaining undeveloped land within the Jordan River historic and active floodplain to provide public safety floodplain values for future generations, preserve critical wildlife habitat, and to maintain open wildlife migration corridors and internationally important flyways. The "Stream Setback No-Build" zoning and ordinance ensures that riparian habitat and the natural character of the Jordan River and its tributary streams are preserved for streambank stability, water quality, flood abatement, critical wildlife habitat, and human enjoyment. The "Wetland, Special Aquatic Site (i.e., Seeps and Springs), Perennial and Intermittent Stream Channel, and Terrace Slope Drainage Channel Protection" ordinance ensures that floodplain wetlands which provide critical wildlife habitat, flood attenuation, pollutant removal, groundwater recharge and discharge, and public safety functional values will be protected and preserved. The ordinance also provides for the protection of special aquatic sites such as seeps and springs which often support endangered or sensitive species survival. Protection of perennial, intermittent, and terrace slope ephemeral drainages is also provided for to prevent future "piping" of natural streams and to encourage "daylighting" of existing piped Jordan River tributary streams.

The "Green Space Site Design" ordinance establishes a minimum 25-foot vegetation buffer zone between: 1) the Jordan River Parkway Trail and adjacent developments, 2) the Mystic Springs Educational Wetland Interpretive Area and adjacent developments, 3) developments adjacent to tributary streams of the Jordan River and associated canal systems, 4) upper terrace slopes adjacent to the Jordan River corridor, and 5) any other "natural area" open space lands where development or associated disturbances will adversely affect passive recreation visual aesthetics, community and regionally important view sheds, water quality, or wildlife habitat.

The "Green Space Site Design" ordinance also requires permeable pavements, on-site bio-retention stormwater swales, and oil and trash separator collection measures for developments within or near the Jordan River corridor to treat stormwater runoff prior to being discharged into the Jordan River. The "Steep Slope/Hillside Protection No Disturbance Setback" ordinance reduces water quality and wetland aquatic and wildlife habitat impacts by reducing erosion and sediment input into floodplain wetlands and the Jordan River while preserving critical upland terrace slope habitat. A "No Wildlife Hunting or Trapping" ordinance provides protection for all wildlife species which together promote a balanced ecosystem within the Jordan River corridor.

2. Jordan River Corridor Regional and Community Recreation Amenities

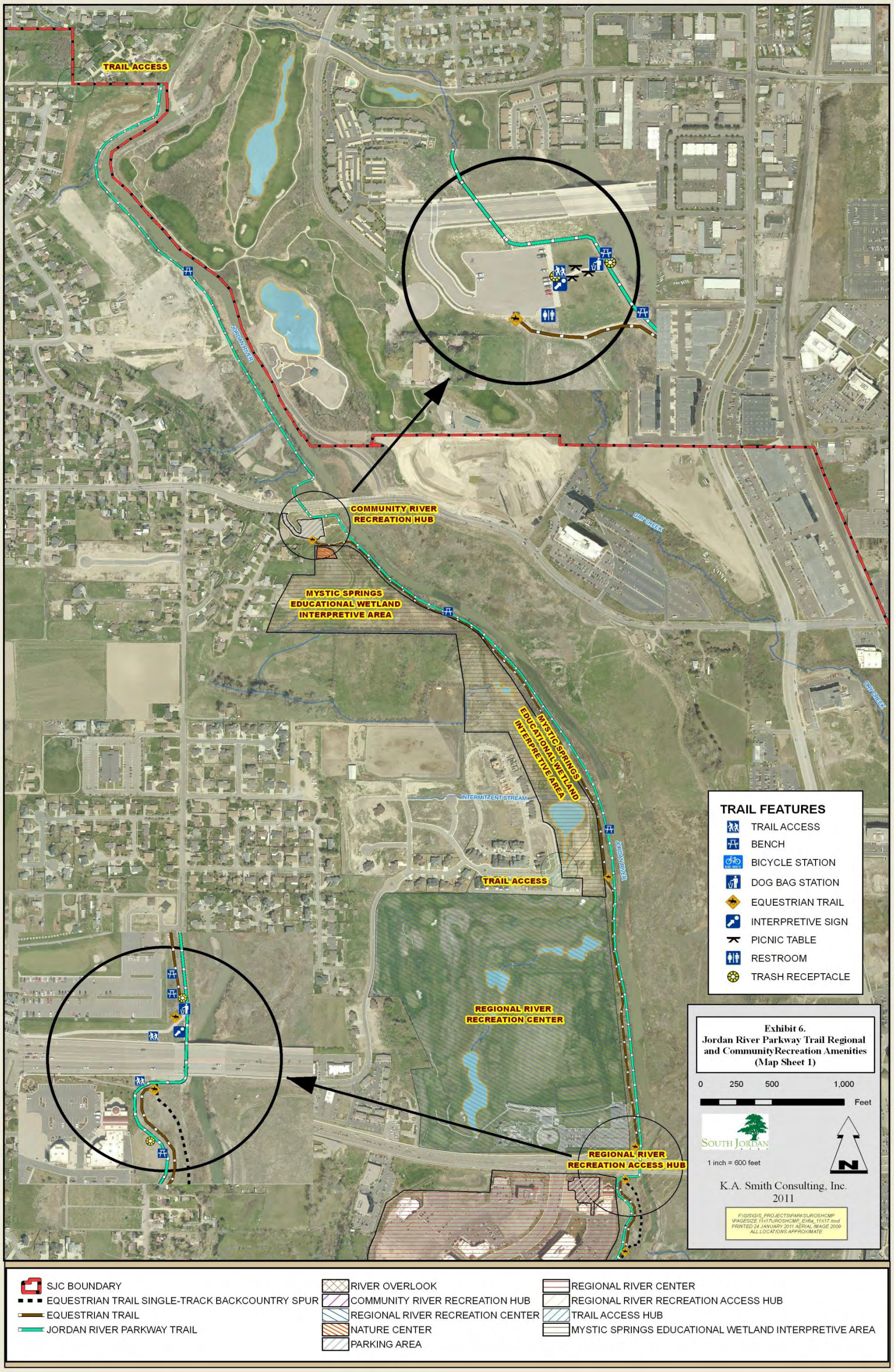
The City of South Jordan is the steward of approximately four miles of Jordan River corridor within the city limits. The Jordan River Parkway Trail, located within the west Jordan River corridor, provides quality community and regional "natural area-passive recreation" use with an abundance of east-west trail access points (Exhibit 6 and Appendix J). A majority of the Jordan River corridor, within South Jordan City limits, is highly urbanized and provides economic development and tourism components consistent with Blueprint Jordan River (Envision Utah et. al. 2008). Numerous "Regional River Centers", "Community River Developments", and "Community River View Developments" with convenient access to the Jordan River Parkway Trail and views of the Jordan River corridor exist from 9400 South to 11800 South. South Jordan City "Regional River Centers" provide high quality commercial, retail, restaurant, healthy lifestyle, and office space amenities with scenic vistas of the Jordan River corridor and mountain viewscapes. "Community River Developments" and "Community River View Developments" provide expansive multi-unit townhomes, single-family homes, and apartment building residential developments within and near the Jordan River corridor. "Regional River Recreation Access Hubs" and "Community River Recreation Hubs" provide convenient parking and east-west access for the Jordan River Parkway Trail. A "Regional River Recreation Center" is provided at Mulligan's Golf Course and "Community Fishing Ponds" are provided at Riverfront Park (Exhibits 1 and 6 and Appendix J).

Jordan River
Community River Development

A "Community and Regional River Education Center" is provided at the Mystic Springs Educational Wetland Interpretive Area. The Mystic Springs Educational Wetland Interpretive Area provides "place-based" wetland and riverine educational opportunities along a primitive trail system. Portions of the area are special needs accessible to allow users of all ages and abilities to enjoy learning about wildlife, wildlife habitat needs, and important wetland and riverine functional values associated with a dynamic, living river ecosystem. Primitive trails with educational signage circumnavigate restored wetlands and enhanced tributary streams, uplands, and riparian habitat naturally occurring within the Jordan River corridor. Trails and educational signs also flank a functioning constructed stormwater detention basin which serves as an educational tool to teach visitors about urban stormwater runoff pollutant and sediment removal to improve receiving stream, wetland, and aquifer water quality.

Riverfront Park
Community Fishing Ponds
Along Jordan River

"Park-Passive Recreation" Open Space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INTERMITTENT STREAM
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REGIONAL RIVER RECREATION CENTER
REGIONAL RIVER RECREATION ACCESS HUB
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BICYCLE STATION
DOG BAG STATION
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Exhibit 6.
Jordan River Parkway Trail Regional and CommunityRecreation Amenities (Map Sheet 1)
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1 inch = 600 feet
K.A. Smith Consulting, Inc.
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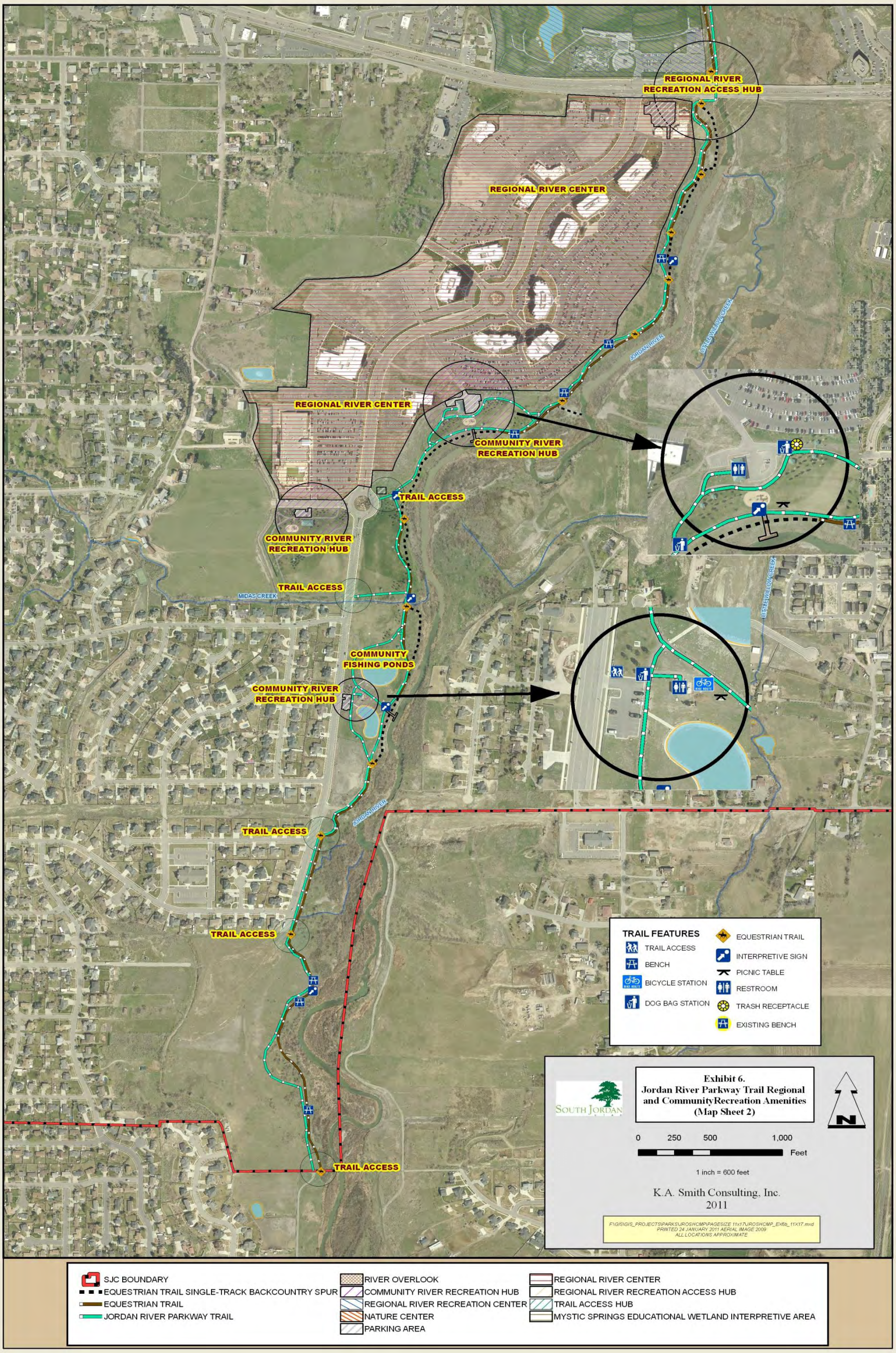
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COMMUNITY RIVER RECREATION HUB
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LITTLE WILLOW CREEK
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DOG BAG STATION
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INTERPRETIVE SIGN
PICNIC TABLE
RESTROOM
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Exhibit 6.
Jordan River Parkway Trail Regional and CommunityRecreation Amenities (Map Sheet 2)
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REGIONAL RIVER RECREATION CENTER
NATURE CENTER
PARKING AREA
REGIONAL RIVER CENTER
REGIONAL RIVER RECREATION ACCESS HUB
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MYSTIC SPRINGS EDUCATIONAL WETLAND INTERPRETIVE AREA

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VIII. Jordan River Corridor Federal and State Listed Endangered, Candidate, and Species of Concern

The Jordan River corridor within Salt Lake County provides critical habitat for four species listed as "endangered", "threatened", or "candidate" under the Federal Endangered Species Act of 1973 (ESA) (Appendix E). An additional twenty-two species are listed as a state of Utah "species of concern" or "candidate Species" (Appendix F). The Jordan River is an important migration corridor for wintering bald eagles, a species which was listed as endangered under the federal ESA for many decades and which remains a state of Utah "species of concern". The Jordan River corridor also provides critical habitat for the June sucker a federally listed ESA "endangered" species; the yellow-billed cuckoo, a federally listed ESA "candidate" species; and the Ute Ladies'-Tresses Orchid, a federally listed ESA "threatened" species (Table 10).

The U.S. Fish and Wildlife Service (USFWS) lists species as "endangered" with the probability of worldwide extinction, "threatened" with becoming endangered, or as "candidate" species for becoming threatened or endangered. An "endangered" species is in danger of extinction throughout all or a significant portion of its habitat range. A "threatened" species is likely to become an endangered species in the near future. A "candidate" species is likely to become threatened or endangered in the future. State of Utah "species of concern" and "candidate" species receive special management under conservation agreements to ease the need for federal ESA listing. Migratory bird species which include neo-tropical migrants, eagles, egrets, herons, and birds of prey are protected under the Migratory Bird Treaty Act of 1918 (Appendix C). Bald and golden eagles are additionally protected under the federal Bald and Golden Eagle Protection of 1940 (Appendix D) and the Utah Wildlife Code. Furbearers are also protected by the Utah Wildlife Code.

The Jordan River Corridor Provides Critical Habitat for the Bald Eagle

Table 10. Salt Lake County Federal Endangered Species Act[1] and State of Utah[2] Listed Species Which Use or May Occur Within the Jordan River Corridor

Species (Common Name)	Scientific Name	State Status
American Peregrine falcon	Falco peregrinus	Species of Concern
American White Pelican	Pelecanus erythrorhynchos	Species of Concern
Bald Eagle	Haliaeetus leucocephalus	Species of Concern
Black Swift	Cypseloides niger	Species of Concern
Bobolink	Dolichonyx oryzivorus	Species of Concern
Bonneville Cutthroat Trout	Onocorhynchus clarkia utah	Candidate Species
Burrowing Owl	Athene cunicularia	Species of Concern
California Floater	Anodonta californiensis	Species of Concern
Columbia Spotted Frog	Rana luteiventris	Candidate Species
Ferruginous Hawk	Buteo regalis	Species of Concern
Grasshopper Sparrow	Ammodramus savannarum	Species of Concern
June Sucker	Chasmistes liorus	ESA-Endangered Species
Great Blue Heron	Ardea herodias	ESA-Species of Concern
Kit Fox	Vulpes macrotis	Species of Concern
Least Chub	Iotichthys phlegethontis	Candidate Species
Lewis's Woodpecker	Melanerpes lewis	Species of Concern
Long-Billed Curlew	Numenius americanus	Species of Concern
Lyrate Mountain Snail	Oreohelix haydeni	Species of Concern
Northern Goshawk	Accipiter gentilis	Candidate Species
Short-Eared Owl	Asio flammeus	Species of Concern
Smooth Green Snake	Opheodrys vernalis	Species of Concern
Spotted Bat	Euderma maculatum	Species of Concern
Three-Toed Woodpecker	Picoides tridactylus	Species of Concern
Townsend's Big-Eared Bat	Corynorhinus townsendii	Species of Concern
Western Pearlshell	Margaritifera falcata	Species of Concern
Ute Ladies'-Tresses Orchid	Spiranthes diluvialis	ESA-Threatened Species
Western Toad	Bufo boreas	Species of Concern
Yellow-Billed Cuckoo	Coccyzus americanus	ESA-Candidate Species

1. Federal Endangered Species Act listed species = "ESA-Endangered Species", "ESA–Threatened Species", "ESA-Candidate Species"
2. State of Utah listed species = "Species of Concern" and "Candidate Species"

The Jordan River Corridor Flyway, Part of the Internationally Recognized "Pacific Flyway" is an Important Migratory Corridor for Great Salt Lake, a Formal Component of the Western Hemisphere Shorebird Reserve Network and a formal "Hemisphere Site"

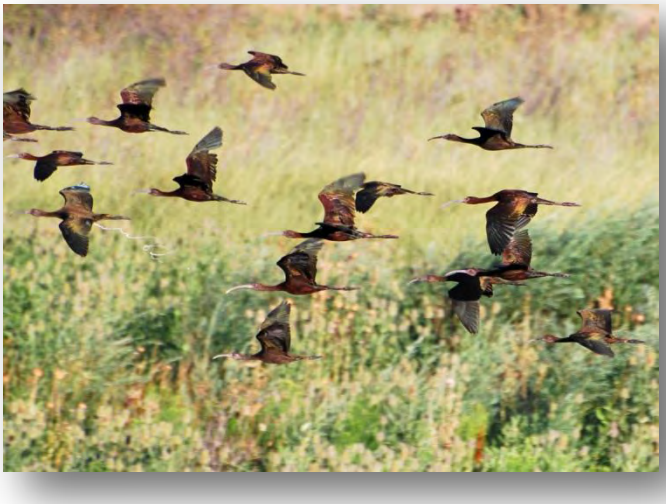
American White Pelican, a State of Utah listed "Species of Concern"

Federal endangered, threatened, or candidate species or state of Utah sensitive wildlife species are mainly listed due to loss of habitat, habitat fragmentation, habitat conversion for agrarian or municipal needs, loss of connected migration corridors, and poisoning and environmental contamination. Impacts to wildlife habitat and internationally important migration flyway corridors also occur from disturbances associated with residential and commercial development; transportation infrastructure such as bridges and roadways; utility line corridors and high-voltage tower supports; satellite radio towers and wind turbines constructed on mountain ridge lines or in updraft drainages; wetland, seep, and spring draining or development; non-native plant and animal species invasion; hydroelectric power dams; and peat harvesting. In an effort to preserve and protect internationally and regionally important wildlife habitat and to prevent species listing government, non-profit, and private property owners will often place perpetual conservation easements on land to sustain large, contiguous tracts of open space; riparian, wetland, and floodplain habitat; and connected migration corridors.

Because the Jordan River in an important wildlife migration corridor between Great Salt Lake and Utah Lake and it is a component of the internationally recognized "Pacific Flyway" wildlife species with federal and state listing in other Utah counties may also use the river corridor within South Jordan City limits for nesting, rearing of young, and food chain support. As such, Utah's federal and state endangered, threatened, or candidate species county lists are included in Appendices E and F, respectively.

A myriad of other resident and migratory wildlife species, which are not on state or federal species protection lists, depend upon critical habitat within the Jordan River corridor for survival, reproduction, and food chain support. Notable riverine wildlife species supported by the Jordan River and its tributary streams include mountain lion, Rocky Mountain elk, Canada lynx, mink, ermine, yellowbelly marmot, mule and white tailed deer, porcupine,

coyotes, red fox, snowshoe hare, skunks, raccoons, ringtail cat, beaver, and northern river otter. Additionally, hundreds of species of shorebirds and waterfowl, amphibians, reptiles, and insects depend upon the Jordan River ecosystem and floodplain habitat for their continued survival.



IX. Jordan River Corridor Long-Term Management and Maintenance Measures

The Jordan River Corridor Master Plan provides long-term management and maintenance measures for open space "natural area" and "park" land use zones within the Jordan River corridor and includes the Jordan River Parkway Trail and Mystic Springs Educational Wetland Interpretive areas. In general, open space "natural area-wildlife habitat" and "natural area-passive recreation" land use zones are self-sustaining, balanced ecosystems requiring minimal human intervention or management. Open space land use zones providing "park-passive recreation" and "park-active recreation" may require implementation of "wildlife-aquatic-sensitive" management and maintenance measures to prevent impacts to wildlife and aquatic organisms, wildlife habitat, and water quality.

The Jordan River Corridor Master Plan adopts and incorporates the "*South Jordan City Jordan River Parkway Corridor Vegetation Enhancement Plan*" (K.A. Smith Consulting, Inc. 2009) as a supportive document which provides proven, scientifically sound management and maintenance principals for ecosystem enhancement within the Jordan River corridor. In general, the "*South Jordan City Jordan River Parkway Corridor Vegetation Enhancement Plan*" (K.A. Smith Consulting, Inc. 2009) was designed to improve visual aesthetics along the Jordan River Parkway Trail; enhance native riparian cottonwood, willow, and upland grass and shrubland plant communities; enhance wildlife habitat; reduce mowing, weed control, and trail maintenance costs; eradicate invasive weedy species; and close off non-designated horse and walking trail spurs to reduce riparian vegetation damage and streambank erosion.

Jordan River Corridor Long-Term Management and Maintenance

1) Jordan River Parkway Trail
-Wildlife Habitat
-Visual Aesthetics
- Equestrian Trail
- Non-Designated Trail Spurs
-Invasive Plant Species Control

2) Riparian, Wetland, and Upland Areas
-Wildlife Habitat
-Cottonwood Protection
-Invasive Plant Species Control
- Non-Designated Trail Spurs

3) South Jordan City Wetland Mitigation Conservation Areas
-Water Diversion/Head Gate Maintenance
-Invasive Plant Species Control
-Fence Maintenance
-Sign Maintenance
-Trespass Issues

4) Annual Maintenance Task Log

During 2009-2011, the three-year phased vegetation enhancement plan (K.A. Smith Consulting, Inc. 2009) was implemented along the Jordan River Parkway Trail and other degraded areas within the west Jordan River corridor. Prudent implementation of the plan significantly improved open space "passive" recreation quality of life experiences along the Jordan River Trail while significantly improving riparian wildlife habitat values.

During implementation of the vegetation enhancement project, many passive recreation trail users commented on the improved trail character and "feeling of content" they experienced as native plant community health was restored and a more natural riverine character was reestablished. Additionally, older trail users indicated that they felt more relaxed with the trail corridor in a non-mowed and "non-park" like condition and enjoyed the "feeling of tall grass naturally swaying in a gentle breeze". Many users also commented on a "feeling of safety" with the return of a more natural trail character that supports healthier populations of resident wildlife and neo-tropical migratory bird species. To ensure that the west Jordan River corridor retains quality habitat and does not return to a degraded condition, the management and maintenance measures specified in the Jordan River Corridor Master Plan and the "*South Jordan City Jordan River Parkway Corridor Vegetation Enhancement Plan"* (K.A. Smith Consulting, Inc. 2009) will be implemented on an "as needed" basis, into perpetuity.

Long-term management and maintenance measures specified in this chapter also address South Jordan City wetland mitigation conservation area water diversion and head gate maintenance; conservation area signage and fencing maintenance; and riverine cottonwood habitat beaver protection maintenance. An annual maintenance task log is included to facilitate effective and consistent management of the Jordan River corridor by South Jordan City Parks and Recreation open space staff, regardless of whether personnel changes occur.

1. Jordan River Corridor Historical Condition

Historically, the Jordan River meandered naturally throughout the South Jordan City lower valley area. Its dynamic and expansive floodplain supported native cottonwood forest and dense willow shrubland plant communities which provided functional floodplain and aquifer discharge and recharge values and high quality wildlife habitat. As the river migrated across its floodplain it created a complex mosaic of vegetation associated with active side channel meanders, backwater channels, abandoned oxbow channels, and uplands. Riparian, emergent marsh, and wet meadow habitat was prevalent throughout the river floodplain, within abandoned oxbow channels, and along streambanks. Cottonwood saplings germinated and established on newly deposited sediment following natural annual flood events.

Decades of disturbance associated with deforestation, stream channelization, dredging, irrigation diversions, urban development, and unnatural stream flow releases from Utah Lake has significantly altered the Jordan River corridor ecology and floodplain functional values. A majority of the native riparian cottonwood and willow shrubland plant communities that once provided essential streambank stability and riparian habitat have been eliminated. Likewise, unnatural water releases from Utah Lake, which erratically increase stream flow velocities and volume, continue to erode Jordan River streambanks and damage critical riparian vegetation. Channelization and dredging has also resulted in a lowering of the Jordan River floodplain water table which has promoted the establishment of non-native opportunistic trees and woody shrubs such as Russian olive and salt cedar. These persistent, invasive species are more adapted to the drier, channelized streambank condition and the saline-alkaline affected silty clay soils commonly associated with the altered Jordan River stream environment. Sandbar willow, present along disturbed streambank areas dominated by Russian olive and salt cedar, also rapidly recolonize somewhat-affected drier saline soils. Although sandbar willow does provide important streambank stability and wildlife habitat, this species tends to form dense stands of homogeneous vegetation which can affect the ability of other desirable native riparian species to recolonize streambanks and floodplains. Homogeneous sandbar willow communities provide reduced structural and spatial plant community diversity which may support fewer wildlife species.

Management practices implemented along the Jordan River Parkway Trail prior to implementation of the "*South Jordan City Jordan River Parkway Corridor Vegetation Enhancement Plan"* (K.A. Smith Consulting, Inc. 2009) included unregulated herbicide weed control within upland and riparian areas; frequent mowing of thistles, native riparian sandbar willow sprouts, and native grasses; and willow branch cutting and spraying. These costly and timely "park maintenance" measures promoted the establishment of state of Utah noxious weeds and weeds of concern including persistent and aggressive thistles and annual grasses and forbs while suppressing the ability of native and more desirable riparian and upland plant species to set seed and reproduce. Consistent mowing of natural grass areas prior to seed ripening allowed annual invasive weedy species to out-compete desirable perennial grasses and forbs. Mowing along the edges of riparian shrub communities also affected the

ability of cottonwood and willow seedlings and sprouts to establish. In some areas, sandbar willow plants adjacent to the paved trail received heavy cutting and herbicide overspray adversely affecting important "edge" nesting and resting habitat for resident and neo-tropical migratory bird species. To reduce South Jordan City maintenance costs, enhance visual aesthetics, and improve wildlife habitat along the Jordan River Parkway Trail the following measures, as specified in the *South Jordan City Jordan River Parkway Corridor Vegetation Enhancement Plan* (K.A. Smith Consulting, Inc. 2009), were implemented during the three-year (2009-2011) phased vegetation enhancement program: 1) "wildlife-aquatic-safe" weed control, 2) selective removal of Russian olive and tamarisk, 3) cottonwood and large willow planting, 4) cottonwood beaver protection, 5) ripping and seeding of degraded upland areas, 6) closing-off non-designated trail spurs, and 7) installing trail signage.

Musk Thistle and Scotch Thistle along Jordan River Parkway Trail Prior to Implementation of the Jordan River Parkway Corridor Vegetation Enhancement Plan (K.A. Smith Consulting, Inc. 2009)

Expanded Riparian Willow Habitat Following Cessation of Mowing along Jordan River Parkway Trail

Native Riparian Trees and Woody Shrubs Provide Important Stream Bank Stability Functions and Compete with Invasive Plant Species that Degrade Wildlife Habitat and Visual Aesthetics

Jordan River Riparian and Upland Habitat Restoration 2009-2011

Installing Cottonwood and Willow Poles On Jordan River Benched Stream Banks

Ripping Compacted Upland Soils

Seeding Decompacted Upland Soils

2. Desired Future Conditions

Desired future conditions specific to open space "natural area-passive recreation" land use zones along the Jordan River Parkway Trail area are described in the "*South Jordan City Jordan River Parkway Corridor Vegetation Enhancement Plan"* (K.A. Smith Consulting, Inc. 2009). These desired future conditions also apply to the long-term management and maintenance of open space "natural area-passive recreation" land use zones within the greater Jordan River corridor and its tributary stream environments. Jordan River corridor open space "natural area-wildlife habitat" and "natural area-passive recreation" land use zones are self-sustaining, balanced ecosystems requiring minimal human intervention or management.

Desired future conditions for open space "natural area-passive recreation" land use zones include a natural riverine ecosystem providing functional floodplain and wetland functional values, quality wildlife habitat, and quality passive recreation experiences for human enjoyment. Jordan River riparian corridor vegetation consists of structurally diverse, native riparian forest/riparian shrubland plant communities transitioning into adjacent upland plant communities comprised of drought-tolerant, native woody shrubs, forbs, and grasses. A natural upland/riparian corridor condition is allowed to expand relatively unmanaged along the Jordan River and Jordan River Parkway Trail. Natural upland and riparian forest/riparian shrubland plant communities provide unmanaged, quality resident wildlife and migratory bird species habitat and compliment a managed open space "park-passive recreation" condition on the west side of the Jordan River Parkway Trail. Native upland plant communities exist as naturally functioning non-mowed ecosystems with big sagebrush (*Artemisia tridentata*), rabbitbrush (*Chrysothamnus nauseosus*), large clumps of Great Basin wildrye (*Elymus cinereus*), wildflowers, and lower growing grasses prevalent. Native grasses are allowed to reproduce naturally by forming tall panicles and producing mature seed heads. Plant litter (or duff) is left in place as native mulch material to ameliorate soil temperatures, conserve soil moisture, enhance soil nutrients, and reduce weedy species invasion. Wetlands within designated conservation areas zoned "natural area –passive recreation" (i.e., Mystic Springs Educational Wetland Interpretive Area) function as self-sustaining ecosystems providing high quality wildlife habitat and passive recreation learning values; however, this area is a "somewhat managed" community and regional river amenity.

Desired future conditions for open space "natural area-wildlife habitat" land use zones within the east river corridor include natural, structurally diverse, riparian, wetland, and upland plant communities comprised of native cottonwoods, willows, and other native woody shrubs and trees. Wetlands are self-sustaining ecosystems which provide high quality floodplain wildlife habitat. Natural upland and riparian forest/riparian shrubland plant communities provide unmanaged, quality resident wildlife and migratory bird species habitat from the west bank of the Jordan River channel to the tops of the east upper river terrace slopes. Native upland plant communities exist as naturally functioning non-mowed ecosystems with big sagebrush, rabbitbrush, large clumps of Great Basin wildrye, wildflowers, and lower growing grasses prevalent. Native grasses are allowed to reproduce naturally by forming tall panicles and producing mature seed heads. Plant litter (or duff) is left in place as native mulch material to ameliorate soil temperatures, conserve soil moisture, enhance soil nutrients, and reduce weedy species invasion.

3. Long-Term Management and Maintenance Goals

To ensure long-term management and maintenance goals area accomplished effectively and efficiently within the Jordan River corridor four primary areas will be maintained by South Jordan City Parks and Recreation staff. These areas include: 1) The Jordan River Parkway Trail; 2) Mystic Springs Educational Wetland Interpretive Area; 3) South Jordan City Parcel 17; and 4) South Jordan City Southeast Jordan River Wetland Mitigation conservation area. A long-term management and maintenance annual task log for primary management areas is specified in Table 11.

Long-term management and maintenance goals to enhance and preserve the functional integrity of wildlife habitat and quality passive recreational values of the Jordan River corridor and its tributary stream environments include: 1) Maintain quality visual aesthetics and wildlife habitat by controlling/eradicating invasive plant species in a "wildlife-aquatic-safe" manner, 2) Minimize maintenance costs/efforts by preserving natural upland habitat as unmowed, drought-tolerant grass and shrubland plant communities contiguous with adjacent riparian habitat, 3) Preserve and enhance riparian and wetland plant communities by selectively removing Russian olive and tamarisk saplings as they establish, 4) Maintain wetland mitigation conservation area hydrology by ensuring the functional integrity of water diversions and head gates, where present; 5) Prevent trash and other pollutants captured in stormwater outlets from entering wetlands by conducting routine scheduled maintenance; 6) Preserve and enhance riparian plant community composition and structure by interplanting native cottonwoods, willows, and other native riparian shrubs on an "as needed" basis; 7) Preserve streambank stability and enhance water quality and instream habitat by reducing streambank erosion, sediment production, and vegetation damage caused by pedestrian, cyclist, and equestrian use of non-designated trail spurs; and 8) Maintain wetland mitigation and wildlife habitat conservation area fencing and signage to prevent human trespass and domestic animal use.

4. Urban Forestry Practices

Urban forestry practices which prescribe the use of non-native or ornamental trees and shrubs will not be implemented within the Jordan River corridor "natural area-passive recreation" or "natural area-wildlife habitat" land use zones to preserve and promote healthy, native riparian and upland plant communities and to prevent invasion of non-native trees and shrubs. Additionally, it is highly recommended that native riparian trees and woody shrubs, rather than ornamental or non-native plant species, be planted within Jordan River corridor land use zones "park-passive recreation" and "park-active recreation" to prevent invasion of adjacent riverine and upland plant communities. Native riparian trees and woody shrubs adapted to the Jordan River corridor are included in Tables 12 and 13.

Non-native and ornamental plant species (i.e., introduced species) planted near natural areas tend to invade and outcompete more desirable native plant species. Introduced plant species degrade native plant communities and alter habitat structure and plant species composition. Degradation of native plant communities affects the ability of these natural areas to sustain the wildlife species that depend upon it for long-term life cycle support. Additionally, non-native or introduced ornamental plant species may introduce disease and insect infestations which may result in mortality of desirable plant species such as native cottonwoods and willows.

Urban forestry practices such as tree and shrub pruning and trimming will not be implemented within land use areas zoned "natural area-passive recreation" or "natural area-wildlife habitat" to preserve critical wildlife habitat, naturally transitioning ecotones and edge habitat, and a natural riverine character. Grass mowing and tree and shrub mastication is not allowed within the Jordan River corridor or along its tributary stream environments except within a 6-foot zone immediately adjacent to the *east* Jordan River Parkway Trail to maintain a mulched equestrian trail, if necessary. Cutting of broken tree branches, other than those which fall across the paved Jordan River Parkway Trail, is not encouraged within open space "natural area-wildlife habitat" and "natural area-passive recreation" land use zones as wildlife commonly use broken branches as understory habitat for nesting and resting. Additionally, understory clearing of woody shrubs and lower tree branches is prohibited as this plant community structure provides critical nesting and rearing habitat for resident and neo-tropical migratory bird species.

Jordan River Parkway community and regional trail users expressed their concern that the natural areas associated with the Jordan River not be cut and cleared to mimic maintained "park-like" conditions. Likewise, trail users appreciate noxious herbaceous weedy species control but do not want to see mowing, clearing, and "sanitization" of the Jordan River corridor area. Trail users also appreciated that native riparian shade trees such as Fremont and narrowleaf cottonwood were being planted along the Jordan River Parkway Trail to provide shade and cooling rather than typical "park" tree planting species.

	Table 11. Jordan River Corridor Primary Management Area - Annual Task Log											
Management Area	January	February	March	April	May	June	July	August	September	October	November	December
Jordan River Parkway Trail												
-Weed Control				x	x	x	x	x	x			
-Supplemental Seeding											x	x
- Cottonwood Beaver Protection			x	x	x	x	x	x	x			
Mystic Springs Wetland Area[1]												
-Phragmites Control/Russian Olive and Salt Cedar Seedling Removal							x	x				
- Cottonwood Beaver Protection			x	x	x	x	x	x	x			
South Jordan City Parcel 17[1]												
-Phragmites Control/Russian Olive and Salt Cedar Seedling Removal							x	x				
-Water Pipeline Road Weed Control							x	x				
- Check Conservation Area Signage			x						x			
- Check Conservation Area Fencing			x						x			
Southeast Jordan River Wetland Mitigation Conservation Area[1]												
-Phragmites Control/ Russian Olive and Salt Cedar Seedling Removal							x	x				
- Cottonwood Beaver Protection			x	x	x	x	x	x	x			
- Observe Presence of Wetland Hydrology From Upper Terrace	x	x	x	x	x	x	x	x	x	x	x	x
- Inspect Wetland Head Gate	x	x	x	x	x	x	x	x	x	x	x	x
- Remove Sediment from Little Willow Creek Diversion Ditch										x		
- Check Conservation Area Signage			x							x		

1. "Wildlife-Safe" weed control by state-certified weed control expert at Parcel 17 Wetland Mitigation Area, Anderson Wetland Mitigation Area, and Mystic Springs Wetland Area will only be implemented, as necessary, during June and July to prevent disturbance to nesting birds and their young. No motorized vehicles are permitted.

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5. Riparian, Wetland, and Upland Area Habitat Management

Long-term riparian, wetland, and upland habitat enhancement and management measures will be implemented according to the detailed procedures specified in the *South Jordan City Jordan River Corridor Vegetation Enhancement Plan* (K.A. Smith Consulting, Inc. 2009) and as specified in the Jordan River Corridor Master Plan. Riparian trees and shrubs improve bank stability, provide shading, enhance wildlife and fish habitat, and enhance passive recreation visual aesthetics. Jordan River corridor riparian native tree and woody shrub transplant stock and upland woody shrub transplant stock to be installed within enhancement areas and "green space site design" zones are specified in Tables 12 and 13. The Jordan River corridor custom upland seed mixture comprised of adapted, native species is specified in Table 14.

Riparian Tree and Woody Shrub Transplant Specifications and Planting Time Frame

Riparian tree and woody shrub transplants will be obtained from Utah or Colorado nurseries which provide adapted, native plant materials similar to those naturally occurring within the Jordan River corridor (Table 12). Transplants may include containerized stock, bareroot stock, 12-foot cottonwood poles, or 8-10 foot willow cuttings. Cottonwood and willow pole plantings should be installed near the Jordan River stream channel where the average perennial water table is within a minimum of four feet from the natural ground surface elevation. Poles should be installed with a 10-12 inch diameter auger mounted onto a bobcat. Planting holes should be drilled at least 4-6 feet deep. Transplants will be installed while dormant (generally November 15-December 15) to reduce transplant shock and improve transplant survival.

Cottonwood Pole Planting Along the Jordan River Parkway Trail to Enhance Resident and Neo-Tropical Bird Species Habitat. Stream Side Shade, and Visual Aesthetics

Table 12. Jordan River Corridor Riparian Native Tree and Woody Shrub Transplant Stock Specifications[1]

Tree Species	Transplant Stock[2]
Fremont cottonwood (*Populus fremontii*)	15-gal (20-feet On Center)
Narrowleaf cottonwood (*Populus angustifolia*)	15-gal (20-feet On Center)
River birch (*Betula occidentalis)*	15-gal (20-feet On Center)
Douglas hawthorne (*Crataegus douglasii*)	15-gal (20-feet On Center)
Chokecherry (*Prunus virginiana*)	15-gal (20-feet On Center)
Willow Species	
Whiplash willow (*Salix lasiandra*)	5-gal (20-feet On Center)
Yellow willow (*Salix lutea*)	5-gal (20-feet On Center)
Peachleaf willow (*Salix amygdaloides*)	15-gal (20-feet On Center)
Woody Shrub Species	
Red-osier dogwood (*Cornus sericea*)	5-gal (10-15 feet On Center)
Wood's rose (*Rosa woodsii*)	5-gal (10-15 feet On Center)
Golden currant (*Ribes aureum)*	5-gal (5-10 feet On Center)
Skunkbush sumac (*Rhus trilobata*)	5-gal (5-10feet On Center)

1. Planting specifications also for 25-foot green space site design zone between open space and private property.
2. Cottonwood and willow poles may also be transplanted.

Willows, river birch, chokecherry, Doulas hawthorne, and red-osier dogwood should be installed along the lower to mid-level portion of stream banks. Transplants will be installed on approximately 15-20 foot centers.

Riparian transitional woody shrubs (i.e., wood's rose, golden currant, and skunkbush sumac) should be installed along the upper river streambanks and transition into native upland bunchgrass habitat. Riparian woody shrubs should be comprised of bareroot or 1-gallon sized stock. Shrub groupings should be installed during late fall (October 1 - December 15) to reduce transplant shock and improve transplant survival. Riparian transitional woody shrubs should be installed in small groupings or patches comprised of 10-12 plants each. Transplants will be installed on approximately 10-foot centers.

Upland Woody Shrub Transplant Specifications and Planting Time Frame

Upland woody shrub transplants will be obtained from Utah or Colorado nurseries which provide adapted, native plant materials similar to those naturally occurring within the Jordan River corridor (Table 13). Transplants may include containerized stock or bareroot stock. Transplants will be installed while dormant during late fall (October 1 - December 15) to reduce transplant shock and improve transplant survival.

In general, adapted, native upland shrubs should be installed along the Jordan River terraces and along the Jordan River Parkway Trail. Upland woody shrubs should only be planted following successful eradication and control of invasive weedy species within upland terrace areas as broadleaf herbicides will also kill woody shrubs. Upland woody shrub habitat should be associated with native upland bunchgrass habitat. Upland woody shrubs should be installed in small groupings or patches comprised of 10-12 plants each. Transplants will be installed on approximately 10-foot centers.

Table 13. Jordan River Corridor Upland Native Woody Shrub Transplant Stock Specifications[1]

Woody Shrub Species	Transplant Stock
Wood's rose (*Rosa woodsii*)	5-gal (10-15 feet On Center)
Golden currant (*Ribes aureum*)	5-gal (5-10 feet On Center)
Basin big sagebrush (*Artemisia tridentata*)	1-gal (5-10 feet On Center)
Rubber rabbitbrush (*Ericameria nauseosus*)	1-gal (5-10 feet On Center)

1. Planting specifications also for 25-foot green space site design zone between open space and private property.

Upland Seed Specifications and Seeding Time Frame

Native upland seed should be obtained from Utah seed companies which provide adapted species with source origins similar to the Jordan River corridor. Native seed origins should be similar in elevation and climate zones and should not be genetic varieties derived from horticultural engineering or hybridization practices which produce quick-growing road side or disturbance area revegetation seed types. Genetically altered seed may cross-pollinate or hybridize with naturally occurring seed strains rendering native plants more susceptible to invasive weedy species competition, infectious disease, insect damage, and fungus. Additionally, genetically altered seed products may affect long-term survivability of native seed strains.

The Jordan River corridor custom drought-tolerant upland native seed mixture (Table 14) will be broadcast applied during late fall or early winter just prior to snowfall (generally November 15- December 15). Seeding as late as possible prevents premature germination and allows for a natural winter stratification process to enhance spring-time germination. Premature germination during late fall will significantly reduce spring seedling survival. Additionally, seeding too early in the fall often encourages large amounts of seed consumption by starlings. Native seed should be broadcast applied for 2-3 growing seasons to ensure adequate plant establishment.

Table 14. Jordan River Corridor Upland Native Seed Mixture Specifications[1]

Grasses	Broadcast Rate (PLS[2] lbs/Acre)
Great Basin wildrye (*Leymus cinereus*)	20
Western wheatgrass (*Pascopyrum smithii*)	20
Sandberg bluegrass (*Poa sandbergii*)	2.5
Sheep fescue (*Festuca ovina*)	10.0
Inland saltgrass (*Distichlis spicata*)	1.0
Total (PLS[2] lbs/Acre)	*53.5*
Shrubs	
Basin big sagebrush (*Artemisia tridentata*)	5.0
Rubber rabbitbrush (*Ericameria nauseosus*)	5.0
Fourwing saltbush (*Atriplex canescens*)	2.5
Garner's saltbush (*Atriplex garneri*)	1.0
Total (PLS[2] lbs/Acre)	*13.5*
Forbs	
Blanket flower (*Gaillardia aristata*)	2.0
Blue flax (*Linum lewisii*)	2.0
Total (PLS[2] lbs/Acre)	*4.0*

1. Custom native seed mixture for 25-foot green space site design vegetation buffer zone and other disturbed upland soils within the Jordan River corridor.
2. PLS lbs/Acre = Pure live seed pounds per acre (broadcast rate).

6. Invasive Plant Species Management

Invasive plant species management includes manual and herbicide control of state of Utah listed herbaceous noxious weeds and "weeds of concern" and manual "selective removal" of invasive riparian woody shrub and tree species such as Russian olive and salt cedar. Weed control will mainly be implemented within the land use zone "natural area-passive recreation" (i.e., along the Jordan River Parkway Trail and within the Mystic Springs Wetland Educational Interpretive Area); however, "spot treatment" of invasive plant species may also be necessary within the "natural area-wildlife habitat" land use zone to prevent degradation of critical Jordan River floodplain wildlife and neo-tropical migratory bird species habitat. The South Jordan City Parks and Recreation open space supervisor should inspect all herbicides proposed for use prior to any weed control treatments to ensure that only approved "wildlife-aquatic-safe" herbicides are being used. Product labels for approved "wildlife-aquatic-safe" herbicides are included in Appendix H. Additionally, the open space supervisor should direct the weed control contractor during herbicide application to ensure that sensitive wildlife habitat, wetlands, and waterways are not contaminated.

Additionally, because the Jordan River corridor provides critical habitat for resident wildlife and migrating neo-tropical bird species it is important that "wildlife-aquatic-safe" weed control measures also be implemented, if necessary, in adjacent parks, community river developments, and regional river centers to prevent direct and indirect herbicide impacts to riparian and wetland habitat and tributary stream water quality.

State of Utah listed noxious weeds and "weeds of concern" commonly occurring within the Jordan River corridor are listed in Table 15. Photographs of, and general management measures for, common invasive plant species are included in Appendix G. Additional photographs and life cycle descriptions of most invasive plant species occurring within the Jordan River corridor are included in the "*Weeds of the West*" (Burrill L.C. et. al. 1996) field manual.

"Spot Treatment" of Whitetop along Jordan River Parkway Trail by State-Certified Weed Control Expert

Table 15. Jordan River Corridor State of Utah Listed Noxious Weeds and Weeds of Concern

Invasive Weedy Species	Habitat[1]	Method of Control[2]
Whitetop or "hoary cress" (*Cardaria draba*)	UPL, WM, R	H
Musk thistle (*Carduus nutans*)	UPL, WM, R	M, H
Diffuse knapweed (*Centaurea diffusa)*	UPL	H
Spotted knapweed (*Centaurea maculosa*)	UPL, R	H
Russian knapweed (*Centaurea repens)*	UPL, R	H
Yellow starthistle (*Centaurea solstitialis)*	UPL	H
Squarrose knapweed (*Centaurea virgata ssp. squarrosa)*	UPL	H
Canada thistle (*Cirsium arvense*)	UPL, WM, EM, R	M, H
Bull thistle (*Cirsium vulgare*)	UPL, WM, EM, R	M, H
Poison hemlock (*Conium maculatum*)	WM, EM, R	H
Field bindweed or "morning glory" (*Convolvulus arvensis*)	UPL, WM, R	H
Houndstongue (*Cyanoglossum officinale*)	UPL	H
Common teasel (*Dipsacus sylvestris*)	WM, EM, R	M, H
Leafy spurge (*Euphorbia esula*)	UPL, R	H
Myrtle spurge (*Euphorbia myrsinitis*)	UPL	H
Black henbane (*Hyoscyamus niger*)	UPL	H
Dyers woad (*Isatis tinctoria*)	UPL	H
Perennial pepperweed (*Lepidium latifolium*)	WM, EM, R	H
Dalmatian toadflax (*Linaria genistifolia ssp. dalmatica*)	UPL, R	H
Yellow toadflax (*Linaria vulgaris*)	UPL	H
Purple loosestrife (*Lythrum salicaria*)	WM, EM, R	H
Scotch thistle (*Onopordum acanthium*)	UPL, R	M, H
Common reed (*Phragmites australis*)	WM, EM, R	H
Goatshead or"puncturevine" (*Tribulus terrestris*)	UPL	H

1. UPL = Upland; WM = Wet Meadow; EM = Emergent Marsh; R = Riparian
2. H = Herbicide; M = Manual

Herbaceous Invasive Plant Species Control

In general, State of Utah listed noxious weeds and "weeds of concern" occurring within the Jordan River corridor will be treated with "wildlife-aquatic-safe" herbicide "spot treatment" on an "as needed" basis by a state-certified weed control expert to ensure that herbicides are applied according to the manufacturer's specifications, and at the smallest effective rates, to minimize wildlife and aquatic organism impacts. The South Jordan City Parks and Recreation open space supervisor should inspect all herbicides proposed for use by state certified weed control contractors prior to any weed control treatments to ensure that only approved "wildlife-aquatic-safe" herbicides, as specified in the Jordan River Corridor Master Plan are used. Product labels for approved "wildlife-aquatic-safe" herbicides are included in Appendix H. Additionally, herbicides will be applied only during the time periods specified in the Jordan River Corridor Master Plan "Annual Task Log" (Table 11) to minimize wildlife disturbance during nesting and rearing of young.

"Wildlife-aquatic-safe" herbicides approved for use within the Jordan River corridor include "*Rodeo"* or a generic equivalent such as *"Aqua Neat Aquatic Herbicide"* (Appendix H). If a surfactant is necessary, only "wildlife-aquatic-safe" surfactants should be used. Aggressive, persistent thistles such as Canada thistle, bull thistle, and scotch thistle may need to be "spot treated" with a *2, 4, D-amine low volatile* herbicide. Use of a *2, 4, D-amine low volatile* herbicide is limited to ***upland*** areas along the Jordan River Parkway Trail where wetland and waterway contamination is not possible. An "amine low volatile" derivative is necessary to minimize volatilization during warm weather spraying to prevent foliage damage and mortality of nearby desirable plant species.

Under no circumstances should herbicides be applied or sprayed within or near wetlands, drainages, oxbow channels, or the Jordan River and its tributary streams. Herbaceous invasive plant species control will be conducted on non-windy days to prevent herbicide "drift", desirable plant species foliage damage, and wildlife habitat degradation. A minimum 50-foot "no spray" zone will be enforced along the boundaries of all water-dependent wildlife habitats (i.e. Jordan River channel, wetlands, springs, and tributary waterways) to prevent water quality and aquatic organism impacts. The open space supervisor should identify any wetland, open water, and sensitive wildlife areas prior to herbicide application to ensure that state-certified weed control contractors avoid herbicide application within the 50-foot "no spray" zone.

Bull Thistle – A Highly Invasive and Persistent Weedy Species Colonizing Jordan River Corridor Dredged and Disturbed Soils Grows 6-Feet Tall

Bull Thistle Degrades Critical Riparian and Floodplain Wildlife Habitat and Jordan River Parkway Trail Visual Aesthetics

Dalmation Toadflax – a State of Utah Listed "High Priority Control" Noxious Weed

Invades Disturbed Uplands and Degrades Wildlife Habitat and Visual Aesthetics

Scotch Thistle and Musk Thistle – Listed as a State of Utah "High Priority Control" Noxious Weeds

Thistles are Highly Invasive and Persistent Weedy Species Colonizing Jordan River Corridor Disturbed Soils

Thistles Rapidly Degrade Critical Riparian and Floodplain Wildlife Habitat and Adversely Affect Visual Aesthetics

Wetland and Riparian Herbaceous Invasive Plant Species Control

Invasive plant species occurring within Jordan River floodplain emergent marsh, wet meadow, and riparian areas include State of Utah listed noxious weeds and "weeds of concern" (Table 15) and other undesirable plant species which can rapidly degrade wildlife habitat and visual aesthetics. Common undesirable invasive plant species which rapidly invade Jordan River corridor floodplain wetland and riparian areas include common reed, common teasel, Canada thistle, bull thistle, stinging nettle, poison hemlock, perennial pepperweed, purple loosestrife, curley dock, horseweed, and barnyard grass.

Wetland and riparian areas should be treated with extra care to prevent contamination of sensitive aquatic habitat. State of Utah listed noxious weeds and "weeds of concern" occurring within the Jordan River corridor will be treated with "wildlife-aquatic-safe" herbicide "spot treatment" on an "as needed" basis by a state-certified weed control expert to ensure that herbicides are applied according to the manufacturer's specifications, and at the smallest effective rates, to minimize wildlife and aquatic organism impacts. The South Jordan City Parks and Recreation open space supervisor should inspect all herbicides proposed for use by state certified weed control contractors prior to any weed control treatments to ensure that only approved "wildlife-aquatic-safe" herbicides, as specified in the Jordan River Corridor Master Plan, are being used. Product labels for approved "wildlife-aquatic-safe" herbicides are included in Appendix H. Additionally, the open space supervisor should direct the weed control contractor during application to ensure that sensitive wildlife habitat and waterways are not contaminated.

Purple Loosestrife – a State of Utah Listed "Very High Priority" Noxious Weed

Invades Emergent Marsh Wetlands and Degrades Critical Wildlife Habitat

"Wildlife-aquatic-safe" herbicides approved for use within the Jordan River corridor include "*Rodeo"* or a generic equivalent such as *"Aqua Neat Aquatic Herbicide"*. If a surfactant is necessary, only "wildlife-aquatic-safe" surfactants should be used. Herbicides containing *2, 4, D* are ***not*** approved for use in wetland and riparian areas or near waterways and, as such, should not be used near any water-dependent or sensitive wildlife habitat areas within the Jordan River corridor. Herbicides will be applied only during the time periods specified in the Jordan River Corridor Master Plan "Annual Task Log" (Table 11) to minimize wildlife disturbance during nesting and rearing of young.

"Wildlife-aquatic-safe" herbicides approved for aquatic habitat such as "*Rodeo"* or a generic equivalent such as *"Aqua Neat"* may be sprayed directly onto undesirable plant species invading wetland and riparian areas (i. e., *Phragmites australis*). However, care should be taken to prevent herbicide overspray onto surface water or into shallowly ponded vegetated fringe areas adjacent to weedy areas as even "safe" herbicides may affect sensitive aquatic organisms. Herbaceous invasive plant species control will be conducted on non-windy days to prevent herbicide "drift", desirable plant species foliage damage, and wildlife habitat degradation.

Invasive Tree and Woody Shrub Plant Species Control

The *South Jordan City Jordan River Corridor Vegetation Enhancement Plan* (K.A. Smith Consulting, Inc. 2009) recognizes Russian olive and salt cedar as an undesirable invasive species and provides for the use of "selective removal" of recolonizing saplings within the Jordan River corridor and its tributary stream environments to prevent degradation of native riparian plant communities and critical wildlife habitat. A "selective removal" program is desirable as it allows for the removal of individual plants and small patches of younger, more aggressive saplings rather than massive large-scale cutting of all plants regardless of their beneficial wildlife or stream bank stability values.

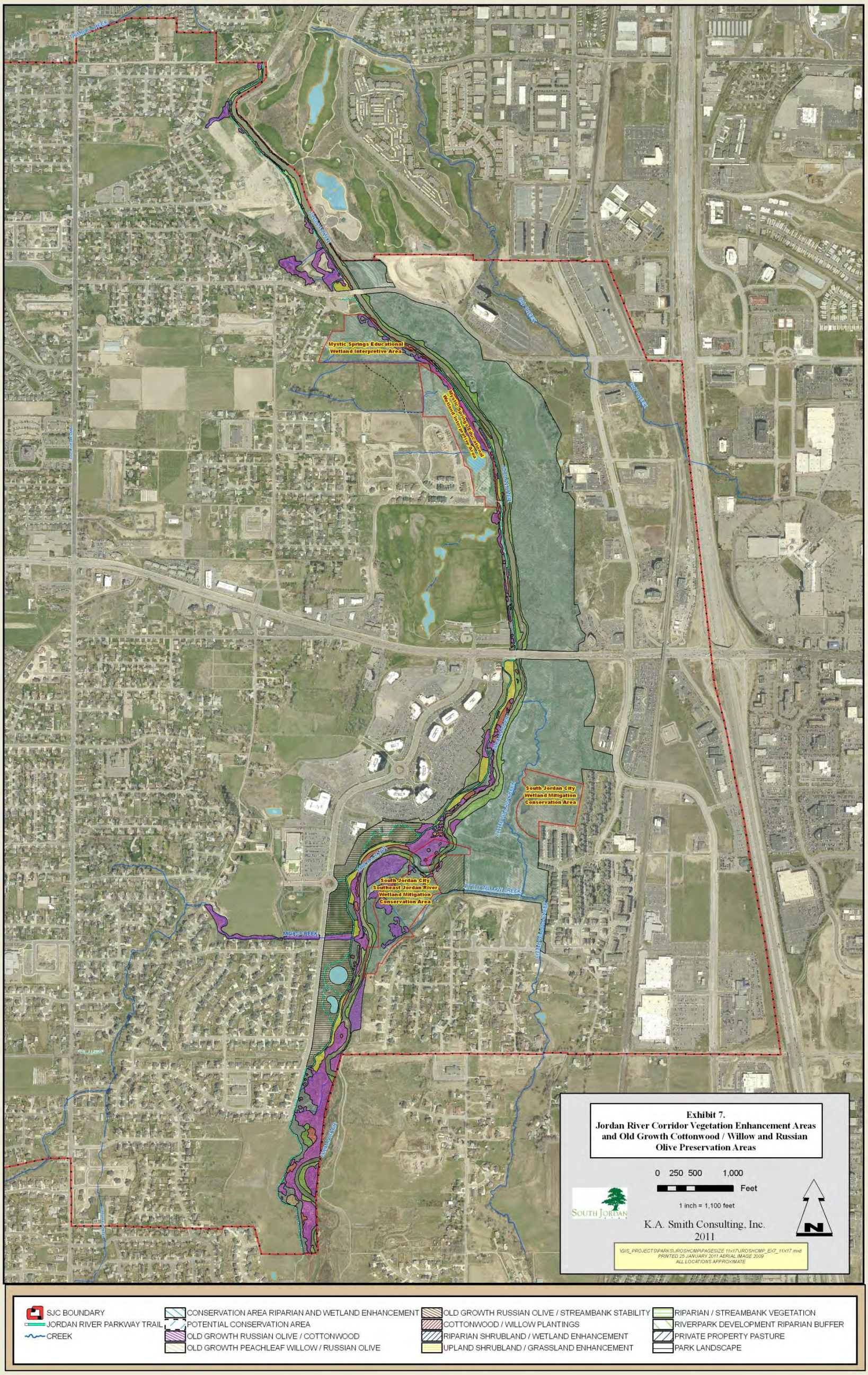
During 2009-2011, K.A. Smith Consulting, Inc. supervised the South Jordan City Parks and Recreation Department open space team in conducting an intensive "selective removal" program of Russian olive and salt cedar plants along four miles of the Jordan River within South Jordan City limits (K.A. Smith Consulting, Inc. 2009). The purpose of the "selective removal" project was to: 1) reduce invasive species competition on desirable native riparian species such as Fremont and narrowleaf cottonwood, willows, and other riparian shrubs, 2) improve desirable species plant community structure and diversity to increase wildlife species diversity, 3) preserve existing nesting and perching "hot spots", 4) preserve wildlife winter forage support, and 5) improve shading and visual aesthetics along the Jordan River Parkway Trail.

Prior to implementing the 2009-2011 Russian olive and salt cedar "selective" removal program, K.A. Smith Consulting Inc. conducted an intensive study of the existing east and west river corridor riparian habitat to identify important old growth Russian olive trees and groves providing critical nesting and rearing habitat and winter forage for resident wildlife and neo-tropical migratory bird species. Field investigations indicated many resident and neo-tropical migratory bird species are concentrating their nest sites in remaining old growth Russian olive trees located on deeply incised channel banks of the Jordan River and small groves within its 100-and 500-year floodplain zones.

Bullock's oriole nests, in particular, are abundant within single, old growth Russian olive trees located on steep channelized banks of the Jordan River and within the 100- and 500-year FEMA floodplain zones. Winter field observations indicate Russian olive seeds are also a primary food source for resident wildlife and neo-tropical migratory bird species. Older, more mature Russian olive trees also provide important mid-and upper canopy dead and dying branches which are used by resident and migratory herons, egrets, hawks, and eagles for crucial perching, resting, and hunting habitat. Old growth cottonwood, willow, and Russian olive preservation areas were mapped to ensure that mature crucial riparian habitat and nesting areas will be protected into perpetuity (Exhibit 7 and Appendix J).

Should it be necessary to "selectively" cut additional recolonizing young Russian olive or salt cedar saplings, the cut stumps should be lightly painted with "*Garlon*" or a generic equivalent such as "Tahoe 4E". The South Jordan City Parks and Recreation open space supervisor should inspect all herbicides proposed for use by state certified weed control contractors to ensure that the herbicides are being applied properly and in a "wildlife-aquatic-safe" manner. Product labels for stump treatment are included in Appendix H.

Russian Olive Preservation Areas Provide Critical Resident and Neo-Tropical Migratory Bird Species Habitat and Streambank Stability Along Deeply Incised Channel Banks Which No Longer Provide Cottonwood or Willow Recolonization Opportunities


Mystic Springs Educational Wetland Interpretive Area
South Jordan City Wetland Mitigation Conservation Area
South Jordan City Southeast Jordan River Wetland Mitigation Conservation Area
Exhibit 7.
Jordan River Corridor Vegetation Enhancement Areas and Old Growth Cottonwood / Willow and Russian Olive Preservation Areas
0 250 500 1,000
Feet
1 inch = 1,100 feet
K.A. Smith Consulting, Inc.
2011
SJC BOUNDARY
JORDAN RIVER PARKWAY TRAIL
CREEK
CONSERVATION AREA RIPARIAN AND WETLAND ENHANCEMENT
POTENTIAL CONSERVATION AREA
OLD GROWTH RUSSIAN OLIVE / COTTONWOOD
OLD GROWTH PEACHLEAF WILLOW / RUSSIAN OLIVE
OLD GROWTH RUSSIAN OLIVE / STREAMBANK STABILITY
COTTONWOOD / WILLOW PLANTINGS
RIPARIAN SHRUBLAND / WETLAND ENHANCEMENT
UPLAND SHRUBLAND / GRASSLAND ENHANCEMENT
RIPARIAN / STREAMBANK VEGETATION
RIVERPARK DEVELOPMENT RIPARIAN BUFFER
PRIVATE PROPERTY PASTURE
PARK LANDSCAPE

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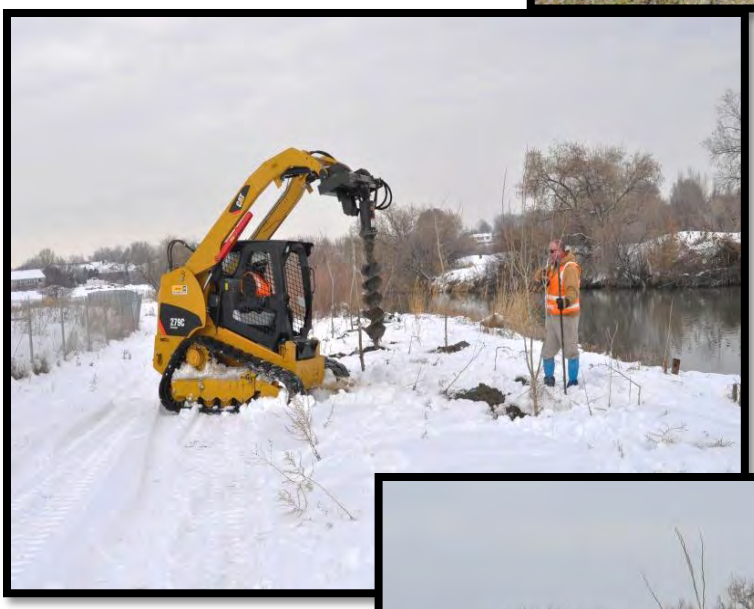
"Selective Removal" of Russian Olive and Salt Cedar to Create Cottonwood and Willow Planting Areas

Cut Stumps were Carefully Treated to Prevent Resprouting of These Highly Aggressive Invasive Species



Planting Cottonwood Poles Along the Jordan River to Enhance Wildlife Habitat, Visual Aesthetics, and Stream Side Shading

7. Cottonwood and Large Willow Beaver Protection Measures

During 2009-2011, K.A. Smith Consulting, Inc. supervised the South Jordan City Parks and Recreation Department open space team in installing cottonwood and willow poles in all areas where Russian olive and salt cedar plants were selectively removed to replace lost riparian habitat and improve plant community composition and structure. Cottonwood pole plantings, mature cottonwood trees, and large willow plants along the Jordan River (i.e., peachleaf willow and whiplash willows) will be monitored periodically, into perpetuity, to determine whether beaver herbivory and girdling is problematic. Cottonwood and willow areas planted during the 2009-2011 vegetation enhancement projects are shown in Exhibit 7 and Appendix J.

Beaver have a wildlife protection status of "a species of notable concern" due to loss of habitat and subsequent population decline. As such, beaver trapping is *not* encouraged within the Jordan River corridor. Beaver trapping is also *not* encouraged within the greater Jordan River corridor or its tributary stream environments as pets and other wildlife may be inadvertently trapped. Additionally, new beaver rapidly recolonize uninhabited territory where trapping has been implemented and in disturbed stream environments to improve streambank stability and wetland hydrology. Ponds created by beaver dams provide high quality open water and wetland habitat for resident and migratory birds and other wildlife species. Beaver dams and huts constructed within the Jordan River corridor should be preserved, where possible, to deter beaver from cutting new cottonwood and willow material to replace damaged or destroyed dams or shelters. Should beaver trapping be necessary, a State of Utah Division of Wildlife Resources permit must be secured prior to initiating a trapping program.

Narrowleaf Cottonwood Pole Planting

First Growing Season

An ongoing beaver "deterrent" program will be necessary to protect cottonwood trees and large willow plants within the Jordan River corridor into perpetuity.

Cost effective beaver protection measures consists of a metal cage installed around the base of cottonwood trees, large willow plants, or groupings of plants. In general, the cage is constructed of 3-4 foot high mid-weight wire gage fencing (not chicken wire) supported by two to three 4-foot rebar stakes. The rebar stakes are interwoven through the wire fencing and securely attached to the fencing with medium-gauge metal tie wire. Protection cages circumvent the entire basal portion of the tree bole and provide enough area for trunk expansion. Care should be taken to ensure that the wire fencing is not resting on the tree trunk and that it is secure enough that it will not bend and make contact with the trunk. Protective cages should be installed at least 12 inches away from the tree trunk as mature beaver are able to stand on their hind feet and girdle trunks if not adequately protected.

During 2010 Nearly 100 Old Growth Cottonwood Stumps Were Protected Along the Jordan River

Protected Stumps were Allowed to Grow into Mature Trees Providing Critical Wildlife Habitat, Shading, and Visual Aesthetics

8. Fertilizer and Soil Amendments

Fertilizer amendments are not necessary within any land use areas zoned "natural area-passive recreation" or "natural area-wildlife habitat". Under no circumstances should fertilizers be applied within 50-feet of wetlands, drainages, oxbow channels, or the Jordan River and its tributary streams. Fertilizer amendments in land use areas zoned "park-passive recreation" or "park-active recreation" should be applied only as needed and at the smallest effective rates to reduce phosphorus loading of wetlands and instream habitat.

The Jordan River corridor soils are mainly comprised of saline-alkali affected Chipman silty clay loam, Magna silty clay, and Taylorsville silty clay loam soil types and recently deposited mixed alluvium, sandy alluvial, and stony terrace escarpment soils (USDA 1974). These saline-alkali affected nutrient-poor silty clay soil types, combined with a compacted condition resulting from channelization activities and other disturbances, promotes undesirable invasive species establishment within disturbed areas of the Jordan River corridor. Native grasses and shrubs of Great Basin Intermontane semi-arid lands are somewhat tolerant of moderate saline/alkaline conditions and poor nutrient soils; however, they are often unable to compete with invasive species for limited soil moisture and nutrients. Early successional, persistent invasive thistles and annual grasses and forbs thrive with supplemental fertilizer and soil amendments. As such, soil amendments will not be applied to any land use areas zoned "natural area-wildlife habitat" or "natural area-passive recreation" to discourage native species competition with undesirable weedy species. Measures which can be implemented to improve soil organic matter, soil structure, and enhance soil microbial activity include ripping disturbed compacted soils, applying small amounts of wood chip mulch, and leaving plant debris on-site.

9. Pesticides

Pesticides are not permitted within land use areas zoned "natural area-passive recreation" or "natural area-wildlife habitat". Under no circumstances should pesticides be applied within or near wetlands, drainages, oxbow channels, or the Jordan River and its tributary streams. A minimum 150-foot "no pesticide application" zone will be enforced along the boundaries of these sensitive habitats and waterways. Limited, controlled use of pesticides within areas zoned "park-passive recreation" or "park-active recreation" may be implemented by a state-certified integrated pest management professional on an "as needed" basis if the City of South Jordan determines the use of pesticides is *essential* to control insects or pests. Pesticides will *not* be applied to any areas east of the Jordan River Parkway Trail.

10. Equestrian Trail

The Jordan River Parkway equestrian trail, within South Jordan City limits, was established according to site-specific conditions and development standard guidelines outlined in the Salt Lake County Jordan River Trail Master Plan (Salt Lake County 2008) (Exhibit 6 and Appendix J). The Salt Lake County standard design guidelines specify that "equestrian trails are intended to accommodate equestrians and their horse, but also serve as an alternative path for pedestrians and cyclists on wilderness terrain bikes". The Jordan River Parkway equestrian trail within South Jordan City limits has been designed to accommodate the County's standard guidelines where possible. Limitations arise where a very narrow area of riparian vegetation is present between the Jordan River west top of bank and the paved trail.

Healthy riparian vegetation along the Jordan River is important to provide streambank stability, shading and cooling for fish habitat, sediment retention, and critical wildlife and avian nesting habitat. Additionally, vegetation enhancement measures implemented during 2009-2011 specifically targeted expansion of native upland and riparian vegetation from the west river bank to the paved Jordan River Parkway Trail to reduce invasive weedy species, improve visual aesthetics, and improve riparian and upland habitat. In some areas, the paved Jordan River Parkway Trail is very close to the river. In these areas, maintaining a cleared equestrian trail away from the paved parkway trail will remove a majority of the upland and stream riparian vegetation established during the enhancement project and compromise streambank stability and wildlife habitat functional values.

Due to the narrow width limitations between the paved Jordan River Parkway Trail and the Jordan River, South Jordan City's equestrian trail will mainly exist immediately adjacent to the paved Jordan River Parkway Trail to reduce vegetation, aesthetic, and wildlife impacts. The trail will exist as a "use" maintained "single-track" immediately adjacent to the *east* side of the paved Jordan River Parkway Trail. A few designated areas for "use" maintained "single-track backcountry trail' spurs also exist (Exhibit 6 and Appendix J)." Single-track backcountry trail" spurs will be maintained naturally by equestrian and wildlife use. Natural vegetation along "use" maintained single-track backcountry trail spurs will not be cut, mowed, or removed by South Jordan City or Salt Lake County. Single-track backcountry trail spurs may need to be closed or relocated if non-designated foot paths are being developed which impact riparian streambank vegetation and wildlife habitat. Additionally, the development of a formal "single-track backcountry trail" away from the paved Jordan River Parkway Trail is not encouraged as trail spurs promote the use of riparian habitat as bathroom and loitering areas. Human fecal waste and trash contaminate water quality, spread disease, and degrade community and regional passive recreation experiences.

11. Off-Highway Vehicle Use

Motorized off-highway vehicle (OHV) use is prohibited within any areas of the Jordan River corridor. Motorized OHV use is consistent with South Jordan City policy and Great Salt Lake Audubon Society conservation policy resolutions. Posted signs restricting OHV use should be maintained with OHV restrictions enforced by Park Rangers or Parks and Recreation staff.

12. "Mutt Mitt" Stations

"Mutt Mitt" stations or other similar pet waste collection facilities will be maintained along the Jordan River Parkway Trail to reduce Jordan River water quality contamination and spread of disease in natural area and park open space areas. Mutt mitt station locations are shown in Exhibit 6 and Appendix J. Supportive material describing the use and importance of "mutt mitt" stations is included in Appendix I.

X. Jordan River Streambank Stability Long-Term Management Guidelines

Prior to human alteration of the Jordan River, the river naturally migrated throughout its entire valley floodplain. High spring flows were dissipated across its vast floodplain and new channels were created and abandoned. The Jordan River floodplain functioned as a stable, dynamic system providing floodwater attenuation, groundwater discharge and recharge, pollutant and sediment removal, and high quality wildlife habitat. A natural ebb and flow of the river created a stable stream environment with a floodplain where newly deposited sediment supported native cottonwood and willow seedling germination and establishment. Abandoned channels and floodplain wetlands with a naturally high water table provided high quality wildlife habitat and open water emergent marsh areas. The Jordan River streambanks were stable and minimal bank sloughing occurred as fluctuating flow velocities and volumes were naturally dissipated across its connected floodplain.

As residential, industrial, and commercial development encroached upon the Jordan River floodplain the river was channelized, dredged, and deepened to accommodate urban growth. Channelization disconnected the river from its functioning floodplain, side channels, and wetlands and increased stream volume and flow velocity within an artificial channel. Increased stream volume and flow velocities within a narrower, confined channel resulted in a highly erosive unnatural stream conveyance system which produced a deeply incised stream channel and unstable stream banks.

Stream Bank Sloughing Resulting From Channelization and Unnatural Fluctuations of Flow Volume and Velocity

Riparian Vegetation Damage and Loss of Critical Wildlife Habitat

Erratic, unnatural releases of Utah Lake water into the Jordan River also alters stream flow volume and velocity producing powerful erosive forces on stream banks. These erosive forces, combined with a lowering of the water table, create an abnormal incised channel condition with constant streambank sloughing and loss of important bank stabilizing riparian vegetation and wildlife habitat. Steep, incised channel banks saturated during high flow volumes commonly slough off in large blocks following a rapid reduction in stream flow. Loss of Jordan River riparian vegetation results in a degraded visual condition for human enjoyment and shade cooling factors important for instream fish and aquatic species habitat.

Ideally, to reduce streambank erosion and prevent possible future flooding of floodplain developments, the river channel should be restored to its near original channel geometry and reconnected to its floodplain, cutoff meander channels, side channels, and wetlands. Unfortunately, there are only a few areas within the Jordan River corridor where stream restoration of this magnitude is possible due to development encroachment within its historic floodplain. South Jordan City offers one of the few stretches of river corridor where portions of the river can be reconnected to its floodplain, cutoff meanders, and wetlands. Enforcement of the "Public Safety Federal Emergency Management Agency (FEMA) 100- and 500-year Floodplain Zone No-Build" ordinance", as discussed in Chapter IV. *Jordan River Corridor Land Use Zoning and Ordinances*, will reduce streambank instability and sloughing by preserving undeveloped floodplain properties which allow the river to naturally dissipate high stream flow volumes and velocities. Restricting development in the Jordan River floodplain is achievable; however, restoring the river channel and reconnecting the river to its floodplain is only possible in a few areas where large tracts of floodplain lands have been preserved in wildlife conservation easements or within privately owned undeveloped floodplain parcels.

A professional stream hydrologist/geomorphologist should be consulted to design instream channel improvements, gravel bar reconfiguration, riffle-pool features, and flow velocity dissipaters to slow erosive forces of unnatural water releases from Utah Lake and to enhance instream fish habitat. Measures which can feasibly be implemented to reduce streambank erosion include: 1) maintain consistent stream flow volume and velocity releases from Utah Lake to reduce destructive erosive forces on the channel banks and stream side vegetation, 2) reconnect the river to its floodplain and cut-off meander channels where possible to attenuate stream flow volume, 3) implement instream gravel bar reconstruction to direct the main channel energy away from eroding banks, 4) stabilize reconstructed streambanks with large root wads, and native willows and cottonwood plantings, 5) implement bioengineering practices to create stable buttressed streambanks with live willow stakes, 6) prevent the use of "hard" stabilization measures such as rock rip-rap, gabions, and cement channels which increase destructive downstream flow velocities, and 7) protect existing streambank vegetation by closing off non-designated equestrian and spur side trails.

XI. Jordan River Corridor Signage

Signs within the Jordan River corridor and along the Jordan River Parkway Trail will be limited to preserve the natural character and feel of a quality river experience (Exhibit 6). Signs will generally be "white writing on green background" or "green writing on white background" and designed to be the smallest possible size which will effectively direct user activities within areas zoned "natural area -passive recreation". Signs will also be posted on perimeter boundaries or fencing of areas zoned "natural area–wildlife habitat" to ensure that human and domestic animal use is prohibited within designated conservation areas and federally permitted wetland mitigation areas into perpetuity. Signs will generally conform to Salt lake County Jordan River Trail standard designs (Salt Lake County 2008).

Sample Yield Signage

XII. References

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XIII. Appendices

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APPENDIX A

South Jordan City
Resolution No. 2009-02

A Resolution of South Jordan City in Support of the Goals and Initiatives of "Blueprint Jordan River"

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SOUTH JORDAN CITY

Resolution No. 2009-02

A Resolution of South Jordan City in Support of the Goals and Initiatives of "Blueprint Jordan River."

WHEREAS, the Jordan River is an urban waterway bordering no less than 15 municipalities in Salt Lake County, with the potential to be a wonderful asset to the residents and visitors of Salt Lake County and all municipalities located therein;

WHEREAS, the Jordan River has been sadly neglected and abused over many years through pollution and loss of natural habitat;

WHEREAS, many communities in the United States have recognized the valuable recreational asset urban waterways present to their residents and visitors, and have implemented plans to maximize the benefits these waterways provide to their urban residents;

WHEREAS, Salt Lake County is an expanding urban area, in which open spaces for parks, trails and recreation are rapidly disappearing;

WHEREAS, residents of Salt Lake County have shown overwhelming support for preservation of open spaces, most recently through passage of a $48 million bond in the 2006 election;

WHEREAS, "Blueprint Jordan River: A Lake to Lake Vision," was facilitated by Envision Utah as a comprehensive three-county visioning process to restore a healthier and more attractive Jordan River corridor;

WHEREAS, Blueprint Jordan River has solicited and included research and information from experts in water quality, erosion, wildlife habitat, open space, urban design, economic development, and recreation;

WHEREAS, the vision of Blueprint Jordan River includes restoration of natural habitat along the Jordan River corrider to include open spaces and trails allowing residents and visitors the opportunity to appreciate and observe the wildlife and vegetation native to the area;

WHEREAS, the vision of Blueprint Jordan River also includes creation of boating and water activities for the enjoyment of residents and visitors;

WHEREAS, the vision of Blueprint Jordan River includes as well plans for integration of urban development in ways which are more compatible with the natural habitat of the Jordan River;

WHEREAS, realization of the goals and visions of Blueprint Jordan River will improve the quality of life for all Salt Lake County residents and visitors by restoring natural habitat and providing recreational opportunities for many years to come, all in a centralized and easily accessible area of Salt Lake County;

WHEREAS, much of the Jordan River corridor has already been developed with homes and businesses, and failure to act immediately to preserve remaining open spaces could lead to further development of thousands of additional acres which would encroach further on the Jordan River corridor and jeopardize the goals and visions of Blueprint Jordan River;

NOW THEREFORE, South Jordan City, hereby affirms its support of the goals and visions of Blueprint Jordan River, and encourages all elected officials in the municipalities of Salt Lake County to become active participants in the plans of Blueprint Jordan River by:

1. Permanently preserving as open space all land within the Jordan River corridor which is currently zoned as open space;

2. Enacting or modifying zoning ordinances to assure that any development within the Jordan River corridor is compatible with Blueprint recommendations;

3. Considering participation in cooperative efforts to fund open space acquisition, trail development, habitat restoration, etc., where practical;

4. Selecting representatives to serve as members of a commission or board to oversee continued progress toward realization of all goals and visions of Blueprint Jordan River.

This Resolution shall take effect upon adoption.

APPROVED AND ADOPTED this 6th day of January, 2009.

W. Kent Money, Mayor, South Jordan City

Attest:

City Recorder

City of South Jordan CORPORATE Seal State of Utah

SOUTH JORDAN CITY COUNCIL **Council Meeting Date:** January 6, 2009

Issue: A Resolution of South Jordan City in Support of the Goals and Initiatives of "Blueprint Jordan River."

Submitted By: Don Tingey Department: Parks & Recreation

BACKGROUND: At the December 16. 2008 City Council meeting, Gabe Epperson, representing Envision Utah, presented to the City Council the Blue Print Jordan River and requested that the City approve a resolution supporting the goals and initiatives within the Plan. The Blue Print Jordan River is essentially a public vision for the Jordan River corridor's future. Key community leaders worked for several years to organize and obtain the resources to initiate this process. South Jordan City was one of 15 municipalities that along with Salt Lake County, Utah County and Davis County, contributed political and financial support to the Plan. The development of the Plan included an extensive public process and the steering committee has worked closely with Envision Utah to guide and develop its final recommendations.

TEAM FINDINGS, CONCLUSIONS & RECOMMENDATIONS:

FINDINGS:
Staff has been involved with the Steering Committee during the entire process of the plan and agrees with its guiding principles. In addition, it is worthy to note that South Jordan City owns approximately 200 acres of property within the corridor and is already working toward accomplishing the many of the goals and initiatives set forth in the Blueprint Jordan River.

CONCLUSIONS:
Staff finds the Blueprint Jordan River to be in accordance with City goals and initiatives.

RECOMMENDATIONS:
Staff recommends that the City Council approve Resolution 2009-02 – A resolution of South Jordan City in support of the goals and initiatives of Blueprint Jordan River.

FISCAL IMPACT:
None

SUPPORT MATERIALS:
Resolution 2009-02

Department Head 12/23/08 Date

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APPENDIX B

Great Salt Lake Audubon
Conservation Policy Resolutions

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CONSERVATION POLICY RESOLUTIONS

GREAT SALT LAKE AUDUBON

Great Salt Lake Audubon (hereinafter sometimes referred to as GSLA) is one of four Utah chapters of National Audubon Society (NAS, founded 1886). GSLA was founded in 1912, and became an affiliated chapter of NAS in 1936. The Constitution of GSLA states that its purposes and objectives include educational and scientific support of the pursuits of NAS. GSLA is primarily concerned with those portions of Utah not covered by other chapters, but matters of national import which also significantly impact Utah are also of concern to GSLA.

These resolutions provide the basis for GSLA's conservation efforts concerning birds, other wildlife and their habitats through education and advocacy. These areas of concern are integral to accomplishing the mission of GSLA, which is

> " dedicated to protecting and enhancing habitat for wild birds, animals and plants, and to maintaining healthy and diverse environments for wildlife and people."

The Bylaws of GSLA provide that "[t]he duties of the Board of Directors are to determine GSLA's mission, set goals and objectives and to work towards their achievement." In working to achieve these goals and objectives the Board may adopt resolutions to guide the President and other members of the Board of Directors, as well as members of various Committees of GSLA and staff, who will from time to time testify or provide written or oral comments to legislative bodies, government agencies and governmental officials, or to media outlets such as newspaper, radio or television. As resolutions are adopted by the Board they shall be added to these Conservation Policy Resolutions.

TABLE OF CONTENTS

I. *CONSERVATION ACTIONS*

The Conservation Policy Resolutions of GSLA are positions advocated and actions to be taken by GSLA, ("**conservation actions**") including protection of bird habitats in wetlands, shorelines, grasslands, and forests, protection of riparian habitats including further cleanup of the Jordan River and its tributaries, adoption of smart growth principles, addressing the national importance of global warming and its impact on all life forms on our planet, including birds, other wildlife and their habitat, addressing the impacts of pesticide spraying on birds and their habitat, and increasing state and federal funds for clean water, wetland and land protection and wildlife programs.

Many of these conservation actions, and policies adopted under such conservation actions, are part of NAS's bird, forest, wetlands and wildlife conservation campaigns. Smart growth activities link many of these critical issues on a local community basis, as well as through state programs and incentives. All of these resolutions are the basis for GSLA's advocacy by its grassroots activists, its Board of Directors, committees and staff.

It is GSLA's hope that these conservation policy resolutions will help guide the policy makers of Utah at all levels as they consider measures affecting land use, conservation and our environment.

II. *CONSERVATION FUNDING*

Securing adequate and sustainable funding for environmental programs is an essential conservation policy for GSLA. GSLA supports dedicated funding streams and reasonable fees to support state conservation programs. Specifically, GSLA supports the creation of state, as well as local, environmental funds, to be funded through taxing power, or through state fees, to fund acquisition and protection of open space (i.e. natural areas), wetland and farmland protection, local recycling, state wildlife protection programs and other worthy environmental programs in the State of Utah.

III. *BIRDS AND WILDLIFE CONSERVATION*

Habitat loss is one of the leading threats to bird populations in Utah and across the nation. Much of the habitat loss today is occurring due to sprawl in suburban and rural areas and the related need for additional highways and transportation corridors to connect poorly planned growth. Consequently, the GSLA is committed to an approach that uses collaborative land use planning to promote sound land use and open space decisions. GSLA strongly supports state smart growth legislation and land use decisions which will

ultimately preserve natural areas, open space, farmland and other critical habitats; similarly, GSLA encourages funding for local comprehensive planning.

In regard to broader wildlife policy and programs, GSLA will continue to work with state and local agencies on issues related to habitat protection and restoration efforts for threatened and other species of conservation concern (e.g., state sensitive species). We work on broad ecosystem issues, such as the management of Great Salt Lake in relation to shorebirds, as well as forest and grassland bird habitats in Utah, and the critical impact of water quality and quantity in ecosystems. These efforts should be strengthened by coordination and collaboration, where appropriate, with the hunting and fishing community. GSLA will continue to promote legislative and budget proposals to address the conservation of birds and other wildlife.

POLICY RESOLUTION: INVASIVE SPECIES

WHEREAS, in arid Utah, essential habitat for wildlife is often found in streamside or riparian ecosystems, whose importance for wildlife cover, migration routes, water, and food is critical because such habitat makes up less than 1 percent of the southwestern landscape.

WHEREAS, these unique and important habitats are being invaded by non-native plants, such as salt cedar and Russian Olive, which are replacing native streamside vegetation and changing ecosystems and waterways. In large areas of west Texas, New Mexico, Arizona, Colorado, Utah, Nevada, and southern California, USGS scientists from the Midcontinent Ecological Science Center have determined that salt cedar is now the dominant riparian species. This change has resulted in loss of biodiversity, degradation of bird habitat, decreased channel conveyance, increased water loss, and loss of recreational opportunities; and

WHEREAS, non-native, invasive plant and animal species pose a serious threat to terrestrial and aquatic ecosystems in the state of Utah, and have been associated with numerous environmental problems such as degradation of water quality, changing the historic biological makeup of many public and private lands around the state, and resulted in a measurable loss of habitat for native plant and animal species; and

WHEREAS, once established, some invasive species have the ability to displace or replace native plant and animal species, disrupt nutrient and fire cycles, and cause changes in the pattern of plant succession; and

WHEREAS, invasive species represent the second leading cause of bio-diversity loss, are responsible for the majority of bird extinctions since 1800, and threaten species on the Audubon Watch List; and

WHEREAS, these invasive species require significant expenditures by the state and its municipalities to remedy such problems in the areas of agriculture, fisheries, transportation, parks and recreation; and

WHEREAS; Utah has been heavily impacted by invasive plants, due in part to Utah's long history of settlement, ranching and mining; and

WHEREAS, the Jordan River Parkway and its tributaries, as well as other major rivers and streams throughout Utah, are home to many bird and wildlife species that are threatened by the spread of invasive species.

THEREFORE, BE IT

RESOLVED, that GSLA recommends that state, regional or local governmental Task Forces be formed, and a technical science committee be created, to provide information and advice to such Task Forces; and be it further

RESOLVED, that GSLA encourage such a Task Force to identify best practices for management of invasive species, to address legislative and/or administrative initiates and to prepare a comprehensive report detailing threats, and identifying remedial action; and be it further

RESOLVED, that GSLA supports any Federal and State legislation that would address the spread of and damages caused by invasive species; and be it further

RESOLVED, that GSLA supports regional initiatives which address the local spread of invasive species and will provide technical assistance with these initiatives.

POLICY RESOLUTION: PESTICIDES

WHEREAS, in Utah, and across the United States , the use of lawn care pesticides and herbicides, primarily for aesthetic purposes, has proliferated at an alarming rate, with current research showing that three times more pesticides are applied per acre on household lawns and gardens that to agricultural crops; and

WHEREAS, pesticide use is directly linked to bird mortality, resulting in the deaths of a estimated seven million birds annually from lawn care pesticides, and other environmental and human health problems and concerns; and

WHEREAS, opportunities exist for pesticide reduction using new techniques such as Integrated Pest Management (IPM), which combines new technologies with traditional control methods, and which may not adversely impact agricultural output, and significant reductions in pesticide use can save farmers money and help protect the environment; and

WHEREAS, the aesthetic use of pesticides for golf course management, lawn care and landscaping which represents a large percentage of pesticides applied in Utah can be reduced by using the same innovations used in agriculture; and

WHEREAS, some of the chemicals being used to combat West Nile Virus have direct, toxic effects on birds and other wildlife, while others are highly toxic to non-target and beneficial insects, such as butterflies, bees and dragonflies, and to most aquatic life. Rampant spraying of pesticides greatly reduces the numbers of insects available as food to resident birds and the millions of migratory birds that stop in areas that have been sprayed. Run-off and aerial drift of sprayed pesticides contaminates ecosystems distant from the original site of pesticide application making dangers less predictable and controllable; and

WHEREAS, the National Audubon Society is promoting Audubon At Home, an education program on improving the health and value to wildlife of backyard habitats by significantly reducing pesticide use; and

WHEREAS, GSLA strongly supports "neighbor notification" law that allows counties to enact local laws requiring neighbors to be alerted to impending commercial pesticide applications; and

WHEREAS, waste tires are prime breeding areas for mosquitoes , and waste tire stockpiles have become an increasingly serious problem across Utah; and

WHEREAS, Cornell University's Community IPM program continues to provide important science on pesticides and how best to reduce them, and provides important public education information.

THEREFORE, BE IT

RESOLVED, that GSLA supports programs and legislative initiatives designed to significantly reduce the use of pesticides and to implement integrated pest management programs across Utah; and be it further

RESOLVED, that GSLA continues to advocate for counties to adopt local laws consistent with state law for neighbor notification of pesticide applications; and be it further

RESOLVED, that GSLA supports scientifically based approaches to pesticide spraying issues and alternatives, including considering the impact on non-target species as well as on public health concerns related to pesticide exposure; and be it further

RESOLVED, that GSLA advocates for the discontinuation of the use of pesticides in aerial and ground spraying techniques which cover large areas of land with the attendant risk to human beings and wildlife; and be it further

RESOLVED, that GSLA supports the exploration of alternative means of establishing disease vector control and response practices; and be it further

RESOLVED, that GSLA, in an effort to reduce the use of pesticides in vector control methods, and to reduce the populations of mosquitoes, advocates for alternative management approaches, including the reduction of waste tire stockpiles in Utah.

IV. *HABITAT CONSERVATION*

GSLA encompasses many bio-regions. These bio-regions connect bird conservation with science, advocacy and educational efforts to achieve conservation successes:

Great Salt Lake:

Jordan River:

Riparian Habitat

Wasatch Front and Range:

Wasatch , Oquirrh and Uinta Mountains:

West Desert:

Western Basin and Range:

POLICY RESOLUTION: GLOBAL CLIMATE CHANGE

WHEREAS, an array of evidence has been collected by scientists from around the world establishing that the planet's, including Utah's, climate is warming; this data, from diverse sources such as bore holes, melting permafrost, retreating glaciers and the thinning polar ice cap, and territorial shifts being made by plant and animal species, establish that the temperature of our planet has risen about 1 degree F. since the late 19th century, and

WHEREAS, measurements from gases trapped in ice fields have established that primarily CO_2 and, to a lesser extent, other greenhouse gases are now present in our atmosphere in amounts significantly exceeding the levels which have existed during the pre-industrial age, indeed for at least the past 420,000 years, and

WHEREAS, the vast majority of the scientific community is in agreement that the increase in greenhouse gases, and global warming, is due to the steadily increasing use of carbon fuels in the past two centuries, in such technological advances as automobiles, planes, and even more significantly, electricity generated by coal fired power plants, resulting in emission of carbon dioxide gas (CO_2), and

WHEREAS, increases in global temperature by 1.4 to 1.9 degrees centigrade threatens "serious or irreversible damage" to many of the Earth's human and natural systems, (United Nations Framework Convention on Climate Change, Article 3.3), including the migration of plants towards the poles and higher elevations, changes in weather patterns, increases in insect life and increases in tropical and heat related illnesses, and

WHEREAS, the United States, with approximately 4% of the world's population produces approximately 25% of the world's carbon dioxide, and

WHEREAS, to lessen the devastating affects upon life on our planet from global warming immediate steps are required to be taken.

THEREFORE, BE IT

RESOLVED, that GSLA supports legislation that encourages the use of renewable energy, such as solar, wind and geothermal, and be it further

RESOLVED, that GSLA supports implementing Renewable Portfolio Standards (RPS) currently implemented by seventeen states and D.C., which encourages a percentage of Utah's power to be derived from renewable sources (see *www.utahsmartenergy.org* , for an online petition), and be it further,

RESOLVED, that GSLA supports legislation that would improve fuel efficiency and tailpipe emission standards for cars and trucks, and be it further

RESOLVED, that GSLA urges its members to consider lifestyle changes, whether large or small, conserving their use of energy by choosing to use more efficient electrical or petroleum based machines (i.e. cars, electrical appliances, air conditioning, lights) and by using them less.

Sources: National Oceanic and Atmospheric Administration; 2006 Wallace Stegner Center Symposium, *Global Climate Change: The Artic to the Rocky Mountain West*

POLICY RESOLUTION: SMART GROWTH

WHEREAS, habitat loss and fragmentation are the greatest threat to bird populations, and

WHEREAS, the population of the State of Utah is increasing rapidly, Utah presently being the fifth fastest growing state in the United States, and farmland and open space in migratory flyways and areas of critical habitat for birds is under significant threat of reduction due to development, and

WHEREAS, low density, single-use urban expansion occurring in Utah tends to result in abandoned city cores and compounds fiscal, social and environmental stresses everywhere.

THEREFORE, BE IT

RESOLVED, that GSLA supports legislation that would encourage the use of existing infrastructure rather than foster sprawl to preserve agricultural land and other open space resources and enhance urban neighborhoods, traditional cities, villages, existing suburbs and small towns, decrease congestion by providing alternative modes of transportation, by providing various incentives for such smart growth, and be it further

RESOLVED, that GSLA supports the general principles underlying comprehensive approaches to smart growth legislation and urges the state and local governments to enact laws and ordinances to such effect; and be it further

RESOLVED, that GSLA supports the education and collaboration among all interests (i.e. environment, development, farm, legislators, local officials, housing, transportation, school district) to make smart growth work for the future quality of life for all Utahans.

POLICY RESOLUTION: PROTECTING UTAH'S WETLANDS

WHEREAS, regardless of size, wetlands provide essential habitat for many species of migratory waterfowl, for numerous threatened, endangered and species of special concern, such as the Bald Eagle, and for countless other amphibian, avian fish and wildlife species to rest, breed and feed; and

WHEREAS, each individual wetland community is highly intricate, often containing a diverse range of plant and animal species, including rare species; and

WHEREAS, the loss of these vital habitats has been linked to population declines of many amphibian species; and

WHEREAS, wetlands not only provide critical habitats for many plant and animal species, but also provide countless other environmental benefits from flood protection and storm water runoff control, to filtering pollutants, pesticides and sediments from the water; and

WHEREAS, currently the Utah Department of Environmental Quality (DEQ) has the authority to determine water quality, while the federal government (EPA and Army Corp.) has authority to regulate the discharge of fill into wetlands; and

WHEREAS, a 2001 Supreme Court ruling in *Solid Waste Agency of Northern Cook County v. United States Army Corps of Engineers* limited the federal government's authority to regulate "isolated" wetlands under the Clean Water Act. "Isolated wetlands" are wetlands that are not connected by surface water to navigable waters of the U.S.; and

WHEREAS, many wetlands in Utah therefore may no longer be afforded the same level of protection;

THEREFORE, BE IT

RESOLVED, that GSLA strongly urges the state legislature to make passage of legislation protecting isolated wetlands a priority; and be it further

RESOLVED, that GSLA supports any legislative or administrative measure that will increase state or federal ability to protect and enhance wetlands.

POLICY RESOLUTION: GREAT SALT LAKE

WHEREAS, the Great Salt Lake, located in Salt Lake, Tooele, Davis and Box Elder Counties, is a unique saltwater habitat, including areas of freshwater and many adjoining freshwater and saltwater wetlands, and forms a critical habitat for both year round and migratory birds; and

WHEREAS, Great Salt Lake is an important recreational resource used and visited by thousands of people each year for boating, hunting, birding and photography; and supports industries extracting brine shrimp and minerals such as salt and magnesium, and

WHEREAS, Great Salt Lake contributes to the preservation of biodiversity through its diverse habitats, very large size, and wide range of species, and

WHEREAS, Great Salt Lake is a critical habitat for birds in the western United States due to its diverse breeding communities and the enormous number of birds that use it as a migration corridor, and

WHEREAS, the values of this marvelous resource are enhanced by its close proximity to Salt Lake City and the urban areas of the Wasatch front, and

WHEREAS, Great Salt Lake forms the western boundary of one of the fastest growing regions in Utah, and its shoreline, and adjacent open spaces, wetlands and farmlands are subject to increasing pressure from population growth and related commercial and transportation development, and

WHEREAS, this encroaching development threatens the water quality and quantity of Great Salt Lake, the relatively undeveloped nature of its shoreline and the survival of its adjacent ecosystems.

THEREFORE, BE IT

RESOLVED, that GSLA aggressively supports the long term protection of the Great Salt Lake ecosystem. This shall include but not be limited to:

*Supporting acquisition and preservation of wetland and buffer areas surrounding Great Salt Lake by state conservation agencies, local land trusts and other conservation organizations such as The Nature Conservancy.

*Encouraging cities and county governments to promote preservation and protection of the Great Salt Lake ecosystem through zoning, planning and other regulatory activities and policies.

*Promoting public understanding of the functions and values of the Great Salt Lake ecosystem and its watershed.

*Promoting and advocating for the application of smart growth principles by the applicable government agencies.

POLICY RESOLUTION: JORDAN RIVER ECOSYSTEM

WHEREAS, the Jordan River, connecting Utah Lake with Great Salt Lake, and the recipient of waters from the Wasatch Mountains and the Oquirrh Mountains, as well as the entire Provo River watershed which flows into Utah Lake, and the Jordan River corridor, provides an open space corridor for wildlife as well as recreation for the urban areas through which it flows, and

WHEREAS, riparian habitats make up less than 1% of the Utah landscape, and

WHEREAS, riparian habitats provide food, water and cover in a compact area and thus are the single most important habitat for birds in Utah, and

WHEREAS, the Jordan River and its corridor should provide an invaluable riparian habitat or ecosystem for birds and other wildlife, and

WHEREAS, land which could be a part of the corridor that becomes developed is a lost opportunity to protect and improve the corridor that cannot practically be reversed, and

WHEREAS, the least costly, socially acceptable and most efficient method to improve and maintain the quality of water in the Jordan River is protection of buffer lands and wildlife habitat in and along the corridor, and

WHEREAS, effluent entering the Jordan River is always a threat to the water and wildlife inhabiting or using the corridor.

THEREFORE, BE IT

RESOLVED, that GSLA advocates and supports land acquisition and conservation easements in the Jordan River riparian corridor, using available state, federal and local sources, as well as non-governmental land trusts and conservation organizations; and be it further

vehicles will have a minimum impact on wildlife, thus preventing negative impacts on the habitat of birds and all other wildlife and further preserving the qualities of the wilderness experience for this and future generations, and be it further

RESOLVED, that GSLA supports diligent enforcement of laws restricting ATVs and ORVs use.

RESOLVED, that GSLA supports full environmental review of all actions which may impact the water quality of the Jordan River.

POLICY RESOLUTION: PROHIBIT the USE of ATVs and ORVs ON ENVIRONMENTALLY SENSITIVE LANDS

WHEREAS, the Wasatch National Forest and the Uinta National Forest, the Uinta Wilderness Area, Mt. Olympus Wilderness Area, Twin Peaks Wilderness Area and Lone Peak Wilderness Area, protect the wild, scenic and biologically diverse mountain landscapes (mountain landscapes) for future generations and so represent some of the environmental crown jewels of the Wasatch front and northern Utah; and

WHEREAS, unprotected natural areas, such as the BLM West Desert, and riparian areas along streams, provide other ecological jewels and bio-diversity of immeasurable value (these mountains and unprotected natural areas are collectively referred to as "natural areas"), and

WHEREAS, the use of 'all terrain vehicles' (ATVs) or 'off road vehicles' (ORVs) is a major threat to the character of these fragile natural areas and will have profound long term adverse impacts on these ecologically sensitive resources; and

WHEREAS, Utah's natural areas provide important habitats for endangered and threatened species, and are vulnerable to motorized vehicle traffic; and

WHEREAS, the use of motorized vehicles on environmentally sensitive lands, such as the BLM West Desert lands as well as many other natural areas across the state, has been increasing, which is adversely impacting, and leading to increased degradation of these sensitive areas; and

WHEREAS, the sales of ATVs in Utah continue to grow but most are not registered as required by law, and many riders fail to comply with state laws with respect to registration, safety and trespass.

THEREFORE, BE IT

RESOLVED, that GSLA's goal is to restrict ATVs and ORVs use to appropriate designated trails and areas, and only in such natural areas where it is determined that such vehicles will have a minimum impact on wildlife, thus preventing negative impacts on the habitat of birds and all other wildlife and further preserving the qualities of the wilderness experience for this and future generations, and be it further

RESOLVED, that GSLA supports diligent enforcement of laws restricting ATVs and ORVs use.

APPENDIX C

Migratory Bird Treaty Act of 1918

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Digest of Federal Resource Laws of Interest to the U.S. Fish and Wildlife Service

Migratory Bird Treaty Act of 1918

Migratory Bird Treaty Act of 1918 (16 U.S.C. 703-712; Ch. 128; July 13, 1918; 40 Stat. 755) as amended by: Chapter 634; June 20, 1936; 49 Stat. 1556; P.L. 86-732; September 8, 1960; 74 Stat. 866; P.L. 90-578; October 17, 1968; 82 Stat. 1118; P.L. 91-135; December 5, 1969; 83 Stat. 282; P.L. 93-300; June 1, 1974; 88 Stat. 190; P.L. 95-616; November 8, 1978; 92 Stat. 3111; P.L. 99-645; November 10, 1986; 100 Stat. 3590 and P.L. 105-312; October 30, 1998; 112 Stat. 2956

The original 1918 statute implemented the 1916 Convention between the U.S. and Great Britain (for Canada) for the protection of migratory birds. Later amendments implemented treaties between the U.S. and Mexico, the U.S. and Japan, and the U.S. and the Soviet Union (now Russia).

Specific provisions in the statute include:

- Establishment of a Federal prohibition, unless permitted by regulations, to "pursue, hunt, take, capture, kill, attempt to take, capture or kill, possess, offer for sale, sell, offer to purchase, purchase, deliver for shipment, ship, cause to be shipped, deliver for transportation, transport, cause to be transported, carry, or cause to be carried by any means whatever, receive for shipment, transportation or carriage, or export, at any time, or in any manner, any migratory bird, included in the terms of this Convention . . . for the protection of migratory birds . . . or any part, nest, or egg of any such bird." (16 U.S.C. 703)

This prohibition applies to birds included in the respective international conventions between the U.S. and Great Britain, the U.S. and Mexico, the U.S. and Japan, and the U.S. and the Russia.

- Authority for the Secretary of the Interior to determine, periodically, when, consistent with the Conventions, "hunting, taking, capture, killing, possession, sale, purchase, shipment, transportation, carriage, or export of any . . .bird, or any part, nest or egg" could be undertaken and to adopt regulations for this purpose. These determinations are to be made based on "due regard to the zones of temperature and to the distribution, abundance, economic value, breeding habits, and times of migratory flight." (16 U.S.C. 704)

- A decree that domestic interstate and international transportation of migratory birds which are taken in violation of this law is unlawful, as well as importation of any migratory birds which are taken in violation of Canadian laws. (16 U.S.C. 705)

- Authority for Interior officials to enforce the provisions of this law, including seizure of birds illegally taken which can be forfeited to the U.S. and disposed of as directed by the

courts. (16 U.S.C. 706)

- Establishment of fines for violation of this law, including misdemeanor charges. (16 U.S.C. 707)
- Authority for States to enact and implement laws or regulations to allow for greater protection of migratory birds, provided that such laws are consistent with the respective Conventions and that open seasons do not extend beyond those established at the national level. (16 U.S.C. 708)
- A repeal of all laws inconsistent with the provisions of this Act. (16 U.S.C. 710)
- Authority for the continued breeding and sale of migratory game birds on farms and preserves for the purpose of increasing the food supply. (16 U.S.C. 711)

The 1936 statute implemented the Convention between the U.S. and Mexico for the Protection of Migratory Birds and Game Mammals. Migratory bird import and export restrictions between Mexico and the U.S. were also authorized, and in issuing any regulations to implement this section, the Secretary of Agriculture was required to consider U.S. laws forbidding importation of certain mammals injurious to agricultural and horticultural interests. Monies for the Secretary of Agriculture to implement these provisions were also authorized.

The 1960 statute (P.L. 86-732) amended the MBTA by altering earlier penalty provisions. The new provisions stipulated that violations of this Act would constitute a misdemeanor and conviction would result in a fine of not more than $500 or imprisonment of not more than six months. Activities aimed at selling migratory birds in violation of this law would be subject to fine of not more than $2000 and imprisonment could not exceed two years. Guilty offenses would constitute a felony. Equipment used for sale purchases was authorized to be seized and held, by the Secretary of the Interior, pending prosecution, and, upon conviction, be treated as a penalty.

Section 10 of the 1969 amendments to the Lacey Act (P.L. 91-135) repealed the provisions of the MBTA prohibiting the shipment of wild game mammals or parts to and from the U.S. or Mexico unless permitted by the Secretary of the Interior. The definition of "wildlife" under these amendments does not include migratory birds, however, which are protected under the MBTA.

The 1974 statute (P.L. 93-300) amended the MBTA to include the provisions of the 1972 Convention between the U.S. and Japan for the Protection of Migratory Birds and Birds in Danger of Extinction. This law also amended the title of the MBTA to read: "An Act to give effect to the conventions between the U.S. and other nations for the protection of migratory birds, birds in danger of extinction, game mammals, and their environment."

Section 3(h) of the Fish and Wildlife Improvement Act of 1978 (P.L. 95-616) amended the MBTA to authorize forfeiture to the U.S. of birds and their parts illegally taken, for disposal by the Secretary of the Interior as he deems appropriate. These amendments also authorized the Secretary to issue regulations to permit Alaskan natives to take migratory birds for their subsistence needs during established seasons. The Secretary was required to consider the related migratory bird conventions with Great Britain, Mexico, Japan, and the Soviet Union in establishing these regulations and to establish seasons to provide for the preservation and maintenance of migratory bird stocks.

Public Law 95-616 also ratified a treaty with the Soviet Union specifying that both nations will take measures to protect identified ecosystems of special importance to migratory birds against pollution, detrimental alterations, and other environmental degradations. (See entry for the Convention Between the United States of America and the Union of Soviet Socialist Republics Concerning the Conservation of Migratory Birds and Their Environment; T.I.A.S. 9073; signed on November 19, 1976, and approved by the Senate on July 12, 1978; 92 Stat. 3110.)

Public Law 99-645, the 1986 Emergency Wetlands Resources Act, amended the Act to require that felony violations under the MBTA must be "knowingly" committed.

P.L. 105-312, Migratory Bird Treaty Reform Act of 1998, amended the law to make it unlawful to take migratory game birds by the aid of bait if the person knows or reasonably should know that the area is baited. This provision eliminates the "strict liability" standard that was used to enforce Federal baiting regulations and replaces it with a "know or should have known" standard. These amendments also make it unlawful to place or direct the placement of bait on or adjacent to an area for the purpose of taking or attempting to take migratory game birds, and makes these violations punishable under title 18 United States Code, (with fines up to $100,000 for individuals and $200,000 for organizations), imprisonment for not more than 1 year, or both. The new amendments require the Secretary of Interior to submit to the Senate Committee on Environment and Public Works and the House Committee on Resources a report analyzing the effect of these amendments and the practice of baiting on migratory bird conservation and law enforcement. The report to Congress is due no later than five years after enactment of the new law.

P.L. 105-312 also amends the law to allow the fine for misdemeanor convictions under the Migratory Bird Treaty Act to be up to $15,000 rather than $5000.

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APPENDIX D

Bald Eagle Protection Act

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Bald Eagle

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States and Counties with Bald Eagles

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Additional Conservation Measures

National Bald Eagle Management Guidelines

Bald & Golden Eagle Protection Act

Bald Eagle Management Guidelines and Conservation Measures

The Bald and Golden Eagle Protection Act

The Bald and Golden Eagle Protection Act (16 U.S.C. 668-668c), enacted in 1940, and amended several times since then, prohibits anyone, without a permit issued by the Secretary of the Interior, from "taking" bald eagles, including their parts, nests, or eggs. The Act provides criminal penalties for persons who "take, possess, sell, purchase, barter, offer to sell, purchase or barter, transport, export or import, at any time or any manner, any bald eagle ... [or any golden eagle], alive or dead, or any part, nest, or egg thereof." The Act defines "take" as "pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest or disturb."

For purposes of these guidelines, "disturb" means: "to agitate or bother a bald or golden eagle to a degree that causes, or is likely to cause, based on the best scientific information available, 1) injury to an eagle, 2) a decrease in its productivity, by substantially interfering with normal breeding, feeding, or sheltering behavior, or 3) nest abandonment, by substantially interfering with normal breeding, feeding, or sheltering behavior."

In addition to immediate impacts, this definition also covers impacts that result from human-induced alterations initiated around a previously used nest site during a time when eagles are not present, if, upon the eagle's return, such alterations agitate or bother an eagle to a degree that interferes with or interrupts normal breeding, feeding, or sheltering habits, and causes injury, death or nest abandonment.

A violation of the Act can result in a fine of $100,000 ($200,000 for organizations), imprisonment for one year, or both, for a first offense. Penalties increase substantially for additional offenses, and a second violation of this Act is a felony.

A copy of the Bald and Golden Eagle Protection Act is available at: http://permits.fws.gov/ltr/ltr.shtml.

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Last updated: May 27, 2008

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APPENDIX E

County Lists of Utah's Federally Listed Threatened, Endangered, and Candidate Species

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County Lists of Utah's Federally Listed Threatened(T), Endangered(E), and Candidate(C) Species

Disclaimer: This list was compiled using known species occurrences and species observations from the Utah Natural Heritage Program's Biodiversity Tracking and Conservation System (BIOTICS); other federally listed species likely occur in Utah Counties. This list includes both current and historic records. (Last updated on September 15, 2009).

Beaver County

Common Name	Scientific Name	Status
Utah Prairie-dog	*Cynomys parvidens*	T

Box Elder County

Common Name	Scientific Name	Status
Goose Creek Milkvetch	*Astragalus anserinus*	C
Fat-whorled Pondsnail	*Stagnicola bonnevillensis*	C
Lahontan Cutthroat Trout	*Oncorhynchus clarkii henshawii*	T
June Sucker	*Chasmistes liorus*	E
Yellow-billed Cuckoo	*Coccyzus americanus*	C
Gray Wolf	*Canis lupus*	E Extirpated

Cache County

Common Name	Scientific Name	Status
Maguire Primrose	*Primula maguirei*	T
Ute Ladies' Tresses	*Spiranthes diluvialis*	LT
Yellow-billed Cuckoo	*Coccyzus americanus*	C
Brown (Grizzly) Bear	*Ursus arctos*	T Extirpated
Canada Lynx	*Lynx canadensis*	T

Carbon County

Common Name	Scientific Name	Status
Uinta Basin Hookless Cactus	*Sclerocactus wetlandicus*	T
Clay Phacelia	*Phacelia argillacea*	E
Humpback Chub	*Gila cypha*	E
Bonytail	*Gila elegans*	E
Colorado Pikeminnow	*Ptychocheilus lucius*	E
Razorback Sucker	*Xyrauchen texanus*	E
Black-footed Ferret	*Mustela nigripes*	E Extirpated

Daggett County

Common Name	Scientific Name	Status
Ute Ladies'-tresses	*Spiranthes diluvialis*	T
Humpback Chub	*Gila cypha*	E
Colorado Pikeminnow	*Ptychocheilus lucius*	E
Razorback Sucker	*Xyrauchen texanus*	E
Black-footed Ferret	*Mustela nigripes*	E Extirpated
Brown (Grizzly) Bear	*Ursus arctos*	T Extirpated
Canada Lynx	*Lynx canadensis*	T

Created by the Utah Division of Wildlife Resources - September 15, 2009

Davis County

Common Name	Scientific Name	Status
Yellow-billed Cuckoo	*Coccyzus americanus*	C

Duchesne County

Common Name	Scientific Name	Status
Ute Ladies'-tresses	*Spiranthes diluvialis*	T
Shrubby Reed-mustard	*Glaucocarpum suffrutescens*	E
Barneby Ridge-cress	*Lepidium barnebyanum*	E
Pariette Cactus	*Sclerocactus brevispinus*	T
Uinta Basin Hookless Cactus	*Sclerocactus wetlandicus*	T
Yellow-billed Cuckoo	*Coccyzus americanus*	C
Black-footed Ferret	*Mustela nigripes*	E Experimental
Gray Wolf	*Canis lupus*	E Extirpated
Brown (Grizzly) Bear	*Ursus arctos*	T Extirpated

Emery County

Common Name	Scientific Name	Status
Jones Cycladenia	*Cycladenia humilis var jonesii*	T
Maguire Daisy	*Erigeron maguirei*	T
Last Chance Townsendia	*Townsendia aprica*	T
Barneby Reed-mustard	*Schoenocrambe barnebyi*	E
San Rafael Cactus	*Pediocactus despainii*	E
Winkler Pincushion Cactus	*Pediocactus winkleri*	T
Wright Fishhook Cactus	*Sclerocactus wrightiae*	E
Humpback Chub	*Gila cypha*	E
Bonytail	*Gila elegans*	E
Colorado Pikeminnow	*Ptychocheilus lucius*	E
Razorback Sucker	*Xyrauchen texanus*	E
Yellow-billed Cuckoo	*Coccyzus americanus*	C
Mexican Spotted Owl	*Strix occidentalis lucida*	T
Black-footed Ferret	*Mustela nigripes*	E Extirpated
Canada Lynx	*Lynx canadensis*	T

Garfield County

Common Name	Scientific Name	Status
Maguire Daisy	*Erigeron maguirei*	T
Ute Ladies'-tresses	*Spiranthes diluvialis*	T
Jones Cycladenia	*Cycladenia humilis var jonesii*	T
Autumn Buttercup	*Ranunculus aestivalis*	E
Humpback Chub	*Gila cypha*	E
Bonytail	*Gila elegans*	E
Colorado Pikeminnow	*Ptychocheilus lucius*	E
Razorback Sucker	*Xyrauchen texanus*	E
Yellow-billed Cuckoo	*Coccyzus americanus*	C
Mexican Spotted Owl	*Strix occidentalis lucida*	T
Utah Prairie-dog	*Cynomys parvidens*	T
Brown (Grizzly) Bear	*Ursus arctos*	T Extirpated

Created by the Utah Division of Wildlife Resources - September 15, 2009

Grand County

Common Name	Scientific Name	Status
Jones Cycladenia	*Cycladenia humilis var jonesii*	T
Humpback Chub	*Gila cypha*	E
Bonytail	*Gila elegans*	E
Colorado Pikeminnow	*Ptychocheilus lucius*	E
Razorback Sucker	*Xyrauchen texanus*	E
Mexican Spotted Owl	*Strix occidentalis lucida*	T
Yellow-billed Cuckoo	*Coccyzus americanus*	C
Black-footed Ferret	*Mustela nigripes*	E Extirpated

Iron County

Common Name	Scientific Name	Status
Yellow-billed Cuckoo	*Coccyzus americanus*	C
Mexican Spotted Owl	*Strix occidentalis lucida*	T
Utah Prairie-dog	*Cynomys parvidens*	T
Brown (Grizzly) Bear	*Ursus arctos*	T Extirpated

Juab County

Common Name	Scientific Name	Status
Yellow-billed Cuckoo	*Coccyzus americanus*	C

Kane County

Common Name	Scientific Name	Status
Welsh's Milkweed	*Asclepias welshii*	T
Kodachrome Bladderpod	*Lesquerella tumulosa*	E
Siler Pincushion Cactus	*Pediocactus sileri*	T
Jones Cycladenia	*Cycladenia humilis var jonesii*	T
Kanab Ambersnail	*Oxyloma kanabense*	E
Coral Pink Sand Dunes Tiger Beetle	*Cicindela limbata albissima*	C
Humpback Chub	*Gila cypha*	E
Bonytail	*Gila elegans*	E
Yellow-billed Cuckoo	*Coccyzus americanus*	C
Mexican Spotted Owl	*Strix occidentalis lucida*	T
Southwestern Willow Flycatcher	*Empidonax traillii extimus*	E
Utah Prairie-dog	*Cynomys parvidens*	T

Millard County

Common Name	Scientific Name	Status
Utah Prairie-dog	*Cynomys parvidens*	T

Morgan County

Common Name	Scientific Name	Status
Yellow-billed Cuckoo	*Coccyzus americanus*	C

Created by the Utah Division of Wildlife Resources - September 15, 2009

Piute County

Common Name	Scientific Name	Status
Utah Prairie-dog	*Cynomys parvidens*	T
Brown (Grizzly) Bear	*Ursus arctos*	T Extirpated

Rich County

Common Name	Scientific Name	Status
Yellow-billed Cuckoo	*Coccyzus americanus*	C
Black-footed Ferret	*Mustela nigripes*	E Extirpated

Salt Lake County

Common Name	Scientific Name	Status
Ute Ladies'-tresses	*Spiranthes diluvialis*	T
June Sucker	*Chasmistes liorus*	E
Yellow-billed Cuckoo	*Coccyzus americanus*	C

San Juan County

Common Name	Scientific Name	Status
Navajo Sedge	*Carex specuicola*	T
Humpback Chub	*Gila cypha*	E
Bonytail	*Gila elegans*	E
Colorado Pikeminnow	*Ptychocheilus lucius*	E
Razorback Sucker	*Xyrauchen texanus*	E
Yellow-billed Cuckoo	*Coccyzus americanus*	C
Mexican Spotted Owl	*Strix occidentalis lucida*	T
Southwestern Willow Flycatcher	*Empidonax traillii extimus*	E
Black-footed Ferret	*Mustela nigripes*	E Extirpated
Gray Wolf	*Canis lupus*	E Extirpated

Sanpete County

Common Name	Scientific Name	Status
Heliotrope Milkvetch	*Astragalus montii*	T
Utah Prairie-dog	*Cynomys parvidens*	T
Brown (Grizzly) Bear	*Ursus arctos*	T Extirpated
Canada Lynx	*Lynx canadensis*	T

Sevier County

Common Name	Scientific Name	Status
Last Chance Townsendia	*Townsendia aprica*	T
Wright Fishhook Cactus	*Sclerocactus wrightiae*	E
Heliotrope Milkvetch	*Astragalus montii*	T
Utah Prairie-dog	*Cynomys parvidens*	T
Brown (Grizzly) Bear	*Ursus arctos*	T Extirpated
Canada Lynx	*Lynx canadensis*	T

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Summit County

Common Name	Scientific Name	Status
Brown (Grizzly) Bear	*Ursus arctos*	T Extirpated
Canada Lynx	*Lynx canadensis*	T

Tooele County

Common Name	Scientific Name	Status
Ute Ladies'-tresses	*Spiranthes diluvialis*	T
Bonytail	*Gila elegans*	E
Yellow-billed Cuckoo	*Coccyzus americanus*	C

Uintah County

Common Name	Scientific Name	Status
Ute Ladies'-tresses	*Spiranthes diluvialis*	T
Shrubby Reed-mustard	*Glaucocarpum suffrutescens*	E
Clay Reed-mustard	*Schoenocrambe argillacea*	T
Pariette Cactus	*Sclerocactus brevispinus*	T
Uinta Basin Hookless Cactus	*Sclerocactus wetlandicus*	T
White River Beardtongue	*Penstemon scariosus var albifluvis*	C
Humpback Chub	*Gila cypha*	E
Bonytail	*Gila elegans*	E
Colorado Pikeminnow	*Ptychocheilus lucius*	E
Razorback Sucker	*Xyrauchen texanus*	E
Yellow-billed Cuckoo	*Coccyzus americanus*	C
Black-footed Ferret	*Mustela nigripes*	E Experimental
Brown (Grizzly) Bear	*Ursus arctos*	T Extirpated
Canada Lynx	*Lynx canadensis*	T

Utah County

Common Name	Scientific Name	Status
Ute Ladies'-tresses	*Spiranthes diluvialis*	T
Deseret Milkvetch	*Astragalus desereticus*	T
Clay Phacelia	*Phacelia argillacea*	E
Utah Valvata Snail	*Valvata utahensis*	E Extirpated
June Sucker	*Chasmistes liorus*	E
Yellow-billed Cuckoo	*Coccyzus americanus*	C
Brown (Grizzly) Bear	*Ursus arctos*	T Extirpated

Wasatch County

Common Name	Scientific Name	Status
Ute Ladies'-tresses	*Spiranthes diluvialis*	T
Clay Phacelia	*Phacelia argillacea*	E
Yellow-billed Cuckoo	*Coccyzus americanus*	C
Brown (Grizzly) Bear	*Ursus arctos*	T Extirpated
Canada Lynx	*Lynx canadensis*	T

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Washington County

Common Name	Scientific Name	Status
Siler Pincushion Cactus	*Pediocactus sileri*	T
Shivwits or Shem Milkvetch	*Astragalus ampullarioides*	E
Holmgren Milkvetch	*Astragalus holmgreniorum*	E
Gierisch Mallow	*Sphaeralcea gierischii*	C
Dwarf Bearclaw-poppy	*Arctomecon humilis*	E
Virgin Chub	*Gila seminuda*	E
Woundfin	*Plagopterus argentissimus*	E
Relict Leopard Frog	*Rana onca*	C Extirpated
Desert Tortoise	*Gopherus agassizii*	T
Yellow-billed Cuckoo	*Coccyzus americanus*	C
Mexican Spotted Owl	*Strix occidentalis lucida*	T
Southwestern Willow Flycatcher	*Empidonax traillii extimus*	E
Gray Wolf	*Canis lupus*	E Extirpated
Brown (Grizzly) Bear	*Ursus arctos*	T Extirpated

Wayne County

Common Name	Scientific Name	Status
Ute Ladies'-tresses	*Spiranthes diluvialis*	T
Maguire Daisy	*Erigeron maguirei*	T
Barneby Reed-mustard	*Schoenocrambe barnebyi*	E
Winkler Pincushion Cactus	*Pediocactus winkleri*	T
Wright Fishhook Cactus	*Sclerocactus wrightiae*	E
Last Chance Townsendia	*Townsendia aprica*	T
San Rafael Cactus	*Pediocactus despainii*	E
Humpback Chub	*Gila cypha*	E
Razorback Sucker	*Xyrauchen texanus*	E
Bonytail	*Gila elegans*	E
Colorado Pikeminnow	*Ptychocheilus lucius*	E
Mexican Spotted Owl	*Strix occidentalis lucida*	T
Yellow-billed Cuckoo	*Coccyzus americanus*	C
Utah Prairie-dog	*Cynomys parvidens*	T

Weber County

Common Name	Scientific Name	Status
Ute Ladies'-tresses	*Spiranthes diluvialis*	T
June Sucker	*Chasmistes liorus*	E
Yellow-billed Cuckoo	*Coccyzus americanus*	C
Gray Wolf	*Canis lupus*	E Extirpated

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DEFINITIONS

E

A taxon that is listed by the U.S. Fish and Wildlife Service as "endangered" with the probability of worldwide extinction.

E Experimental

An "endangered" taxon that is considered by the U.S. Fish and Wildlife Service to be "experimental and non-essential" in its designated use areas in Utah.

E, T, or C Extirpated

An "endangered," "threatened," or "candidate" taxon that is "extirpated" and considered by the U.S. Fish and Wildlife Service to no longer occur in Utah.

E or T Proposed

A taxon "proposed" to be listed as "endangered" or "threatened" by the U.S. Fish and Wildlife Service.

T

A taxon that is listed by the U.S. Fish and Wildlife Service as "threatened" with becoming endangered.

C

A taxon for which the U.S. Fish and Wildlife Service has on file sufficient information on biological vulnerability and threats to justify it being a "candidate" for listing as endangered or threatened.

Note: Please contact the U.S. Fish and Wildlife Service (801-975-3330) for the purpose of consultation under the Endangered Species Act.

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APPENDIX F

Utah's State Listed Wildlife Species by County

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Utah's State Listed Species by County

Disclaimer: This list was compiled using known species occurrences and species observations from the Utah Natural Heritage Program's Biodiversity Tracking and Conservation System (BIOTICS); other species of special concern likely occur in Utah Counties. This list includes both current and historic records. (Last updated on September 15, 2009).

Beaver County

Common Name	Scientific Name	State Status
AMERICAN WHITE PELICAN	PELECANUS ERYTHRORHYNCHOS	SPC
BALD EAGLE	HALIAEETUS LEUCOCEPHALUS	SPC
BIG FREE-TAILED BAT	NYCTINOMOPS MACROTIS	SPC
BONNEVILLE CUTTHROAT TROUT	ONCORHYNCHUS CLARKII UTAH	CS
BURROWING OWL	ATHENE CUNICULARIA	SPC
DARK KANGAROO MOUSE	MICRODIPODOPS MEGACEPHALUS	SPC
FERRUGINOUS HAWK	BUTEO REGALIS	SPC
FRINGED MYOTIS	MYOTIS THYSANODES	SPC
GREATER SAGE-GROUSE	CENTROCERCUS UROPHASIANUS	SPC
HAMLIN VALLEY PYRG	PYRGULOPSIS HAMLINENSIS	SPC
KIT FOX	VULPES MACROTIS	SPC
LEAST CHUB	IOTICHTHYS PHLEGETHONTIS	CS
LONG-BILLED CURLEW	NUMENIUS AMERICANUS	SPC
NORTHERN GOSHAWK	ACCIPITER GENTILIS	CS
PYGMY RABBIT	BRACHYLAGUS IDAHOENSIS	SPC
SHORT-EARED OWL	ASIO FLAMMEUS	SPC
SOUTHERN LEATHERSIDE CHUB	LEPIDOMEDA ALICIAE	SPC
SPOTTED BAT	EUDERMA MACULATUM	SPC
THREE-TOED WOODPECKER	PICOIDES TRIDACTYLUS	SPC
TOWNSEND'S BIG-EARED BAT	CORYNORHINUS TOWNSENDII	SPC
UTAH PRAIRIE-DOG	CYNOMYS PARVIDENS	S-ESA
WESTERN TOAD	BUFO BOREAS	SPC

Box Elder County

Common Name	Scientific Name	State Status
AMERICAN WHITE PELICAN	PELECANUS ERYTHRORHYNCHOS	SPC
BALD EAGLE	HALIAEETUS LEUCOCEPHALUS	SPC
BLUEHEAD SUCKER	CATOSTOMUS DISCOBOLUS	CS
BOBOLINK	DOLICHONYX ORYZIVORUS	SPC
BONNEVILLE CUTTHROAT TROUT	ONCORHYNCHUS CLARKII UTAH	CS
BURROWING OWL	ATHENE CUNICULARIA	SPC
CALIFORNIA FLOATER	ANODONTA CALIFORNIENSIS	SPC
DESERET MOUNTAINSNAIL	OREOHELIX PERIPHERICA	SPC
FAT-WHORLED PONDSNAIL	STAGNICOLA BONNEVILLENSIS	S-ESA
FERRUGINOUS HAWK	BUTEO REGALIS	SPC
GRASSHOPPER SPARROW	AMMODRAMUS SAVANNARUM	SPC
GRAY WOLF	CANIS LUPUS	S-ESA
GREAT PLAINS TOAD	BUFO COGNATUS	SPC
GREATER SAGE-GROUSE	CENTROCERCUS UROPHASIANUS	SPC
JUNE SUCKER	CHASMISTES LIORUS	S-ESA

Box Elder County (con't)

Common Name	Scientific Name	State Status
KIT FOX	VULPES MACROTIS	SPC
LAHONTAN CUTTHROAT TROUT	ONCORHYNCHUS CLARKII HENSHAWI	S-ESA
LEAST CHUB	IOTICHTHYS PHLEGETHONTIS	CS
LEWIS'S WOODPECKER	MELANERPES LEWIS	SPC
LONG-BILLED CURLEW	NUMENIUS AMERICANUS	SPC
LYRATE MOUNTAINSNAIL	OREOHELIX HAYDENI	SPC
MOUNTAIN PLOVER	CHARADRIUS MONTANUS	SPC
NORTHERN GOSHAWK	ACCIPITER GENTILIS	CS
NORTHWEST BONNEVILLE PYRG	PYRGULOPSIS VARIEGATA	SPC
PREBLE'S SHREW	SOREX PREBLEI	SPC
PYGMY RABBIT	BRACHYLAGUS IDAHOENSIS	SPC
SHARP-TAILED GROUSE	TYMPANUCHUS PHASIANELLUS	SPC
SHORT-EARED OWL	ASIO FLAMMEUS	SPC
TOWNSEND'S BIG-EARED BAT	CORYNORHINUS TOWNSENDII	SPC
UTAH PHYSA	PHYSELLA UTAHENSIS	SPC
WESTERN PEARLSHELL	MARGARITIFERA FALCATA	SPC
WESTERN TOAD	BUFO BOREAS	SPC
YELLOW-BILLED CUCKOO	COCCYZUS AMERICANUS	S-ESA
YELLOWSTONE CUTTHROAT TROUT	ONCORHYNCHUS CLARKII BOUVIERI	SPC

Cache County

Common Name	Scientific Name	State Status
AMERICAN WHITE PELICAN	PELECANUS ERYTHRORHYNCHOS	SPC
BALD EAGLE	HALIAEETUS LEUCOCEPHALUS	SPC
BLACK SWIFT	CYPSELOIDES NIGER	SPC
BLUEHEAD SUCKER	CATOSTOMUS DISCOBOLUS	CS
BOBOLINK	DOLICHONYX ORYZIVORUS	SPC
BONNEVILLE CUTTHROAT TROUT	ONCORHYNCHUS CLARKII UTAH	CS
BROWN (GRIZZLY) BEAR	URSUS ARCTOS	S-ESA
BURROWING OWL	ATHENE CUNICULARIA	SPC
CALIFORNIA FLOATER	ANODONTA CALIFORNIENSIS	SPC
CANADA LYNX	LYNX CANADENSIS	S-ESA
DESERET MOUNTAINSNAIL	OREOHELIX PERIPHERICA	SPC
FERRUGINOUS HAWK	BUTEO REGALIS	SPC
FRINGED MYOTIS	MYOTIS THYSANODES	SPC
GRASSHOPPER SPARROW	AMMODRAMUS SAVANNARUM	SPC
GREAT PLAINS TOAD	BUFO COGNATUS	SPC
GREATER SAGE-GROUSE	CENTROCERCUS UROPHASIANUS	SPC
LEWIS'S WOODPECKER	MELANERPES LEWIS	SPC
LONG-BILLED CURLEW	NUMENIUS AMERICANUS	SPC
LYRATE MOUNTAINSNAIL	OREOHELIX HAYDENI	SPC
NORTHERN GOSHAWK	ACCIPITER GENTILIS	CS
PYGMY RABBIT	BRACHYLAGUS IDAHOENSIS	SPC
SHARP-TAILED GROUSE	TYMPANUCHUS PHASIANELLUS	SPC
SHORT-EARED OWL	ASIO FLAMMEUS	SPC
THREE-TOED WOODPECKER	PICOIDES TRIDACTYLUS	SPC
TOWNSEND'S BIG-EARED BAT	CORYNORHINUS TOWNSENDII	SPC
WESTERN RED BAT	LASIURUS BLOSSEVILLII	SPC

Cache County (con't)

Common Name	Scientific Name	State Status
WESTERN TOAD	BUFO BOREAS	SPC
YELLOW-BILLED CUCKOO	COCCYZUS AMERICANUS	S-ESA

Carbon County

Common Name	Scientific Name	State Status
BALD EAGLE	HALIAEETUS LEUCOCEPHALUS	SPC
BLACK-FOOTED FERRET	MUSTELA NIGRIPES	S-ESA
BLUEHEAD SUCKER	CATOSTOMUS DISCOBOLUS	CS
BONYTAIL	GILA ELEGANS	S-ESA
BURROWING OWL	ATHENE CUNICULARIA	SPC
COLORADO PIKEMINNOW	PTYCHOCHEILUS LUCIUS	S-ESA
COLORADO RIVER CUTTHROAT TROUT	ONCORHYNCHUS CLARKII PLEURITICUS	CS
FERRUGINOUS HAWK	BUTEO REGALIS	SPC
FLANNELMOUTH SUCKER	CATOSTOMUS LATIPINNIS	CS
GREATER SAGE-GROUSE	CENTROCERCUS UROPHASIANUS	SPC
HUMPBACK CHUB	GILA CYPHA	S-ESA
KIT FOX	VULPES MACROTIS	SPC
LONG-BILLED CURLEW	NUMENIUS AMERICANUS	SPC
NORTHERN GOSHAWK	ACCIPITER GENTILIS	CS
RAZORBACK SUCKER	XYRAUCHEN TEXANUS	S-ESA
ROUNDTAIL CHUB	GILA ROBUSTA	CS
TOWNSEND'S BIG-EARED BAT	CORYNORHINUS TOWNSENDII	SPC
WESTERN RED BAT	LASIURUS BLOSSEVILLII	SPC
WESTERN TOAD	BUFO BOREAS	SPC
WHITE-TAILED PRAIRIE-DOG	CYNOMYS LEUCURUS	SPC

Daggett County

Common Name	Scientific Name	State Status
BALD EAGLE	HALIAEETUS LEUCOCEPHALUS	SPC
BEAR LAKE SCULPIN	COTTUS EXTENSUS	SPC
BLACK-FOOTED FERRET	MUSTELA NIGRIPES	S-ESA
BLUEHEAD SUCKER	CATOSTOMUS DISCOBOLUS	CS
BROWN (GRIZZLY) BEAR	URSUS ARCTOS	S-ESA
CANADA LYNX	LYNX CANADENSIS	S-ESA
COLORADO PIKEMINNOW	PTYCHOCHEILUS LUCIUS	S-ESA
COLORADO RIVER CUTTHROAT TROUT	ONCORHYNCHUS CLARKII PLEURITICUS	CS
FLANNELMOUTH SUCKER	CATOSTOMUS LATIPINNIS	CS
FRINGED MYOTIS	MYOTIS THYSANODES	SPC
GREATER SAGE-GROUSE	CENTROCERCUS UROPHASIANUS	SPC
HUMPBACK CHUB	GILA CYPHA	S-ESA
LEWIS'S WOODPECKER	MELANERPES LEWIS	SPC
NORTHERN GOSHAWK	ACCIPITER GENTILIS	CS
RAZORBACK SUCKER	XYRAUCHEN TEXANUS	S-ESA
ROUNDTAIL CHUB	GILA ROBUSTA	CS
SHORT-EARED OWL	ASIO FLAMMEUS	SPC
THREE-TOED WOODPECKER	PICOIDES TRIDACTYLUS	SPC
TOWNSEND'S BIG-EARED BAT	CORYNORHINUS TOWNSENDII	SPC

Daggett County (con't)

Common Name	Scientific Name	State Status
WESTERN TOAD	BUFO BOREAS	SPC
WHITE-TAILED PRAIRIE-DOG	CYNOMYS LEUCURUS	SPC

Davis County

Common Name	Scientific Name	State Status
AMERICAN WHITE PELICAN	PELECANUS ERYTHRORHYNCHOS	SPC
BALD EAGLE	HALIAEETUS LEUCOCEPHALUS	SPC
BLUEHEAD SUCKER	CATOSTOMUS DISCOBOLUS	CS
BOBOLINK	DOLICHONYX ORYZIVORUS	SPC
BONNEVILLE CUTTHROAT TROUT	ONCORHYNCHUS CLARKII UTAH	CS
BURROWING OWL	ATHENE CUNICULARIA	SPC
COLUMBIA SPOTTED FROG	RANA LUTEIVENTRIS	CS
FERRUGINOUS HAWK	BUTEO REGALIS	SPC
GRASSHOPPER SPARROW	AMMODRAMUS SAVANNARUM	SPC
KIT FOX	VULPES MACROTIS	SPC
LEAST CHUB	IOTICHTHYS PHLEGETHONTIS	CS
LEWIS'S WOODPECKER	MELANERPES LEWIS	SPC
LONG-BILLED CURLEW	NUMENIUS AMERICANUS	SPC
SHORT-EARED OWL	ASIO FLAMMEUS	SPC
TOWNSEND'S BIG-EARED BAT	CORYNORHINUS TOWNSENDII	SPC
WESTERN PEARLSHELL	MARGARITIFERA FALCATA	SPC
WESTERN TOAD	BUFO BOREAS	SPC
YELLOW-BILLED CUCKOO	COCCYZUS AMERICANUS	S-ESA

Duchesne County

Common Name	Scientific Name	State Status
BALD EAGLE	HALIAEETUS LEUCOCEPHALUS	SPC
BLACK SWIFT	CYPSELOIDES NIGER	SPC
BLACK-FOOTED FERRET	MUSTELA NIGRIPES	S-ESA
BLUEHEAD SUCKER	CATOSTOMUS DISCOBOLUS	CS
BONNEVILLE CUTTHROAT TROUT	ONCORHYNCHUS CLARKII UTAH	CS
BROWN (GRIZZLY) BEAR	URSUS ARCTOS	S-ESA
BURROWING OWL	ATHENE CUNICULARIA	SPC
COLORADO RIVER CUTTHROAT TROUT	ONCORHYNCHUS CLARKII PLEURITICUS	CS
EUREKA MOUNTAINSNAIL	OREOHELIX EUREKENSIS	SPC
FERRUGINOUS HAWK	BUTEO REGALIS	SPC
FLANNELMOUTH SUCKER	CATOSTOMUS LATIPINNIS	CS
FRINGED MYOTIS	MYOTIS THYSANODES	SPC
GRAY WOLF	CANIS LUPUS	S-ESA
GREATER SAGE-GROUSE	CENTROCERCUS UROPHASIANUS	SPC
KIT FOX	VULPES MACROTIS	SPC
LEWIS'S WOODPECKER	MELANERPES LEWIS	SPC
LONG-BILLED CURLEW	NUMENIUS AMERICANUS	SPC
MOUNTAIN PLOVER	CHARADRUS MONTANUS	SPC
NORTHERN GOSHAWK	ACCIPITER GENTILIS	CS
ROUNDTAIL CHUB	GILA ROBUSTA	CS
SHORT-EARED OWL	ASIO FLAMMEUS	SPC
SMOOTH GREENSNAKE	OPHEODRYS VERNALIS	SPC

Duchesne County (con't)

Common Name	Scientific Name	State Status
SPOTTED BAT	EUDERMA MACULATUM	SPC
THREE-TOED WOODPECKER	PICOIDES TRIDACTYLUS	SPC
TOWNSEND'S BIG-EARED BAT	CORYNORHINUS TOWNSENDII	SPC
WESTERN TOAD	BUFO BOREAS	SPC
WHITE-TAILED PRAIRIE-DOG	CYNOMYS LEUCURUS	SPC
YELLOW-BILLED CUCKOO	COCCYZUS AMERICANUS	S-ESA

Emery County

Common Name	Scientific Name	State Status
BALD EAGLE	HALIAEETUS LEUCOCEPHALUS	SPC
BLACK-FOOTED FERRET	MUSTELA NIGRIPES	S-ESA
BLUEHEAD SUCKER	CATOSTOMUS DISCOBOLUS	CS
BONYTAIL	GILA ELEGANS	S-ESA
BURROWING OWL	ATHENE CUNICULARIA	SPC
CANADA LYNX	LYNX CANADENSIS	S-ESA
COLORADO PIKEMINNOW	PTYCHOCHEILUS LUCIUS	S-ESA
COLORADO RIVER CUTTHROAT TROUT	ONCORHYNCHUS CLARKII PLEURITICUS	CS
FERRUGINOUS HAWK	BUTEO REGALIS	SPC
FLANNELMOUTH SUCKER	CATOSTOMUS LATIPINNIS	CS
GREAT PLAINS TOAD	BUFO COGNATUS	SPC
GREATER SAGE-GROUSE	CENTROCERCUS UROPHASIANUS	SPC
HUMPBACK CHUB	GILA CYPHA	S-ESA
KIT FOX	VULPES MACROTIS	SPC
NORTHERN GOSHAWK	ACCIPITER GENTILIS	CS
RAZORBACK SUCKER	XYRAUCHEN TEXANUS	S-ESA
ROUNDTAIL CHUB	GILA ROBUSTA	CS
SPOTTED OWL	STRIX OCCIDENTALIS	S-ESA
THREE-TOED WOODPECKER	PICOIDES TRIDACTYLUS	SPC
TOWNSEND'S BIG-EARED BAT	CORYNORHINUS TOWNSENDII	SPC
WESTERN TOAD	BUFO BOREAS	SPC
WHITE-TAILED PRAIRIE-DOG	CYNOMYS LEUCURUS	SPC
YELLOW-BILLED CUCKOO	COCCYZUS AMERICANUS	S-ESA

Garfield County

Common Name	Scientific Name	State Status
ALLEN'S BIG-EARED BAT	IDIONYCTERIS PHYLLOTIS	SPC
AMERICAN WHITE PELICAN	PELECANUS ERYTHRORHYNCHOS	SPC
ARIZONA TOAD	BUFO MICROSCAPHUS	SPC
BALD EAGLE	HALIAEETUS LEUCOCEPHALUS	SPC
BLACK CANYON PYRG	PYRGULOPSIS PLICATA	SPC
BLUEHEAD SUCKER	CATOSTOMUS DISCOBOLUS	CS
BONNEVILLE CUTTHROAT TROUT	ONCORHYNCHUS CLARKII UTAH	CS
BONYTAIL	GILA ELEGANS	S-ESA
BROWN (GRIZZLY) BEAR	URSUS ARCTOS	S-ESA
BURROWING OWL	ATHENE CUNICULARIA	SPC
COLORADO PIKEMINNOW	PTYCHOCHEILUS LUCIUS	S-ESA
COLORADO RIVER CUTTHROAT TROUT	ONCORHYNCHUS CLARKII PLEURITICUS	CS

Garfield County (con't)

Common Name	Scientific Name	State Status
COMMON CHUCKWALLA	SAUROMALUS ATER	SPC
DESERT NIGHT LIZARD	XANTUSIA VIGILIS	SPC
FERRUGINOUS HAWK	BUTEO REGALIS	SPC
FLANNELMOUTH SUCKER	CATOSTOMUS LATIPINNIS	CS
FRINGED MYOTIS	MYOTIS THYSANODES	SPC
GREATER SAGE-GROUSE	CENTROCERCUS UROPHASIANUS	SPC
HUMPBACK CHUB	GILA CYPHA	S-ESA
KIT FOX	VULPES MACROTIS	SPC
LEWIS'S WOODPECKER	MELANERPES LEWIS	SPC
LONG-BILLED CURLEW	NUMENIUS AMERICANUS	SPC
NORTHERN GOSHAWK	ACCIPITER GENTILIS	CS
PYGMY RABBIT	BRACHYLAGUS IDAHOENSIS	SPC
RAZORBACK SUCKER	XYRAUCHEN TEXANUS	S-ESA
ROUNDTAIL CHUB	GILA ROBUSTA	CS
SHORT-EARED OWL	ASIO FLAMMEUS	SPC
SOUTHERN LEATHERSIDE CHUB	LEPIDOMEDA ALICIAE	SPC
SPOTTED BAT	EUDERMA MACULATUM	SPC
SPOTTED OWL	STRIX OCCIDENTALIS	S-ESA
THREE-TOED WOODPECKER	PICOIDES TRIDACTYLUS	SPC
TOWNSEND'S BIG-EARED BAT	CORYNORHINUS TOWNSENDII	SPC
UTAH PHYSA	PHYSELLA UTAHENSIS	SPC
UTAH PRAIRIE-DOG	CYNOMYS PARVIDENS	S-ESA
WESTERN TOAD	BUFO BOREAS	SPC
YELLOW-BILLED CUCKOO	COCCYZUS AMERICANUS	S-ESA

Grand County

Common Name	Scientific Name	State Status
ALLEN'S BIG-EARED BAT	IDIONYCTERIS PHYLLOTIS	SPC
AMERICAN WHITE PELICAN	PELECANUS ERYTHRORHYNCHOS	SPC
BALD EAGLE	HALIAEETUS LEUCOCEPHALUS	SPC
BIG FREE-TAILED BAT	NYCTINOMOPS MACROTIS	SPC
BLACK-FOOTED FERRET	MUSTELA NIGRIPES	S-ESA
BLUEHEAD SUCKER	CATOSTOMUS DISCOBOLUS	CS
BONYTAIL	GILA ELEGANS	S-ESA
BURROWING OWL	ATHENE CUNICULARIA	SPC
COLORADO PIKEMINNOW	PTYCHOCHEILUS LUCIUS	S-ESA
CORNSNAKE	ELAPHE GUTTATA	SPC
EUREKA MOUNTAINSNAIL	OREOHELIX EUREKENSIS	SPC
FERRUGINOUS HAWK	BUTEO REGALIS	SPC
FLANNELMOUTH SUCKER	CATOSTOMUS LATIPINNIS	CS
FRINGED MYOTIS	MYOTIS THYSANODES	SPC
GREAT PLAINS TOAD	BUFO COGNATUS	SPC
GREATER SAGE-GROUSE	CENTROCERCUS UROPHASIANUS	SPC
GUNNISON SAGE-GROUSE	CENTROCERCUS MINIMUS	CS
GUNNISON'S PRAIRIE-DOG	CYNOMYS GUNNISONI	SPC
HUMPBACK CHUB	GILA CYPHA	S-ESA
KIT FOX	VULPES MACROTIS	SPC

Grand County (con't)

Common Name	Scientific Name	State Status
LEWIS'S WOODPECKER	MELANERPES LEWIS	SPC
MOUNTAIN PLOVER	CHARADRIUS MONTANUS	SPC
NORTHERN GOSHAWK	ACCIPITER GENTILIS	CS
RAZORBACK SUCKER	XYRAUCHEN TEXANUS	S-ESA
ROUNDTAIL CHUB	GILA ROBUSTA	CS
SMOOTH GREENSNAKE	OPHEODRYS VERNALIS	SPC
SPOTTED BAT	EUDERMA MACULATUM	SPC
SPOTTED OWL	STRIX OCCIDENTALIS	S-ESA
THREE-TOED WOODPECKER	PICOIDES TRIDACTYLUS	SPC
TOWNSEND'S BIG-EARED BAT	CORYNORHINUS TOWNSENDII	SPC
WHITE-TAILED PRAIRIE-DOG	CYNOMYS LEUCURUS	SPC
YELLOW-BILLED CUCKOO	COCCYZUS AMERICANUS	S-ESA

Iron County

Common Name	Scientific Name	State Status
ARIZONA TOAD	BUFO MICROSCAPHUS	SPC
BALD EAGLE	HALIAEETUS LEUCOCEPHALUS	SPC
BLACK SWIFT	CYPSELOIDES NIGER	SPC
BONNEVILLE CUTTHROAT TROUT	ONCORHYNCHUS CLARKII UTAH	CS
BRIAN HEAD MOUNTAINSNAIL	OREOHELIX PARAWANENSIS	SPC
BROWN (GRIZZLY) BEAR	URSUS ARCTOS	S-ESA
BURROWING OWL	ATHENE CUNICULARIA	SPC
COMMON CHUCKWALLA	SAUROMALUS ATER	SPC
DARK KANGAROO MOUSE	MICRODIPODOPS MEGACEPHALUS	SPC
FERRUGINOUS HAWK	BUTEO REGALIS	SPC
FRINGED MYOTIS	MYOTIS THYSANODES	SPC
GREATER SAGE-GROUSE	CENTROCERCUS UROPHASIANUS	SPC
KIT FOX	VULPES MACROTIS	SPC
LEAST CHUB	IOTICHTHYS PHLEGETHONTIS	CS
LEWIS'S WOODPECKER	MELANERPES LEWIS	SPC
LONG-BILLED CURLEW	NUMENIUS AMERICANUS	SPC
NORTHERN GOSHAWK	ACCIPITER GENTILIS	CS
PYGMY RABBIT	BRACHYLAGUS IDAHOENSIS	SPC
SHORT-EARED OWL	ASIO FLAMMEUS	SPC
SOUTHERN LEATHERSIDE CHUB	LEPIDOMEDA ALICIAE	SPC
SPOTTED BAT	EUDERMA MACULATUM	SPC
SPOTTED OWL	STRIX OCCIDENTALIS	S-ESA
THREE-TOED WOODPECKER	PICOIDES TRIDACTYLUS	SPC
TOWNSEND'S BIG-EARED BAT	CORYNORHINUS TOWNSENDII	SPC
UTAH PRAIRIE-DOG	CYNOMYS PARVIDENS	S-ESA
YELLOW-BILLED CUCKOO	COCCYZUS AMERICANUS	S-ESA

Juab County

Common Name	Scientific Name	State Status
AMERICAN WHITE PELICAN	PELECANUS ERYTHRORHYNCHOS	SPC
BALD EAGLE	HALIAEETUS LEUCOCEPHALUS	SPC
BOBOLINK	DOLICHONYX ORYZIVORUS	SPC
BONNEVILLE CUTTHROAT TROUT	ONCORHYNCHUS CLARKII UTAH	CS

Juab County (con't)

Common Name	Scientific Name	State Status
BURROWING OWL	ATHENE CUNICULARIA	SPC
CALIFORNIA FLOATER	ANODONTA CALIFORNIENSIS	SPC
COLUMBIA SPOTTED FROG	RANA LUTEIVENTRIS	CS
DARK KANGAROO MOUSE	MICRODIPODOPS MEGACEPHALUS	SPC
EUREKA MOUNTAINSNAIL	OREOHELIX EUREKENSIS	SPC
FERRUGINOUS HAWK	BUTEO REGALIS	SPC
FRINGED MYOTIS	MYOTIS THYSANODES	SPC
GRASSHOPPER SPARROW	AMMODRAMUS SAVANNARUM	SPC
GREATER SAGE-GROUSE	CENTROCERCUS UROPHASIANUS	SPC
KIT FOX	VULPES MACROTIS	SPC
LEAST CHUB	IOTICHTHYS PHLEGETHONTIS	CS
LEWIS'S WOODPECKER	MELANERPES LEWIS	SPC
LONG-BILLED CURLEW	NUMENIUS AMERICANUS	SPC
NORTHERN GOSHAWK	ACCIPITER GENTILIS	CS
PYGMY RABBIT	BRACHYLAGUS IDAHOENSIS	SPC
SHORT-EARED OWL	ASIO FLAMMEUS	SPC
SOUTHERN LEATHERSIDE CHUB	LEPIDOMEDA ALICIAE	SPC
THREE-TOED WOODPECKER	PICOIDES TRIDACTYLUS	SPC
TOWNSEND'S BIG-EARED BAT	CORYNORHINUS TOWNSENDII	SPC
UTAH PHYSA	PHYSELLA UTAHENSIS	SPC
WESTERN TOAD	BUFO BOREAS	SPC
YELLOW-BILLED CUCKOO	COCCYZUS AMERICANUS	S-ESA

Kane County

Common Name	Scientific Name	State Status
ALLEN'S BIG-EARED BAT	IDIONYCTERIS PHYLLOTIS	SPC
AMERICAN WHITE PELICAN	PELECANUS ERYTHRORHYNCHOS	SPC
ARIZONA TOAD	BUFO MICROSCAPHUS	SPC
BALD EAGLE	HALIAEETUS LEUCOCEPHALUS	SPC
BIG FREE-TAILED BAT	NYCTINOMOPS MACROTIS	SPC
BLUEHEAD SUCKER	CATOSTOMUS DISCOBOLUS	CS
BONNEVILLE CUTTHROAT TROUT	ONCORHYNCHUS CLARKII UTAH	CS
BONYTAIL	GILA ELEGANS	S-ESA
BURROWING OWL	ATHENE CUNICULARIA	SPC
COMMON CHUCKWALLA	SAUROMALUS ATER	SPC
DESERT NIGHT LIZARD	XANTUSIA VIGILIS	SPC
DESERT SUCKER	CATOSTOMUS CLARKII	SPC
FERRUGINOUS HAWK	BUTEO REGALIS	SPC
FLANNELMOUTH SUCKER	CATOSTOMUS LATIPINNIS	CS
FRINGED MYOTIS	MYOTIS THYSANODES	SPC
GREAT PLAINS TOAD	BUFO COGNATUS	SPC
GREATER SAGE-GROUSE	CENTROCERCUS UROPHASIANUS	SPC
HUMPBACK CHUB	GILA CYPHA	S-ESA
KANAB AMBERSNAIL	OXYLOMA KANABENSE	S-ESA
KIT FOX	VULPES MACROTIS	SPC
LEWIS'S WOODPECKER	MELANERPES LEWIS	SPC
NORTHERN GOSHAWK	ACCIPITER GENTILIS	CS
ROUNDTAIL CHUB	GILA ROBUSTA	CS

Kane County (con't)

Common Name	Scientific Name	State Status
SOUTHERN LEATHERSIDE CHUB	LEPIDOMEDA ALICIAE	SPC
SOUTHWESTERN WILLOW FLYCATCHER	EMPIDONAX TRAILLII EXTIMUS	S-ESA
SPOTTED BAT	EUDERMA MACULATUM	SPC
SPOTTED OWL	STRIX OCCIDENTALIS	S-ESA
THREE-TOED WOODPECKER	PICOIDES TRIDACTYLUS	SPC
TOWNSEND'S BIG-EARED BAT	CORYNORHINUS TOWNSENDII	SPC
UTAH PRAIRIE-DOG	CYNOMYS PARVIDENS	S-ESA
VIRGIN SPINEDACE	LEPIDOMEDA MOLLISPINIS	CS
WESTERN TOAD	BUFO BOREAS	SPC
YELLOW-BILLED CUCKOO	COCCYZUS AMERICANUS	S-ESA

Millard County

Common Name	Scientific Name	State Status
AMERICAN WHITE PELICAN	PELECANUS ERYTHRORHYNCHOS	SPC
BALD EAGLE	HALIAEETUS LEUCOCEPHALUS	SPC
BIFID DUCT PYRG	PYRGULOPSIS PECULIARIS	SPC
BIG FREE-TAILED BAT	NYCTINOMOPS MACROTIS	SPC
BONNEVILLE CUTTHROAT TROUT	ONCORHYNCHUS CLARKII UTAH	CS
BURROWING OWL	ATHENE CUNICULARIA	SPC
CALIFORNIA FLOATER	ANODONTA CALIFORNIENSIS	SPC
CLOAKED PHYSA	PHYSA MEGALOCHLAMYS	SPC
COLUMBIA SPOTTED FROG	RANA LUTEIVENTRIS	CS
DARK KANGAROO MOUSE	MICRODIPODOPS MEGACEPHALUS	SPC
FERRUGINOUS HAWK	BUTEO REGALIS	SPC
FRINGED MYOTIS	MYOTIS THYSANODES	SPC
GREATER SAGE-GROUSE	CENTROCERCUS UROPHASIANUS	SPC
KIT FOX	VULPES MACROTIS	SPC
LEAST CHUB	IOTICHTHYS PHLEGETHONTIS	CS
LEWIS'S WOODPECKER	MELANERPES LEWIS	SPC
LONG-BILLED CURLEW	NUMENIUS AMERICANUS	SPC
LONGITUDINAL GLAND PYRG	PYRGULOPSIS ANGUINA	SPC
NORTHERN GOSHAWK	ACCIPITER GENTILIS	CS
PYGMY RABBIT	BRACHYLAGUS IDAHOENSIS	SPC
SHORT-EARED OWL	ASIO FLAMMEUS	SPC
SOUTHERN LEATHERSIDE CHUB	LEPIDOMEDA ALICIAE	SPC
SUB-GLOBOSE SNAKE PYRG	PYRGULOPSIS SAXATILIS	SPC
TOWNSEND'S BIG-EARED BAT	CORYNORHINUS TOWNSENDII	SPC
UTAH PRAIRIE-DOG	CYNOMYS PARVIDENS	S-ESA
WESTERN TOAD	BUFO BOREAS	SPC

Morgan County

Common Name	Scientific Name	State Status
BALD EAGLE	HALIAEETUS LEUCOCEPHALUS	SPC
BLUEHEAD SUCKER	CATOSTOMUS DISCOBOLUS	CS
BOBOLINK	DOLICHONYX ORYZIVORUS	SPC
BONNEVILLE CUTTHROAT TROUT	ONCORHYNCHUS CLARKII UTAH	CS
DESERET MOUNTAINSNAIL	OREOHELIX PERIPHERICA	SPC
FERRUGINOUS HAWK	BUTEO REGALIS	SPC

Morgan County (con't)

Common Name	Scientific Name	State Status
GRASSHOPPER SPARROW	AMMODRAMUS SAVANNARUM	SPC
GREATER SAGE-GROUSE	CENTROCERCUS UROPHASIANUS	SPC
LEWIS'S WOODPECKER	MELANERPES LEWIS	SPC
LYRATE MOUNTAINSNAIL	OREOHELIX HAYDENI	SPC
NORTHERN GOSHAWK	ACCIPITER GENTILIS	CS
SHARP-TAILED GROUSE	TYMPANUCHUS PHASIANELLUS	SPC
WESTERN PEARLSHELL	MARGARITIFERA FALCATA	SPC
WESTERN TOAD	BUFO BOREAS	SPC
YELLOW-BILLED CUCKOO	COCCYZUS AMERICANUS	S-ESA

Piute County

Common Name	Scientific Name	State Status
AMERICAN WHITE PELICAN	PELECANUS ERYTHRORHYNCHOS	SPC
BALD EAGLE	HALIAEETUS LEUCOCEPHALUS	SPC
BONNEVILLE CUTTHROAT TROUT	ONCORHYNCHUS CLARKII UTAH	CS
BROWN (GRIZZLY) BEAR	URSUS ARCTOS	S-ESA
CALIFORNIA FLOATER	ANODONTA CALIFORNIENSIS	SPC
FERRUGINOUS HAWK	BUTEO REGALIS	SPC
GREATER SAGE-GROUSE	CENTROCERCUS UROPHASIANUS	SPC
LONG-BILLED CURLEW	NUMENIUS AMERICANUS	SPC
NORTHERN GOSHAWK	ACCIPITER GENTILIS	CS
OTTER CREEK PYRG	PYRGULOPSIS FUSCA	SPC
PYGMY RABBIT	BRACHYLAGUS IDAHOENSIS	SPC
SHORT-EARED OWL	ASIO FLAMMEUS	SPC
SOUTHERN LEATHERSIDE CHUB	LEPIDOMEDA ALICIAE	SPC
THREE-TOED WOODPECKER	PICOIDES TRIDACTYLUS	SPC
TOWNSEND'S BIG-EARED BAT	CORYNORHINUS TOWNSENDII	SPC
UTAH PHYSA	PHYSELLA UTAHENSIS	SPC
UTAH PRAIRIE-DOG	CYNOMYS PARVIDENS	S-ESA
WESTERN TOAD	BUFO BOREAS	SPC

Rich County

Common Name	Scientific Name	State Status
BALD EAGLE	HALIAEETUS LEUCOCEPHALUS	SPC
BEAR LAKE SCULPIN	COTTUS EXTENSUS	SPC
BEAR LAKE SPRINGSNAIL	PYRGULOPSIS PILSBRYANA	SPC
BEAR LAKE WHITEFISH	PROSOPIUM ABYSSICOLA	SPC
BLACK-FOOTED FERRET	MUSTELA NIGRIPES	S-ESA
BOBOLINK	DOLICHONYX ORYZIVORUS	SPC
BONNEVILLE CISCO	PROSOPIUM GEMMIFER	SPC
BONNEVILLE CUTTHROAT TROUT	ONCORHYNCHUS CLARKII UTAH	CS
BONNEVILLE WHITEFISH	PROSOPIUM SPILONOTUS	SPC
BURROWING OWL	ATHENE CUNICULARIA	SPC
CALIFORNIA FLOATER	ANODONTA CALIFORNIENSIS	SPC
FERRUGINOUS HAWK	BUTEO REGALIS	SPC
GREATER SAGE-GROUSE	CENTROCERCUS UROPHASIANUS	SPC
LEWIS'S WOODPECKER	MELANERPES LEWIS	SPC
LYRATE MOUNTAINSNAIL	OREOHELIX HAYDENI	SPC

Rich County (con't)

Common Name	Scientific Name	State Status
NORTHERN GOSHAWK	ACCIPITER GENTILIS	CS
PYGMY RABBIT	BRACHYLAGUS IDAHOENSIS	SPC
SHORT-EARED OWL	ASIO FLAMMEUS	SPC
THREE-TOED WOODPECKER	PICOIDES TRIDACTYLUS	SPC
WESTERN PEARLSHELL	MARGARITIFERA FALCATA	SPC
WESTERN TOAD	BUFO BOREAS	SPC
WHITE-TAILED PRAIRIE-DOG	CYNOMYS LEUCURUS	SPC
YELLOW-BILLED CUCKOO	COCCYZUS AMERICANUS	S-ESA

Salt Lake County

Common Name	Scientific Name	State Status
AMERICAN WHITE PELICAN	PELECANUS ERYTHRORHYNCHOS	SPC
BALD EAGLE	HALIAEETUS LEUCOCEPHALUS	SPC
BLACK SWIFT	CYPSELOIDES NIGER	SPC
BOBOLINK	DOLICHONYX ORYZIVORUS	SPC
BONNEVILLE CUTTHROAT TROUT	ONCORHYNCHUS CLARKII UTAH	CS
BURROWING OWL	ATHENE CUNICULARIA	SPC
CALIFORNIA FLOATER	ANODONTA CALIFORNIENSIS	SPC
COLUMBIA SPOTTED FROG	RANA LUTEIVENTRIS	CS
FERRUGINOUS HAWK	BUTEO REGALIS	SPC
GRASSHOPPER SPARROW	AMMODRAMUS SAVANNARUM	SPC
GREATER SAGE-GROUSE	CENTROCERCUS UROPHASIANUS	SPC
JUNE SUCKER	CHASMISTES LIORUS	S-ESA
KIT FOX	VULPES MACROTIS	SPC
LEAST CHUB	IOTICHTHYS PHLEGETHONTIS	CS
LEWIS'S WOODPECKER	MELANERPES LEWIS	SPC
LONG-BILLED CURLEW	NUMENIUS AMERICANUS	SPC
LYRATE MOUNTAINSNAIL	OREOHELIX HAYDENI	SPC
NORTHERN GOSHAWK	ACCIPITER GENTILIS	CS
SHORT-EARED OWL	ASIO FLAMMEUS	SPC
SMOOTH GREENSNAKE	OPHEODRYS VERNALIS	SPC
SPOTTED BAT	EUDERMA MACULATUM	SPC
THREE-TOED WOODPECKER	PICOIDES TRIDACTYLUS	SPC
TOWNSEND'S BIG-EARED BAT	CORYNORHINUS TOWNSENDII	SPC
WESTERN PEARLSHELL	MARGARITIFERA FALCATA	SPC
WESTERN TOAD	BUFO BOREAS	SPC
YELLOW-BILLED CUCKOO	COCCYZUS AMERICANUS	S-ESA

San Juan County

Common Name	Scientific Name	State Status
ALLEN'S BIG-EARED BAT	IDIONYCTERIS PHYLLOTIS	SPC
AMERICAN WHITE PELICAN	PELECANUS ERYTHRORHYNCHOS	SPC
ARIZONA TOAD	BUFO MICROSCAPHUS	SPC
BALD EAGLE	HALIAEETUS LEUCOCEPHALUS	SPC
BIG FREE-TAILED BAT	NYCTINOMOPS MACROTIS	SPC
BLACK-FOOTED FERRET	MUSTELA NIGRIPES	S-ESA
BLUEHEAD SUCKER	CATOSTOMUS DISCOBOLUS	CS
BOBOLINK	DOLICHONYX ORYZIVORUS	SPC

San Juan County (con't)

Common Name	Scientific Name
BONYTAIL	GILA ELEGANS
BURROWING OWL	ATHENE CUNICULARIA
COLORADO PIKEMINNOW	PTYCHOCHEILUS LUCIUS
COMMON CHUCKWALLA	SAUROMALUS ATER
DESERT NIGHT LIZARD	XANTUSIA VIGILIS
FERRUGINOUS HAWK	BUTEO REGALIS
FLANNELMOUTH SUCKER	CATOSTOMUS LATIPINNIS
FRINGED MYOTIS	MYOTIS THYSANODES
GRAY WOLF	CANIS LUPUS
GREATER SAGE-GROUSE	CENTROCERCUS UROPHASIANUS
GUNNISON SAGE-GROUSE	CENTROCERCUS MINIMUS
GUNNISON'S PRAIRIE-DOG	CYNOMYS GUNNISONI
HUMPBACK CHUB	GILA CYPHA
KIT FOX	VULPES MACROTIS
LEWIS'S WOODPECKER	MELANERPES LEWIS
LONG-BILLED CURLEW	NUMENUIS AMERICANUS
MOGOLLON VOLE	MICROTUS MOGOLLONENSIS
NORTHERN GOSHAWK	ACCIPITER GENTILIS
RAZORBACK SUCKER	XYRAUCHEN TEXANUS
ROUNDTAIL CHUB	GILA ROBUSTA
SHORT-EARED OWL	ASIO FLAMMEUS
SILKY POCKET MOUSE	PEROGNATHUS FLAVUS
SMOOTH GREENSNAKE	OPHEODRYS VERNALIS
SOUTHWESTERN WILLOW FLYCATCHER	EMPIDONAX TRAILLII EXTIMUS
SPOTTED BAT	EUDERMA MACULATUM
SPOTTED OWL	STRIX OCCIDENTALIS
THREE-TOED WOODPECKER	PICOIDES TRIDACTYLUS
TOWNSEND'S BIG-EARED BAT	CORYNORHINUS TOWNSENDII
WHITE-TAILED PRAIRIE-DOG	CYNOMYS LEUCURUS
YAVAPAI MOUNTAINSNAIL	OREOHELIX YAVAPAI
YELLOW-BILLED CUCKOO	COCCYZUS AMERICANUS

Sanpete County

Common Name	Scientific Name
BALD EAGLE	HALIAEETUS LEUCOCEPHALUS
BONNEVILLE CUTTHROAT TROUT	ONCORHYNCHUS CLARKII UTAH
BROWN (GRIZZLY) BEAR	URSUS ARCTOS
BURROWING OWL	ATHENE CUNICULARIA
CANADA LYNX	LYNX CANADENSIS
COLORADO RIVER CUTTHROAT TROUT	ONCORHYNCHUS CLARKII PLEURITICUS
COLUMBIA SPOTTED FROG	RANA LUTEIVENTRIS
FERRUGINOUS HAWK	BUTEO REGALIS
GRASSHOPPER SPARROW	AMMODRAMUS SAVANNARUM
GREATER SAGE-GROUSE	CENTROCERCUS UROPHASIANUS
KIT FOX	VULPES MACROTIS
LEWIS'S WOODPECKER	MELANERPES LEWIS
LONG-BILLED CURLEW	NUMENIUS AMERICANUS
NINEMILE PYRG	PYRGULOPSIS NONARIA

Sanpete County (con't)

Common Name	Scientific Name	State Status
NORTHERN GOSHAWK	ACCIPITER GENTILIS	CS
SOUTHERN BONNEVILLE SPRINGSNAIL	PYRGULOPSIS TRANSVERSA	SPC
SOUTHERN LEATHERSIDE CHUB	LEPIDOMEDA ALICIAE	SPC
THREE-TOED WOODPECKER	PICOIDES TRIDACTYLUS	SPC
TOWNSEND'S BIG-EARED BAT	CORYNORHINUS TOWNSENDII	SPC
UTAH PRAIRIE-DOG	CYNOMYS PARVIDENS	S-ESA
WESTERN TOAD	BUFO BOREAS	SPC

Sevier County

Common Name	Scientific Name	State Status
AMERICAN WHITE PELICAN	PELECANUS ERYTHRORHYNCHOS	SPC
BALD EAGLE	HALIAEETUS LEUCOCEPHALUS	SPC
BIG FREE-TAILED BAT	NYCTINOMOPS MACROTIS	SPC
BLACK SWIFT	CYPSELOIDES NIGER	SPC
BONNEVILLE CUTTHROAT TROUT	ONCORHYNCHUS CLARKII UTAH	CS
BROWN (GRIZZLY) BEAR	URSUS ARCTOS	S-ESA
BURROWING OWL	ATHENE CUNICULARIA	SPC
CANADA LYNX	LYNX CANADENSIS	S-ESA
CARINATE GLENWOOD PYRG	PYRGULOPSIS INOPINATA	SPC
COLORADO RIVER CUTTHROAT TROUT	ONCORHYNCHUS CLARKII PLEURITICUS	CS
FERRUGINOUS HAWK	BUTEO REGALIS	SPC
FRINGED MYOTIS	MYOTIS THYSANODES	SPC
GREATER SAGE-GROUSE	CENTROCERCUS UROPHASIANUS	SPC
KIT FOX	VULPES MACROTIS	SPC
LEWIS'S WOODPECKER	MELANERPES LEWIS	SPC
LONG-BILLED CURLEW	NUMENIUS AMERICANUS	SPC
NORTHERN GOSHAWK	ACCIPITER GENTILIS	CS
OTTER CREEK PYRG	PYRGULOPSIS FUSCA	SPC
PYGMY RABBIT	BRACHYLAGUS IDAHOENSIS	SPC
SHORT-EARED OWL	ASIO FLAMMEUS	SPC
SMOOTH GLENWOOD PYRG	PYRGULOPSIS CHAMBERLINI	SPC
SOUTHERN LEATHERSIDE CHUB	LEPIDOMEDA ALICIAE	SPC
THREE-TOED WOODPECKER	PICOIDES TRIDACTYLUS	SPC
TOWNSEND'S BIG-EARED BAT	CORYNORHINUS TOWNSENDII	SPC
UTAH PRAIRIE-DOG	CYNOMYS PARVIDENS	S-ESA
WESTERN TOAD	BUFO BOREAS	SPC

Summit County

Common Name	Scientific Name	State Status
BALD EAGLE	HALIAEETUS LEUCOCEPHALUS	SPC
BLUEHEAD SUCKER	CATOSTOMUS DISCOBOLUS	CS
BOBOLINK	DOLICHONYX ORYZIVORUS	SPC
BONNEVILLE CUTTHROAT TROUT	ONCORHYNCHUS CLARKII UTAH	CS
BROWN (GRIZZLY) BEAR	URSUS ARCTOS	S-ESA
CANADA LYNX	LYNX CANADENSIS	S-ESA
COLORADO RIVER CUTTHROAT TROUT	ONCORHYNCHUS CLARKII PLEURITICUS	CS
COLUMBIA SPOTTED FROG	RANA LUTEIVENTRIS	CS
DESERET MOUNTAINSNAIL	OREOHELIX PERIPHERICA	SPC

Summit County (con't)

Common Name	Scientific Name	State Status
FERRUGINOUS HAWK	BUTEO REGALIS	SPC
GREATER SAGE-GROUSE	CENTROCERCUS UROPHASIANUS	SPC
LEWIS'S WOODPECKER	MELANERPES LEWIS	SPC
NORTHERN GOSHAWK	ACCIPITER GENTILIS	CS
NORTHERN LEATHERSIDE CHUB	LEPIDOMEDA COPEI	SPC
SHORT-EARED OWL	ASIO FLAMMEUS	SPC
SMOOTH GREENSNAKE	OPHEODRYS VERNALIS	SPC
THREE-TOED WOODPECKER	PICOIDES TRIDACTYLUS	SPC
WESTERN PEARLSHELL	MARGARITIFERA FALCATA	SPC
WESTERN TOAD	BUFO BOREAS	SPC
WHITE-TAILED PRAIRIE-DOG	CYNOMYS LEUCURUS	SPC

Tooele County

Common Name	Scientific Name	State Status
AMERICAN WHITE PELICAN	PELECANUS ERYTHRORHYNCHOS	SPC
BALD EAGLE	HALIAEETUS LEUCOCEPHALUS	SPC
BOBOLINK	DOLICHONYX ORYZIVORUS	SPC
BONNEVILLE CUTTHROAT TROUT	ONCORHYNCHUS CLARKII UTAH	CS
BONYTAIL	GILA ELEGANS	LE
BURROWING OWL	ATHENE CUNICULARIA	SPC
CALIFORNIA FLOATER	ANODONTA CALIFORNIENSIS	SPC
COLUMBIA SPOTTED FROG	RANA LUTEIVENTRIS	CS
DARK KANGAROO MOUSE	MICRODIPODOPS MEGACEPHALUS	SPC
EUREKA MOUNTAINSNAIL	OREOHELIX EUREKENSIS	SPC
FERRUGINOUS HAWK	BUTEO REGALIS	SPC
GRASSHOPPER SPARROW	AMMODRAMUS SAVANNARUM	SPC
GREATER SAGE-GROUSE	CENTROCERCUS UROPHASIANUS	SPC
KIT FOX	VULPES MACROTIS	SPC
LEAST CHUB	IOTICHTHYS PHLEGETHONTIS	CS
LEWIS'S WOODPECKER	MELANERPES LEWIS	SPC
LONG-BILLED CURLEW	NUMENIUS AMERICANUS	SPC
LYRATE MOUNTAINSNAIL	OREOHELIX HAYDENI	SPC
NORTHERN GOSHAWK	ACCIPITER GENTILIS	CS
NORTHWEST BONNEVILLE PYRG	PYRGULOPSIS VARIEGATA	SPC
PREBLE'S SHREW	SOREX PREBLEI	SPC
PYGMY RABBIT	BRACHYLAGUS IDAHOENSIS	SPC
SHORT-EARED OWL	ASIO FLAMMEUS	SPC
SOUTHERN BONNEVILLE SPRINGSNAIL	PYRGULOPSIS TRANSVERSA	SPC
SOUTHERN TIGHTCOIL	OGARIDISCUS SUBRUPICOLA	SPC
TOWNSEND'S BIG-EARED BAT	CORYNORHINUS TOWNSENDII	SPC
UTAH PHYSA	PHYSELLA UTAHENSIS	SPC
YELLOW-BILLED CUCKOO	COCCYZUS AMERICANUS	S-ESA

Uintah County

Common Name	Scientific Name	State Status
AMERICAN WHITE PELICAN	PELECANUS ERYTHRORHYNCHOS	SPC
BALD EAGLE	HALIAEETUS LEUCOCEPHALUS	SPC
BIG FREE-TAILED BAT	NYCTINOMOPS MACROTIS	SPC

Uintah County (con't)

Common Name	Scientific Name	State Status
BLACK-FOOTED FERRET	MUSTELA NIGRIPES	S-ESA
BLUEHEAD SUCKER	CATOSTOMUS DISCOBOLUS	CS
BOBOLINK	DOLICHONYX ORYZIVORUS	SPC
BONYTAIL	GILA ELEGANS	S-ESA
BROWN (GRIZZLY) BEAR	URSUS ARCTOS	S-ESA
BURROWING OWL	ATHENE CUNICULARIA	SPC
CANADA LYNX	LYNX CANADENSIS	S-ESA
COLORADO PIKEMINNOW	PTYCHOCHEILUS LUCIUS	S-ESA
COLORADO RIVER CUTTHROAT TROUT	ONCORHYNCHUS CLARKII PLEURITICUS	CS
CORNSNAKE	ELAPHE GUTTATA	SPC
FERRUGINOUS HAWK	BUTEO REGALIS	SPC
FLANNELMOUTH SUCKER	CATOSTOMUS LATIPINNIS	CS
FRINGED MYOTIS	MYOTIS THYSANODES	SPC
GREATER SAGE-GROUSE	CENTROCERCUS UROPHASIANUS	SPC
HUMPBACK CHUB	GILA CYPHA	S-ESA
KIT FOX	VULPES MACROTIS	SPC
LEWIS'S WOODPECKER	MELANERPES LEWIS	SPC
LONG-BILLED CURLEW	NUMENIUS AMERICANUS	SPC
MOUNTAIN PLOVER	CHARADRIUS MONTANUS	SPC
NORTHERN GOSHAWK	ACCIPITER GENTILIS	CS
RAZORBACK SUCKER	XYRAUCHEN TEXANUS	S-ESA
ROUNDTAIL CHUB	GILA ROBUSTA	CS
SHORT-EARED OWL	ASIO FLAMMEUS	SPC
SMOOTH GREENSNAKE	OPHEODRYS VERNALIS	SPC
SPOTTED BAT	EUDERMA MACULATUM	SPC
THREE-TOED WOODPECKER	PICOIDES TRIDACTYLUS	SPC
TOWNSEND'S BIG-EARED BAT	CORYNORHINUS TOWNSENDII	SPC
WHITE-TAILED PRAIRIE-DOG	CYNOMYS LEUCURUS	SPC
YELLOW-BILLED CUCKOO	COCCYZUS AMERICANUS	S-ESA

Utah County

Common Name	Scientific Name	State Status
AMERICAN WHITE PELICAN	PELECANUS ERYTHRORHYNCHOS	SPC
BALD EAGLE	HALIAEETUS LEUCOCEPHALUS	SPC
BLACK SWIFT	CYPSELOIDES NIGER	SPC
BLUEHEAD SUCKER	CATOSTOMUS DISCOBOLUS	CS
BOBOLINK	DOLICHONYX ORYZIVORUS	SPC
BONNEVILLE CUTTHROAT TROUT	ONCORHYNCHUS CLARKII UTAH	CS
BROWN (GRIZZLY) BEAR	URSUS ARCTOS	S-ESA
BURROWING OWL	ATHENE CUNICULARIA	SPC
CALIFORNIA FLOATER	ANODONTA CALIFORNIENSIS	SPC
COLORADO RIVER CUTTHROAT TROUT	ONCORHYNCHUS CLARKII PLEURITICUS	CS
COLUMBIA SPOTTED FROG	RANA LUTEIVENTRIS	CS
DESERT VALVATA	VALVATA UTAHENSIS	S-ESA
EUREKA MOUNTAINSNAIL	OREOHELIX EUREKENSIS	SPC
FERRUGINOUS HAWK	BUTEO REGALIS	SPC

Utah County (con't)

Common Name	Scientific Name
FRINGED MYOTIS	MYOTIS THYSANODES
GREATER SAGE-GROUSE	CENTROCERCUS UROPHASIANUS
JUNE SUCKER	CHASMISTES LIORUS
KIT FOX	VULPES MACROTIS
LEAST CHUB	IOTICHTHYS PHLEGETHONTIS
LEWIS'S WOODPECKER	MELANERPES LEWIS
LONG-BILLED CURLEW	NUMENIUS AMERICANUS
NORTHERN GOSHAWK	ACCIPITER GENTILIS
ROUNDTAIL CHUB	GILA ROBUSTA
SHORT-EARED OWL	ASIO FLAMMEUS
SMOOTH GREENSNAKE	OPHEODRYS VERNALIS
SOUTHERN BONNEVILLE SPRINGSNAIL	PYRGULOPSIS TRANSVERSA
SOUTHERN LEATHERSIDE CHUB	LEPIDOMEDA ALICIAE
SPOTTED BAT	EUDERMA MACULATUM
THREE-TOED WOODPECKER	PICOIDES TRIDACTYLUS
TOWNSEND'S BIG-EARED BAT	CORYNORHINUS TOWNSENDII
UTAH PHYSA	PHYSELLA UTAHENSIS
WESTERN RED BAT	LASIURUS BLOSSEVILLII
WESTERN TOAD	BUFO BOREAS
WHITE-TAILED PRAIRIE-DOG	CYNOMYS LEUCURUS
YELLOW-BILLED CUCKOO	COCCYZUS AMERICANUS

Wasatch County

Common Name	Scientific Name
BALD EAGLE	HALIAEETUS LEUCOCEPHALUS
BLACK SWIFT	CYPSELOIDES NIGER
BLUEHEAD SUCKER	CATOSTOMUS DISCOBOLUS
BOBOLINK	DOLICHONYX ORYZIVORUS
BONNEVILLE CUTTHROAT TROUT	ONCORHYNCHUS CLARKII UTAH
BROWN (GRIZZLY) BEAR	URSUS ARCTOS
CANADA LYNX	LYNX CANADENSIS
COLORADO RIVER CUTTHROAT TROUT	ONCORHYNCHUS CLARKII PLEURITICUS
COLUMBIA SPOTTED FROG	RANA LUTEIVENTRIS
FERRUGINOUS HAWK	BUTEO REGALIS
FRINGED MYOTIS	MYOTIS THYSANODES
GREATER SAGE-GROUSE	CENTROCERCUS UROPHASIANUS
LEWIS'S WOODPECKER	MELANERPES LEWIS
LONG-BILLED CURLEW	NUMENIUS AMERICANUS
NORTHERN GOSHAWK	ACCIPITER GENTILIS
ROUNDTAIL CHUB	GILA ROBUSTA
SHORT-EARED OWL	ASIO FLAMMEUS
SMOOTH GREENSNAKE	OPHEODRYS VERNALIS
SOUTHERN LEATHERSIDE CHUB	LEPIDOMEDA ALICIAE
THREE-TOED WOODPECKER	PICOIDES TRIDACTYLUS
TOWNSEND'S BIG-EARED BAT	CORYNORHINUS TOWNSENDII
WESTERN TOAD	BUFO BOREAS
YELLOW-BILLED CUCKOO	COCCYZUS AMERICANUS

Washington County

Common Name	Scientific Name	State Status
ALLEN'S BIG-EARED BAT	IDIONYCTERIS PHYLLOTIS	SPC
AMERICAN WHITE PELICAN	PELECANUS ERYTHRORHYNCHOS	SPC
ARIZONA TOAD	BUFO MICROSCAPHUS	SPC
BALD EAGLE	HALIAEETUS LEUCOCEPHALUS	SPC
BIG FREE-TAILED BAT	NYCTINOMOPS MACROTIS	SPC
BLACK SWIFT	CYPSELOIDES NIGER	SPC
BLUEHEAD SUCKER	CATOSTOMUS DISCOBOLUS	CS
BOBOLINK	DOLICHONYX ORYZIVORUS	SPC
BONNEVILLE CUTTHROAT TROUT	ONCORHYNCHUS CLARKII UTAH	CS
BROWN (GRIZZLY) BEAR	URSUS ARCTOS	S-ESA
BURROWING OWL	ATHENE CUNICULARIA	SPC
COMMON CHUCKWALLA	SAUROMALUS ATER	SPC
DESERT IGUANA	DIPSOSAURUS DORSALIS	SPC
DESERT NIGHT LIZARD	XANTUSIA VIGILIS	SPC
DESERT SPRINGSNAIL	PYRGULOPSIS DESERTA	SPC
DESERT SUCKER	CATOSTOMUS CLARKII	SPC
DESERT TORTOISE	GOPHERUS AGASSIZII	S-ESA
FERRUGINOUS HAWK	BUTEO REGALIS	SPC
FLANNELMOUTH SUCKER	CATOSTOMUS LATIPINNIS	CS
FRINGED MYOTIS	MYOTIS THYSANODES	SPC
GILA MONSTER	HELODERMA SUSPECTUM	SPC
GRAY WOLF	CANIS LUPUS	S-ESA
GREATER SAGE-GROUSE	CENTROCERCUS UROPHASIANUS	SPC
KIT FOX	VULPES MACROTIS	SPC
LEWIS'S WOODPECKER	MELANERPES LEWIS	SPC
LONG-BILLED CURLEW	NUMENIUS AMERICANUS	SPC
MOJAVE RATTLESNAKE	CROTALUS SCUTULATUS	SPC
MOUNTAIN PLOVER	CHARADRIUS MONTANUS	SPC
NORTHERN GOSHAWK	ACCIPITER GENTILIS	CS
PYGMY RABBIT	BRACHYLAGUS IDAHOENSIS	SPC
RELICT LEOPARD FROG	RANA ONCA	S-ESA
SHORT-EATRED OWL	ASIO FLAMMEUS	SPC
SIDEWINDER	CROTALUS CERASTES	SPC
SOUTHWESTERN WILLOW FLYCATCHER	EMPIDONAX TRAILLII EXTIMUS	S-ESA
SPECKLED RATTLESNAKE	CROTALUS MITCHELLII	SPC
SPOTTED BAT	EUDERMA MACULATUM	SPC
SPOTTED OWL	STRIX OCCIDENTALIS	S-ESA
THREE-TOED WOODPECKER	PICOIDES TRIDACTYLUS	SPC
TOWNSEND'S BIG-EARED BAT	CORYNORHINUS TOWNSENDII	SPC
VIRGIN CHUB	GILA SEMINUDA	S-ESA
VIRGIN SPINEDACE	LEPIDOMEDA MOLLISPINIS	CS
WESTERN BANDED GECKO	COLEONYX VARIEGATUS	SPC
WESTERN RED BAT	LASIURUS BLOSSEVILLII	SPC
WESTERN THREADSNAKE	LEPTOTYPHLOPS HUMILIS	SPC
WESTERN TOAD	BUFO BOREAS	SPC
WET-ROCK PHYSA	PHYSELLA ZIONIS	SPC
WOUNDFIN	PLAGOPTERUS ARGENTISSIMUS	S-ESA

Washington County (con't)

Common Name	Scientific Name	State Status
YELLOW-BILLED CUCKOO	COCCYZUS AMERICANUS	S-ESA
ZEBRA-TAILED LIZARD	CALLISAURUS DRACONOIDES	SPC

Wayne County

Common Name	Scientific Name	State Status
ALLEN'S BIG-EARED BAT	IDIONYCTERIS PHYLLOTIS	SPC
AMERICAN WHITE PELICAN	PELECANUS ERYTHRORHYNCHOS	SPC
BALD EAGLE	HALIAEETUS LEUCOCEPHALUS	SPC
BIG FREE-TAILED BAT	NYCTINOMOPS MACROTIS	SPC
BLUEHEAD SUCKER	CATOSTOMUS DISCOBOLUS	CS
BOBOLINK	DOLICHONYX ORYZIVORUS	SPC
BONYTAIL	GILA ELEGANS	S-ESA
BURROWING OWL	ATHENE CUNICULARIA	SPC
COLORADO PIKEMINNOW	PTYCHOCHEILUS LUCIUS	S-ESA
COLORADO RIVER CUTTHROAT TROUT	ONCORHYNCHUS CLARKII PLEURITICUS	CS
FERRUGINOUS HAWK	BUTEO REGALIS	SPC
FLANNELMOUTH SUCKER	CATOSTOMUS LATIPINNIS	CS
FRINGED MYOTIS	MYOTIS THYSANODES	SPC
GREATER SAGE-GROUSE	CENTROCERCUS UROPHASIANUS	SPC
HUMPBACK CHUB	GILA CYPHA	S-ESA
KIT FOX	VULPES MACROTIS	SPC
LEWIS'S WOODPECKER	MELANERPES LEWIS	SPC
LONG-BILLED CURLEW	NUMENIUS AMERICANUS	SPC
NORTHERN GOSHAWK	ACCIPITER GENTILIS	CS
PYGMY RABBIT	BRACHYLAGUS IDAHOENSIS	SPC
RAZORBACK SUCKER	XYRAUCHEN TEXANUS	S-ESA
ROUNDTAIL CHUB	GILA ROBUSTA	CS
SHORT-EARED OWL	ASIO FLAMMEUS	SPC
SOUTHERN LEATHERSIDE CHUB	LEPIDOMEDA ALICIAE	SPC
SPOTTED BAT	EUDERMA MACULATUM	SPC
SPOTTED OWL	STRIX OCCIDENTALIS	S-ESA
TOWNSEND'S BIG-EARED BAT	CORYNORHINUS TOWNSENDII	SPC
UTAH PRAIRIE-DOG	CYNOMYS PARVIDENS	S-ESA
WESTERN TOAD	BUFO BOREAS	SPC
YELLOW-BILLED CUCKOO	COCCYZUS AMERICANUS	S-ESA

Weber County

Common Name	Scientific Name	State Status
AMERICAN WHITE PELICAN	PELECANUS ERYTHRORHYNCHOS	SPC
BALD EAGLE	HALIAEETUS LEUCOCEPHALUS	SPC
BLUEHEAD SUCKER	CATOSTOMUS DISCOBOLUS	CS
BOBOLINK	DOLICHONYX ORYZIVORUS	SPC
BONNEVILLE CUTTHROAT TROUT	ONCORHYNCHUS CLARKII UTAH	CS
BURROWING OWL	ATHENE CUNICULARIA	SPC
COLUMBIA SPOTTED FROG	RANA LUTEIVENTRIS	CS
DESERET MOUNTAINSNAIL	OREOHELIX PERIPHERICA	SPC
FERRUGINOUS HAWK	BUTEO REGALIS	SPC

Weber County (con't)

Common Name	Scientific Name	State Status
GRASSHOPPER SPARROW	AMMODRAMUS SAVANNARUM	SPC
GRAY WOLF	CANIS LUPUS	S-ESA
GREATER SAGE-GROUSE	CENTROCERCUS UROPHASIANUS	SPC
JUNE SUCKER	CHASMISTES LIORUS	S-ESA
KIT FOX	VULPES MACROTIS	SPC
LEWIS'S WOODPECKER	MELANERPES LEWIS	SPC
LONG-BILLED CURLEW	NUMENIUS AMERICANUS	SPC
LYRATE MOUNTAINSNAIL	OREOHELIX HAYDENI	SPC
MOUNTAIN PLOVER	CHARADRIUS MONTANUS	SPC
NORTHERN GOSHAWK	ACCIPITER GENTILIS	CS
SHARP-TAILED GROUSE	TYMPANUCHUS PHASIANELLUS	SPC
SHORT-EARED OWL	ASIO FLAMMEUS	SPC
SMOOTH GREENSNAKE	OPHEODRYS VERNALIS	SPC
TOWNSEND'S BIG-EARED BAT	CORYNORHINUS TOWNSENDII	SPC
WASATCH MOUNTAINSNAIL	OREOHELIX PERIPHERICA WASATCHENSIS	SPC
YELLOW-BILLED CUCKOO	COCCYZUS AMERICANUS	S-ESA

Key to State Status Field

Symbol	Definition
S-ESA	Federally-listed or candidate species under the Endangered Species Act.
SPC	Wildlife species of concern.
CS	Species receiving special management under a Conservation Agreement in order to preclude the need for Federal listing.

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APPENDIX G

Jordan River Corridor
Common Noxious Weeds and "Weeds of Concern"
Photographs

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DIVERSE SALT LAKE COUNTY

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Weed Control

Home ›FAQ

Frequently Asked Questions

What is a Noxious Weed?

"Noxious weed" is a legal term used at the federal, state, and county level to identify and list plants that pose a significant threat to agriculture, the environment, recreation, and public health.

At a State level, The Utah Noxious Weed Act defines a noxious weed as " ... any plant the commissioner determines to be especially injurious to public health, crops, livestock, land, or other property".

Typically, noxious weeds are invasive* non-native plants, that once established are not only difficult to control but spread aggressively. Outside of their native origins, noxious weeds become oppressors with no known natural competitors to keep their populations in check. These silent invaders quickly begin to out-compete native plants often forming monocultures, and forever changing our landscapes. Unlike other ornamental and introduced plants that blend in harmlessly, noxious weeds are nothing short of ecological time bombs.

*Invasive Plant: An invasive plant is "an unwanted plant that is not native to the area of infestation and is capable of displacing native species. " (California Weed Science Society. 2002). Invasive

plants are not listed on the State Noxious Weed List, but have the potential to become a listed noxious weed. Therefore, the Salt Lake County Weed Control Program monitors invasive plant infestations.

- **What impacts do noxious weeds have?**
- **Why should I care about noxious weeds?**
- **Why does Salt Lake have a noxious weed program?**
- **What is the Salt Lake Weed Board and what do they do?**
- **What is the Salt Lake Weed Control Program doing about noxious weeds throughout the county?**
- **Will the County come out and take care of my weeds?**
- **What can I do about noxious weeds?**
- **What is a Cooperative Weed Management Area and is the county involved in one?**

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Weed Control

Home › Noxious Weeds › Pink and Purple Flower Plants › Canada Thistle

Canada Thistle

Information | Images

Cirsium arvense
Creeping perennial

View Larger Images

Identification and management tips

- Canada thistle has small purple flowers covered in spiny thorns.
- Plants are male or female (dioecious) and grow in circular patches that often are one clone and sex.
- It is difficult to control because its extensive root system allows it to recover from control attempts, and the seed can remain viable in soil up to 20 years.
- For most effective control, persistence is imperative so the weed is continually stressed, forcing it to exhaust root nutrient stores

- and eventually die.
- Canada thistle is not tolerant of shade, thus the first step is to invigorate competition from the desirable forage species planted in the pasture.
- Grasses and alfalfa can compete effectively with Canada thistle if their growth is favored by good management.
- Mowing and/ or tillage can be an effective tool if combined with herbicide treatments.
- Research at Colorado State University shows that Tordon 22K (picloram), Curtail (clopyralid plus 2,4-D), Transline (clopyralid), Banvel/Vanquish/Clarity (dicamba), 2,4-D and Telar (chlorsulfuron) are effective against Canada thistle when applied pre-bud in the spring and/ or in the fall. These herbicides are most effective when combined with cultural and/or mechanical control.

Most effective control methods and timing

Prevention (Prev) Monitor and destroy new plants before seed production.

Mechanical (Mech) Hand pulling, digging, cutting, mowing and tilling.

Cultural (Cult) Biological control agents, livestock grazing, and revegetation practices.

Chemical (Chem) Selective herbicides based on the plant and the specific location. Check our weed fact sheets for specific control information.

Links

- http://www.ext.colostate.edu/Pubs/natres/03108.html
- http://www.weeds.iastate.edu/mgmt/2002/canadathistle.htm

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Weed Control

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Common Reed

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PHRAGMITES CONTROL PLAN

By

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August 29, 2007

BACKGROUND

Common reed, *Phragmites australis*, is a tall, native, warm-season, sod-forming grass. It has a worldwide distribution (Tucker 1990) and is endemic to North America (Niering & Warren 1977). The culms are erect, rigid, smooth, and hollow. The culms may be nearly 1 inch in diameter and from 6 to 13 feet tall, terminating in a 12-inch-long dense panicle. Common reed has an extensive rhizome network and occasionally produces stolons as well.

A Phragmites stand at Bear River Migratory Bird Refuge

Common reed grows on level ground in freshwater marshes, oxbow lakes, swales, and backwater areas of river and streams. It also grows around springs and along pond and lake margins, stream banks, and irrigation ditches. It does not grow in permanently standing water but rather is found on sites with high water tables or sites that are seasonally flooded with not more than 20 inches of water. Water control that lowers the water level, but does not drain the area, increases production (USDA PLANTS Database 2007). Throughout most of its range, common reed typically forms closed, monotypic stands along marsh and slough edges. These stands are often dense, with up to 19 stems (live and dead) per square foot.

REPRODUCTION

In wetlands, *P. australis* (henceforth *Phragmites*) is generally a nuisance species because it is an efficient colonizer of disturbed soils and acts as a climax species thereby forming extensive monocultures that reduce plant and animal biodiversity (Ailstock, unpublished report). Ailstock reported that the aggressive nature of *Phragmites* is a direct reflection of the adaptive features of its life cycle. *Phragmites* is an efficient colonizer of disturbed environments because

it seeds profusely and spreads vegetatively by a vigorous system of rhizomes and stolons (Best et al. 1981; Hara et al. 1993; Marks et al. 1994 *in* Ailstock et al 2001).

When *Phragmites* becomes established, whether by seeds or rhizome segments, colony expansion occurs primarily by rhizomes in wet organic soils and rhizomes and stolons in sandy soils. Under optimal conditions, growth in excess of 30 feet is common within a single growing season. Such rapid growth is possible because the horizontal stems of *Phragmites* exhibit strong apical dominance. Growth is channeled to the extension of these stems rather than the production of new aerial stems from subtending nodes (Ailstock unpublished report).

Growth begins in Utah between April and June. The period of shoot emergence may last from 1 to 3 months (Cross et al 1989). New shoots grow from buds at nodes of old stems, stolons and rhizomes (http://plant-materials.nrcs.usda.gov/intranet/pfs.html). Cross (1989) reported time of flowering in Utah to be mid-July through August. Foliage stays green until frost in the fall, and thereafter becomes brittle and turns a pale yellow. Stems remain standing throughout the winter (Cross et al 1989 and author personal observation).

On Bear River Migratory Bird Refuge (Refuge), *Phragmites* is apparently able to out-compete more desirable aquatic emergent species, especially alkali bulrush, *Schoenoplectus maritimus.* Several wetland management units that historically included a mix of aquatic emergent species have, over a period of less than 5 years, become a monotypic stand of *Phragmites* (author, personal observation). *Phragmites'* ability to supplant more desirable species has also been noted in Utah by Cross et al (1989) and in North Dakota (Dix and Smeins 1967).

In general, small, sparse stands of common reed in Refuge wetlands are considered a source of biological diversity. However, due to it's aggressive growth, dispersal, and ability to displace aquatic vegetation with higher wildlife values, common reed needs to be controlled in wetlands managed for beneficial use by migratory birds.

WILDLIFE VALUE

Nesting Cover

Common reed often grows in vast, unbroken stands along marsh edges. These stands are typically dense and impenetrable, and except for the stand edge, are of little value to nesting waterfowl. Ward (1942) reported that the interior of large common reed stands at the Delta Marsh, Manitoba, were practically void of nesting ducks. Stand edges, however, were frequently used; 31 percent of 147 duck nests were found there. The most common duck species nesting in common reed edges were the mallard, lesser scaup, canvasback, ruddy duck, and redhead. Conversely, Cross (1989) found that both the interior and edges of common reed stands provided poor waterfowl nesting habitat. She cited studies at Fish Springs National Wildlife Refuge, Utah, and at the Delta Marsh in Manitoba, where only 4 to 6 percent of duck nests were found in common reed, all near the stand edge. At Fish Springs, only snowy egrets, black-crowned night herons, and yellow-headed blackbirds nested in the interior of common reed stands.

Phragmites is also used for nesting strata at Bear River Refuge. In 2002, a colony of nesting waterbirds was discovered using the *Phragmites*/alkali bulrush stand in Unit 5B. The unit has been used annually (2002-2007) by breeding white-faced ibis, black-crowned night heron, cattle egret, great egret, snowy egret, and great blue heron. Franklin's gulls utilized only the alkali bulrush component of the emergent vegetation for nesting 2002-2005. By 2006, virtually all the alkali bulrush stands that once occupied this unit had been replaced by *Phragmites*. After this time, no Franklin's gull nests have been found.

Waterbird colony and nest in Phragmites, Bear River Refuge.

On the Refuge, the secretive marsh wrens, *Cistothorus palustris*, frequently build their dome-shaped nests among the stout stalks of *Phragmites* stands.

Hiding and Thermal Cover

Common reed provides good cover for flightless adult ducks during their molting period (Swanson and Duebbert 1989).

This phenomenon has also been noted at Bear River Refuge. The Refuge hosts a number of molting dabbling duck species, notably northern pintail and mallard in mid-July. Many flightless ducks are observed escaping to large stands of *Phragmites* when disturbed or found within the open water pockets that dot the *Phragmites* stands.

The Utah Division of Wildlife Resources routinely conducts aerial surveys of the Refuge during the late fall and winter (October-January). Large concentrations of over-wintering American green-winged teal (~ 10,000 birds) utilizing dense stands of *Phragmites* on the Refuge have been reported (Tom Aldrich, personal communication).

Wildlife Food

Common reed is not an important wildlife food. Occasionally, seeds are eaten by waterfowl, and rhizomes and stems by muskrats (Martin et al 1957).

MANAGEMENT AREA

Bear River Migratory Bird Refuge is located in the northeast arm of the Great Salt Lake in Box Elder County near Brigham City, Utah. The Refuge, situated at the mouth of the Bear River, is the largest freshwater component of the Great Salt Lake ecosystem.

The Refuge encompasses about 71,000 acres of the Bear River delta and an additional 3,000 acres of uplands. The delta is a mosaic of freshwater marshes, river channels and alkali

DISTRIBUTION OF PHRAGMITES

Phragmites is present in all 26 wetland management units, grassland ponds on the Nichols, White and Stauffer grassland units, and most water delivery canals on the Refuge. *Phragmites* stands are also present on dike slopes surrounding wetland units. The size (area occupied) and density of *Phragmites* stands varies by wetland unit.

OBJECTIVES

The overarching objective of *Phragmites* control is not to completely eradicate the species, as this species does contribute to overall habitat diversity of wetlands. Rather, the objective is to reduce the extent of monotypic stands that have invaded Refuge wetland habitats. Therefore, common reed will be considered a management problem if the stand(s) occupy ≥ 10 % of the total wet acres in a unit.

1) Reduce amount of area occupied by *Phragmites* to $\leq 10\%$ of total area in each wetland management unit by 2015.

2) Reduce amount of area occupied by *Phragmites* along water delivery canals and wetland dikes to $\leq 5\%$ of linear area by 2015.

MANAGEMENT ACTIONS

Managed wetland units (water control capabilities) meeting or exceeding the 10% area occupied by *Phragmites* and in need of control, include in priority order: 1A, 2B, 2C, 2A, 2D, 3H, 3I, 3J, 3K. Units 6-10 that are south of D-Line dike, but have no direct water level management capability, also have *Phragmites* infestations in need of control efforts. The worst infestation areas of *Phragmites* in Units 6-10 are parallel to D-line along the "borrow area".

Unit 5B is about 1800 acres in size. When the water elevation is at a target of 4204.6 msl, there about 1100 acres of open water and 300 acres of emergent vegetation in the flooded area. *Phragmites* accounts for 90% of the total area occupied by emergent vegetation. Retired Project Leader Al Trout, indicated that the area of the unit occupied by emergent vegetation used to be about a 50%-50% mix between *Phragmites* and alkali bulrush. A survey in 2003 indicated that alkali bulrush occupied only 10% of the emergent stand. Phragmites once established, appears to out-compete other more desirable emergent species such as alkali bulrush, and perhaps hardstem bulrush, *Schoenoplectus acutus*.

As indicated earlier, *Phragmites* productivity increases when water levels in wetlands are lowered but not necessarily drained. The water levels in the majority of Refuge wetland impoundments naturally decreases or completely dries due to evaporative loss in the summer months as a result of inadequate water supply from the Bear River. This scenario likely facilitates the abundance and rapid expansion of *Phragmites* on the Refuge.

Unit 5B, though over the desirable threshold level of *Phragmites,* supports a large nesting colony of Refuge priority species white-faced ibis as well as black-crowned night heron, great egret, great blue heron, and cattle egret. The number of breeding white-faced ibis in this unit was estimated around 16,000 breeding adults in 2006, making it the largest nesting colony in North America. No action will be taken to reduce the stand of common reed in Unit 5B until either 1) adjacent unit 4C has a comparable size stand of alkali bulrush/harstem bulrush the birds could colonize or 2)the phragmites stand increases in size to occupy an area roughly 50% of the wet acreage of 5B.

CONTROL METHODS

Control strategies include herbicide application of 2% Glyphosate in the fall period (August-October). An aquatic surfactant (2 quarts/100 gallons) is mixed with herbicide. Fall treatment has been found to be most effective, as this is the period when the plant has stopped active stem growth and is instead translocating nutrients to the rhizomes (Capotosto and Wolfe 2007). The upper half of the plant is targeted for spraying in order to cover the largest surface area. Herbicide application is followed up by a prescribed burn.

Utah Waterfowl Management Area Managers, (Utah Division of Wildlife Resources) around the Great Salt Lake, follow up their herbicide application with a spring [redacted] spot treatment of herbicide in the fall if necessary. The Refuge units are too wet in the spring to [redacted]. Instead, fall [redacted] (September-November) will be used as the follow-up treatment to herbicide application. There should be a period of at least [redacted] weeks between herbicide application and [redacted] to allow for sufficient time for the plant to transport herbicides to the rhizomes.

[redacted] following herbicide application has several benefits: 1) [redacted] removes prior year's growth. Removal of the standing vegetation allows for better visual determination of effectiveness of herbicide application (i.e. number of remaining live shoots or stems growing in treated area, the following spring), 2) Allows for more effective follow-up or spot treatment herbicide applications as chemical may be applied directly to remaining live plants and not diluted by chemical falling on standing dead vegetation, 3) Creates open areas or unoccupied niches and decreases shading to encourage colonization and germination by more desirable aquatic plant species from the existing seed bank, and 4) Creates more open space desired by migratory birds.

The Refuge has enough funding to purchase chemical to treat two units annually. In 2007, Units 2B and 2C will be treated. Refuge staff will continue to employ the two-step strategy of fall herbicide application and a fall prescribed burn in two units each year until all areas of the Refuge mentioned above have been treated. The treatment will be repeated in a unit if the amount of *Phragmites* is not reduced to objective levels. We estimate that all areas of the Refuge should be treated at least once by 2015 under this treatment strategy.

Treatment sites or units will be selected each year during the Refuge staff annual habitat planning meeting.

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Dyers Woad Fact Sheet

Isatis tinctoria — *Brassicaceae* Family



Photos by Steve Dewey, Utah State University, Bugwood.org

Distinguishing Features:

1. **Flowers:** Bright yellow with four petals.
2. **Seeds:** Black seed pods. Plants spread primarily by seed, but seed *does not* remain viable in the soil for long periods of time.
3. **Leaves:** Bluish green with a cream colored mid rib.
4. **Flowering Time:** April - May (after the first year). Seeds mature in June - July.
5. **Life cycle:** Woad is a biennial and doesn't flower until the second year.

Impacts:

- Invades rangelands, pastures, roadsides, orchards, forests, and waste areas.
- Dyers woad alters the native plant community as well as reducing forage value for livestock.
- Plants produce an average of 350-500 seeds per plant and as many as 10,000 seeds.
- Plant populations can spread at a rate of 2-100 acres within a couple of years.

Control:

- Hand pulling is the most effective method of controlling infestations.
- Plants should be pulled at least twice a year. Once when the flowers start to bloom, followed by a second pull 2-3 weeks later to eliminate any remaining plants.
- **It is important to remove pulled plants from the area if they have started to go to seed. Seed development may still continue even if the plant has been pulled.**
- For larger infestations, a spring chemical application when flowers are pre-bloom is most effective.
- Metsulfuron and chlorsulfuron offer excellent to good control respectively when applied in early spring.

Volunteers pull woad at the annual City Creek Canvon Woad Pull.

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Dalmatian Toadflax Fact Sheet

Linaria dalmatica

Scrophulariaceae Family

Richard Old, XID Services, Inc., Bugwood.org

Linda Wilson, University of Idaho, Bugwood.org

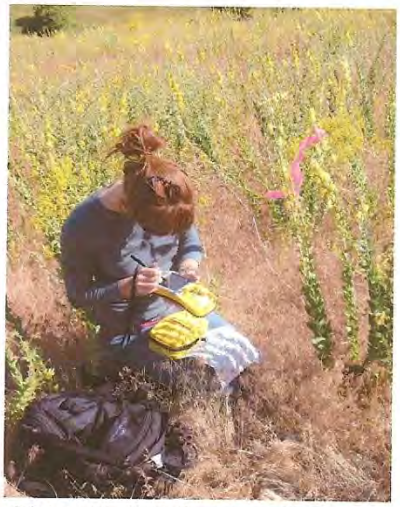
(c)*John M. Randall*/The Nature Conservancy

Distinguishing Features:

1. **Flowers:** Flowers are bright yellow snapdragons arranged at the top of the stems.
2. **Seeds:** Seeds are viable for up to 10 years and one mature plant is capable of producing 500,000 seeds in a year.
3. **Leaves:** Leaves are bluish-green with a waxy coating, heart-shaped and close to the stem.
4. **Flowering Time:** June - October after the first year.
5. **Life cycle:** Short lived perennial with most populations living an average of 3-5 years.

Impacts:

- Aggressive and invasive species that reduces the value of rangeland, forests, and meadows by out-competing desirable forage species.
- Unpalatable to livestock.
- Dalmatian toadflax has an extensive root system that allows it to survive adverse soil and/or climatic conditions and then spread during more favorable years.



Salt Lake City Water Resource staff GPS dalmatian toadflax bio-control.

Control:

- For small infestations, hand pulling or digging up the roots for an average of 6 years. This depletes the root reserves on small patches, and prevents further seed production. However, the roots are deep and extensive and plants will re-sprout from root fragments.
- For large infestations or where digging is not practical, apply herbicides in the fall. Herbicide success can be variable.
- Use of a non-selective herbicide (such as glyphosate) should be combined with an effective re-vegetation of the site.
- Since toadflax does not compete well with well-established vegetation, establish desirable perennial grasses and winter annuals.
- For three to four years following treatment, monitor areas for new plants from the seed bank.

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Field Bindweed (Morning glory) Fact Sheet

Convolvulus arvensis

Morningglory Family

Chris Evans, River to River CWMA, Bugwood.org

Center and right photos by Steve Dewey, Utah State University, Bugwood.org

Distinguishing Features:

❶ **Flowers:** Trumpet-shaped flowers, light pink to white.
❷ **Seeds / Roots:** Reproduces vegetatively from roots, rhizomes, stem fragments, and by seeds that can lie dormant in the soil for up to 50 years.
❸ **Leaves:** Smooth, arrowhead-shaped leaves.
❹ **Flowering Time:** June - October.
❺ **Life cycle/ other:** A deep-rooted perennial vine with twining stems that can reach 6 ft in length.

Impacts:

- Once established, nearly impossible to fully eradicate.
- Out-competes native plant species by forming dense infestations.
- Field bindweed can reduce crop yields by up to 60%.
- Threatens restoration efforts by out-competing new plantings.

USDA PLANTS Database, USDA NRCS PLANTS Database, Bugwood.org

Control:

- Remove seedlings before they become perennial plants and produce seeds. Don't dispose in backyard compost piles.
- Avoid digging or tilling the soil around mature field bindweed roots; Roots or rhizome fragments left behind may resprout.
- For small infestations repeated hand pulling works eventually, but is highly labor intensive.
- For small infestations herbicides can be painted or brushed on leaves to avoid drift onto desirable plants. Products containing glyphosate are effective when applied in the summer and fall before the leaves die back.
- For large infestations smothering plants with mulch, black plastic or plastic-fiber mats (geotextiles) is another option, but the covering must be kept in place for several years. Success may be somewhat limited as field bindweed can persist without light, sending its underground roots beyond the edge of the covering to start a new infestation.
- For best results, control methods should be used throughout several growing seasons; success in controlling this weed requires the **prevention** of seeds, **competition** from more desirable vegetation and vigilance in **removing new growth.**

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Houndstongue Fact Sheet

Cynoglossum officinale Boraginaceae Family

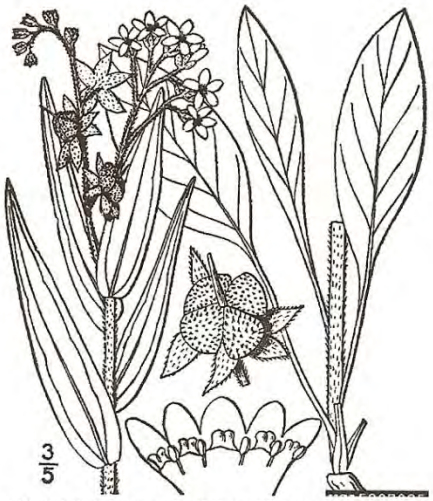
Richard Old, XID Services, Inc., Bugwood.org

Richard Old, XID Services, Inc., Bugwood.org

Richard Old, XID Services, Inc., Bugwood.org

Distinguishing Features:

❶ **Flowers:** Reddish-purple or occasionally white, with five petals.
❷ **Seeds:** Reproduces by seed. Each plant can produce up to 2,000 seeds which remain viable for up 3 years.
❸ **Leaves:** Rough hairy leaves that are up to 12 inches long and 3 inches wide.
❹ **Flowering Time:** Early summer.
❺ **Life cycle/ other:** Biennial.



USDA PLANTS Database, USDA NRCS PLANTS Database, Bugwood.org

Impacts:

- Invades areas that have more than 10% bare ground and prefers gravelly alkaline soils. Does not compete well with native plants.
- The seed pods (nutlets) are covered with hooked spines and provide a mechanism for dispersal on clothing and fur.
- Houndstongue contains pyrrolizidine alkaloids which are highly toxic to horses. However, animals rarely eat it unless it is dried and mixed with hay.

Control:

- For small infestations, houndstongue can be dug-up or hand-pulled if soil conditions permit. Hand pulling may be difficult as the taproot is strong and grows deep into the soil.
- For plants that have already gone to seed, clip and bag the stalks and nutlets. Plants will not regrow the following year as each plant dies following seed production.
- For larger infestations, Escort (Metsulfuron) at 1 to 2 ounces per acre (oz/A) is very effective when applied throughout the growing season. For First-year rosettes, 2,4-D applied at 2 pints/Acre from late May to mid-June is effective. Second-year plants are much less susceptible to 2,4-D.
- Prevent seed spread! Beware to remove all seeds from clothing, shoes, shoelaces, etc.

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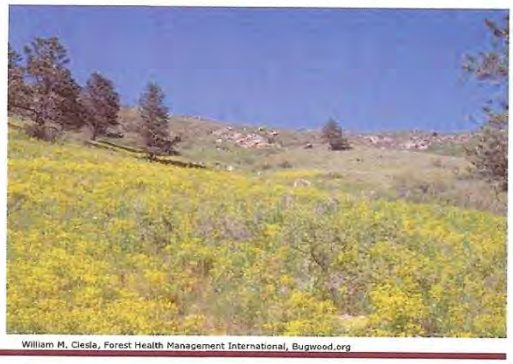
Leafy Spurge Fact Sheet

Euphorbia esula

Euphorbiaceae Family



William M. Ciesla, Forest Health Management International, Bugwood.org

Distinguishing Features:

❶ **Flowers:** Yellowish green flowers surrounded by bracts.
❷ **Seeds:** Each flowering stem produces 140 seeds; Seed capsules throw their seeds up to 15 ft.
❸ **Leaves:** 1-4 inches long and narrow.
❹ **Flowering Time:** May through July.

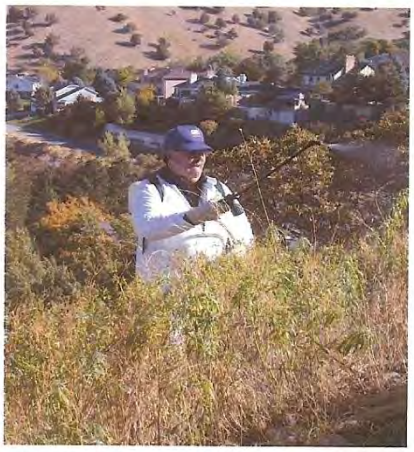
Caution!! All parts of leafy spurge contain a caustic latex sap that can result in skin irritation, redness, swelling, and blisters.

Impacts:

- Leafy spurge is highly competitive with native plants, often replacing native plant communities and decreasing plant diversity and reducing wildlife forage and habitat.
- Leafy spurge is difficult to control once established because of the extensive root system. The above portion of the plant may stand up to 3 feet tall, but the root system can grow over 26 feet down and 15 feet across.
- The roots provide storage for a large nutrient reserve and can move herbicides out of the plant and into the soil.

Control:

- Early control in May/ June is critical to long-term management, as is establishing competitive grass cover.
- Research from North Dakota State University indicates that Tordon 22K (picloram) 2,4-D, Banvel/Vanquish/Clarity (dicamba) are most effective when applied in spring, followed by a fall application to leafy spurge re-growth if needed.
- The key to control leafy spurge is to exhaust the root nutrient stores, causing it to collapse. Control methods must be maintained consistently for 4-5 years, or infestations can quickly rebound.
- Mowing and cultivation are not recommended.



SLCo Weed Supervisor sprays leafy spurge for a private property landowner near Big Cottonwood Canyon.

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Myrtle Spurge Fact Sheet

Euphorbia myrsinites — *Euphorbiaceae* Family



Distinguishing Features:

1. **Flowers:** Inconspicuous flowers with showy yellow bracts.
2. **Seeds:** Plants spread primarily by seed and are capable of projecting seed up to 15 feet.
3. **Leaves:** Blue-green triangular shaped leaves with white milky latex.
4. **Flowering Time:** April - June.

Warning!! All parts of myrtle spurge contain a caustic latex sap that can result in skin irritation, redness, swelling, and blisters. Caution must be taken not to get any of the sap on the skin or in the eyes. If contact does occur, rinse the area thoroughly.

Impacts:

- Myrtle spurge is an escaped ornamental that quickly crowds out native plants.
- Although it is touted as deer resistant and an extremely drought tolerant, it has escaped its original planting and is rapidly invading our foothills and wild lands along the Wasatch Front.
- It poses a threat to children and adults who come in contact with its caustic sap.
- Although Myrtle spurge is not a Utah State listed noxious weed, it ***is a Salt Lake County noxious weed***, and therefore is restricted for sale within the county.

Control:

- Small infestations can be controlled through multiple years of digging up at least 4" of the root.
- Myrtle spurge is best controlled in the spring when the soil is moist and prior to seed production.
- Make sure to dispose of all the plant parts in the garbage instead of composting.
- For larger infestations, myrtle spurge can be effectively controlled with products containing 2, 4-D and dicamba (i.e. Weed B Gon) applied in late fall.

A "Purge your Spurge" participant holds a bag of myrtle spurge.

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Knapweed Fact Sheet
Russian and Squarrose Knapweed

Asteraceae Family

Steve Dewey, USU University, Bugwood.org

(c)*John M Randall*/The Nature Conservancy

Cindy Roche, Bugwood.org

Nathan Belliston/ Utahweed.org

Russian knapweed *(Acroptilon repens)*

Squarrose knapweed (*Centaurea virgata)*

Distinguishing Features:

❶ **Flowers:**
- Russian knapweed: Flowers are pink or purple colored. Bracts have papery tips.
- Squarrose knapweed: Flowers are pink or purple colored. Spiny bracts having a long, recurved (backward pointing) terminal spine.

❷ **Seeds:** Seeds can remain viable up to eight years. Seeds below depths of one and a half inches will not germinate until the soil is disturbed.

❸ **Leaves:**

❹ **Roots:** Russian knapweed roots are easily recognizable by their black or dark brown color and small buds that develop into adventitious shoots, enabling the plant to spread rapidly, and form dense colonies.

❺ **Flowering Time:** June to October depending on species.

❻ **Life cycle/ other:**
- Russian knapweed: Long lived perennial spreading by creeping roots as well as seeds.
- Squarrose knapweed: Perennial.

Steve Dewey, Utah State University, Bugwood.org

K.G. Beck. Bugwood.org

Russian knapweed plant (top) and new shoots emerging from the roots (below).

Impacts:
- Knapweeds are highly competitive plants that can exclude more desirable plants and form large, dense infestations.
- *Russian knapweed* contains an allelopathic compound which inhibits the growth of competing plants.
- Knapweed invasions cause losses averaging up to 63 percent of available grazing forage.

Control:

- The most effective method of control for Russian and squarrose knapweed is to prevent its establishment through proper land management.
- Russian knapweed does not establish readily in healthy, natural habitats.
- For small Russian knapweed sites with limited distribution, pull or dig up plants and remove as much root as possible so the plant will not re-sprout.
- The keys to controlling Russian knapweed are to 1) stress the weed and cause it to expend nutrient reserves in its root system, 2) eliminate new seed production, and 3) control its vegetative spread.
- Carefully monitor sites throughout the growing season to remove missed plants. Expect the level of control work to be intensive for the first several years due to seed banks and the soil disturbance that occurs when pulling or digging.
- Larger infestations can be treated with an appropriate herbicide for the site. Monitor the site throughout the growing season to catch any missed plants.
- Picloram (TordonTM) has been determined to be the most effective herbicide on Russian knapweed regardless of the time of application. (TNC Species Management Summary, 2005).
- Once the initial infestation has been controlled, native species should be replanted to act as a vegetative suppressant.
- Mowing alone is not recommended for control. Since the plant has the ability to flower below the mower height, mowing alone will not prevent seed production.

Top and Botton photos by Steve Dewey, Utah State University, Bugwood.org

A Mormon cricket perches on a squarrose knapweed plant.

Squarrose knapweed in full bloom.

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Knapweed Fact Sheet

Spotted and Diffuse Knapweed

Asteraceae Family

Cindy Roche, Bugwood.org

Spotted knapweed
Centaurea maculosa

Richard Old, XID Services, Inc., Bugwood.org

Diffuse knapweed
C. diffusa

L.L. Berry, Bugwood.org

Distinguishing Features:

❶ **Flowers:**
- Spotted knapweed: Flowers are pink or purple colored. Bract tips have black triangular spots.
- Diffuse knapweed: Flowers are predominantly white, occasionally pink-purple. Bracts end in sharp, rigid spines with the terminal spine being distinctly longer. *Sometimes can have black spots, but will always have a terminal spine.*

❷ **Seeds:** Preventing seed production is imperative to control of all knapweeds! Typically, seeds can remain viable up to eight years. Seeds below depths of one and a half inches will not germinate until the soil is disturbed.

❸ **Leaves:** Leaves are blue-green, deeply lobed, and sparsely arranged along the stem.

❹ **Flowering Time:** June to October.

❺ **Life cycle/ other:** *Both can germinate in the spring and fall.*
- Spotted knapweed: Biennial or short lived perennial.
- Diffuse knapweed: Biennial or short lived perennial. Occasionally an annual.

Impacts:

➢ Knapweeds are highly competitive plants that can exclude more desirable plants and form large, dense

Both pics by Richard Old, XID Services, Inc., Bugwood.org

Diffuse knapweed rosette (top) and mature flowering plant (bottom).

infestations.

- Spotted knapweed threatens wildlife habitat and pastures because of its ability to quickly move from disturbed sites into relatively undisturbed, beneficial plant communities.
- During the winter, knapweed plants will break off at the base of the stem and form tumbleweeds. These tumbleweeds are blown around by the wind therefore spreading seed to un-infested areas.
- Knapweed invasions cause losses averaging up to 63 percent of available grazing forage.

Marisa Williams, University of Arkansas, Fayetteville, Bugwood.org

Spotted knapweed flowering.

Control:

- Diffuse and spotted knapweed can be managed similarly. They are readily controlled with herbicides. **However, the weeds will reinvade unless cultural techniques are used!**
- **For small sites** with limited distribution, pull or dig up plants and remove as much root as possible so the plant will not re-sprout. Roots tend to break off four to six inches beneath the ground.
- Carefully monitor sites throughout the growing season to remove missed plants. Expect the level of control work to be intensive for the first several years due to seed banks and the soil disturbance that occurs when pulling or digging.
- **Larger infestations** can be treated with an appropriate herbicide for the site. Monitor the site throughout the growing season to catch any missed plants.
- Weed scientists at both Montana State University and Colorado State University indicate that 1 pt/A of Tordon (0.25 lb) controls spotted knapweed for two to three years, but the weed will reinvade the area unless other management techniques are used.
- Irrigation (where possible) may help stimulate grass competition. Diffuse knapweed will not tolerate flooding and shade.
- Livestock (sheep, goats, cattle) will eat diffuse and spotted knapweed. Recent research completed by Colorado State University shows that cattle grazing diffuse knapweed twice in spring decreased seed set by 50 percent.
- Mowing alone is *not recommended* for control. Since the plant has the ability to flower below the mower height, mowing alone will not prevent seed production.

Steve Dewey, Utah State University, Bugwood.org

Spotted knapweed will infest dry and arid lands, like this Utah interstate right-of-way.

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Weed Control

Home › Noxious Weeds › Pink and Purple Flower Plants › Musk Thistle

Musk Thistle

Information | Images

Carduus nutans
Biennial

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Identification and management tips

- Musk thistle flowers are large reddish-purple and "nod" at maturity.
- It is classified as a biennial, although it often germinates in late summer, it over winters as a rosette, and produces flowers and seeds the following summer.
- Musk thistle is a prolific seed producer. One plant can set up to 20,000 seeds. However, only one-third of the seeds are viable.
- The key to successful musk thistle control is to prevent seed

- production.
- For small infestations, the most effective control is digging up the rosettes in the spring.
- Musk thistle will not tolerate tillage and can be removed easily by severing its root below ground with a shovel or hoe.
- For large infestations, herbicides such as Tordon, Vanquish/Clarity or 2,4-D can be applied to musk thistle rosettes in spring or in the fall after new rosettes emerge. Apply Ally or Telar up to the early flower growth stage.
- However, as with all weed control, an integrated approach is best. Musk thistle's tolerance to most herbicides increases after it bolts, and therefore herbicides should be applied selectively and only at the most appropriate time.

Most effective control methods and timing

March	April	May	June	July	Aug	Sept	Oct
Prev Mech Chem	Prev Mech Chem	Prev Mech Chem	Prev Mech	Prev Mech	Prev Mech	Prev Mech Chem	Prev Mech Chem

Prevention (Prev) Monitor and destroy new plants before seed production.

Mechanical (Mech) Hand pulling, digging, cutting, mowing and tilling.

Cultural (Cult) Biological control agents, livestock grazing, and revegetation practices.

Chemical (Chem) Selective herbicides based on the plant and the specific location. Check our weed fact sheets for specific control information.

DIVERSE SALT LAKE COUNTY

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Weed Control

Home › Noxious Weeds › White and Green Flowering Plants › Perennial Pepperweed

Perennial Pepperweed

Information | Images

Lepidium latifolium
Long-lived perennial

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Identification and management tips

- A 1 - 3 foot tall perennial with waxy leaves, white flowers, and creeping rhizomes. Also known as tall whitetop.
- Perennial pepperweed is often confused with hoary cress (Cardaria draba); also called whitetop. However, unlike the taller perennial pepperweed, hoary cress stems are less than 3 feet tall and have leaves that clasp the stem and lack an obvious petiole.
- Impacts riparian areas and wetlands by forming large dense

- stands that displace native plants.
- For small infestations, pull or dig plants (try to remove as much of the root as possible) before they go to seed. This is an effective way of controlling a few scattered plants.
- For larger infestations, the use of glyphosate (Roundup and other products) in the spring is another option, but care must be taken to avoid injuring nearby plants.
- Again, timing is everything! Don't waste your glyphosate on mature pepperweed in July ..... it is just too late!

Most effective control methods and timing

March	April	May	June	July	Aug	Sept	Oct
	Prev Mech Chem	Prev Mech Chem	Prev Mech Chem				

Prevention (Prev)
Monitor and destroy new plants before seed production.

Mechanical (Mech)
Hand pulling, digging, cutting, mowing and tilling.

Cultural (Cult)
Biological control agents, livestock grazing, and revegetation practices.

Chemical (Chem)
Selective herbicides based on the plant and the specific location. Check our weed fact sheets for specific control information.

Links

- Weber County Weed Abatement: Controlling Whitetop & Perennial Pepperweed

Puncturevine (a.k.a Goathead) Fact Sheet

Tribulus terrestris — *Zygophyllaceae* Family

Richard Old, XID Services, Inc., Bugwood.org

Forest & Kim Starr, U.S. Geological Survey, Bugwood.org

Richard Old, XID Services, Inc., Bugwood.org

Distinguishing Features:

1. **Flowers**: Yellow, five petaled flowers, approximately ½ inch in size.
2. **Seeds**: A spiny bur, containing 5 seeds; Matures to a tan or grey and is very hard. 500 - 2,000 seeds per plant that can remain viable in the soil for 4-5 years.
3. **Leaves**: Small, hairy, opposite.
3. **Flowering Time**: Mid summer. Germinates and goes to seed in 2 - 3 weeks.
5. **Life cycle/ other**: Annual forming dense mats reaching 2-5 ft in diameter.

Richard Old, XID Services, Inc., Bugwood.org

Puncturvine produces sharply pointed burrs that stick painfully to bare feet and cause bicycle flats, reducing the recreational potential of many areas.

Impacts:

- The hard, spiky seed case can injure livestock, people, and pets when stepped on and can puncture bicycle and car tires.
- A problem in orchards, turf, pastures, and recreational trails.

Control:

- Long-term control of puncturevine can be achieved by consistently reducing the amount of seed in the soil. Burrs that have dropped after removing the plant may be collected and removed by sweeping or raking the ground.
- For small infestations of puncturevine in the home landscape and garden, the most effective management is removal of seedlings and older plants by digging or hoeing, taking care to also remove any burrs that fall off the plant.
- For larger infestations, there are few preemergent herbicides that are effective. Products containing oryzalin, benefin, or trifluralin will provide partial control of germinating seeds.
- Postemergence, products containing 2, 4-D, glyphosate, and dicamba are effective when applied when the plants are small.
- Biological control from two introduced weevils has been very effective in mild climates, but has failed to establish in Utah possibly because of our cold winters.

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Purple Starthistle

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Weed Control

Home › Noxious Weeds › Pink and Purple Flower Plants › Purple Loosestrife

Purple Loosestrife

Information | Images

Lythrum salicaria
Perennial

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Identification and management tips

- Purple loosestrife flowers are magenta-colored and bloom from June to September.
- The root system consists rhizomes that spread rapidly to form dense mats.
- Small infestations of young purple loosestrife plants may be pulled by hand, preferably before seed set. Older plants can be removed with a shovel.
- Large infestations can be effectively controlled using either a

- glyphosate or triclopyr based herbicides approved for use in or near water.
- Chemical applications are most effective when applied late in the season when plants are preparing for dormancy. However, it may be best to do a mid-summer and a late season treatment, to reduce the amount of seed produced.
- For long term control of large infestations biological control is recommended.

Most effective control methods and timing

March	April	May	June	July	Aug	Sept	Oct
		Prev Mech	Prev Mech	Prev Mech Chem	Prev Mech Chem	Prev Mech Chem	Prev Mech Chem

Prevention (Prev)
Monitor and destroy new plants before seed production.

Mechanical (Mech)
Hand pulling, digging, cutting, mowing and tilling.

Cultural (Cult)
Biological control agents, livestock grazing, and revegetation practices.

Chemical (Chem)
Selective herbicides based on the plant and the specific location. Check our weed fact sheets for specific control information.

Links

- Weber County Weed Abatement: Purple Loosestrife
- USDA Forest Service: Invasive Plants Website; Weed of the Week

DIVERSE SALT LAKE COUNTY

Find It

Go

- Noxious Weeds
- Education and Mapping
- FAQ
- File a Complaint
- Contact Us
- Links
- Credits and References
- Public Works Home

Weed Control

Home ⟩ Noxious Weeds ⟩ Pink and Purple Flower Plants ⟩ Salt Cedar

Salt Cedar

Information | Images

Tamarix racimossima
Perennial shrub

View Larger Images

Identification and management tips

- Saltcedar is an aggressive, woody shrub with large sprays of small whitish or pinkish flowers that are born in finger-like clusters.
- Leaves are very small and scaly and arranged alternatively.
- For smaller infestations, cut saltcedar stems off at ground level (within 2 inches of the soil surface) and immediately paint the cut surface with triclopyr or imazapyr.
- The recent introduction of a biological control, the saltcedar leaf

- beetle (Diorhabda elongata) in Delta Utah, has shown very promising through rapid expansion and almost complete defoliation.
- Repeated defoliation by the leaf beetle after several years has resulted in saltcedar death.

Most effective control methods and timing

March	April	May	June	July	Aug	Sept	Oct
	Prev Cult	Prev Cult	Cult	Cult	Cult	Chem Cult	Chem Cult

Prevention (Prev) Monitor and destroy new plants before seed production.

Mechanical (Mech) Hand pulling, digging, cutting, mowing and tilling.

Cultural (Cult) Biological control agents, livestock grazing, and revegetation practices.

Chemical (Chem) Selective herbicides based on the plant and the specific location. Check our weed fact sheets for specific control information.

Links

- USDA Forest Service, Invasive Plants Website, Weed of the Week: Saltcedar
- TNC Element Stewardship Abstract: Tamarisk

Scotch Thistle Fact Sheet

Onopordum acanthium Asteraceae Family

Steve Dewey, Utah State University, Bugwood.org

Richard Old, XID Services, Inc., Bugwood.org

Vince Belleci, Bugwood.org

Distinguishing Features:

❶ **Flowers**: Plants are covered with 1" spiny purple flowers.
❷ **Seeds**: Plants produce up to 6,000 seeds annually with seeds remaining viable in the soil up to 5 years.
❸ **Leaves**: Up to 2 ft long and covered in cottony/ woolly hairs with spines on the margins.
❹ **Flowering Time**: June - September.
❺ **Life cycle/ other**: Biennial growing up to 8 feet tall and 3 feet wide.

Impacts:

- Scotch thistle primarily invades disturbed lands.
- Its rapid growth and large size reduce available resources for smaller plants. It competes with and decreases desirable forage, and can form a dense monoculture stand.
- It can act as a living barbed-wire fence, preventing livestock and wildlife access to feed and water.

Vince Belleci, Bugwood.org

Control:

- Prevention of this plant's invasion is the best management. Control plants before they flower and set seed.
- Control of these plants must include preventing new seed dispersal for 6 years.
- For small infestations the best method for removing infestations are digging them out by hand.
- For larger infestations the use of herbicide on young plants in the rosette stage before flowering prevents seed set. Picloram and metsulfuron offer excellent control.
- In both small and large infestations, plant competition by seeding disturbed areas with desirable grass species that will compete for resources but not be affected by the broad leaf herbicides is best for long-term management.

SALT LAKE COUNTY
Salt Lake County Weed Control Program
www.weeds.slco.org
801-562-6466
weeds@slco.org

DIVERSE SALT LAKE COUNTY

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- Links
- Credits and References
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Weed Control

Home ⟩ Noxious Weeds ⟩ Orange and Yellow Flowering Plants ⟩ St. Johns Wort

St.Johns Wort

Information | Images

Hypericum perforatum
Perennial

View Larger Images

Identification and management tips

- St. Johnswort flowers have five yellow petals. The leaves, when held up to the light, appear to have tiny, transparent perforations.
- St. Johnswort is a tap rooted perennial plant that spreads by seed and by underground and aboveground creeping stems.
- St. Johnswort flowers from June to September.
- A single plant is capable of producing 15,000 to 33,000 seeds per year. The seeds may remain viable in the soil for up to ten

- years.
- On small and isolated infestations, hand pulling or digging of young plants may be effective if repeated several times per season.
- St. Johnswort can be difficult to eradicate with herbicides because of its extensive root system, but control of new or small infestations can be accomplished.
- In pasture, rangeland, and non-cropland sites, foliar applications of 2,4-D at 2 quarts per acre will destroy the plant in seedling and pre-flowering stages. Spring application of one quart per acre of picloram is also effective and recommended.

Most effective control methods and timing

March	April	May	June	July	Aug	Sept	Oct
	Prev Mech Chem	Prev Mech Chem	Prev Mech				

Prevention (Prev)
Monitor and destroy new plants before seed production.

Mechanical (Mech)
Hand pulling, digging, cutting, mowing and tilling.

Cultural (Cult)
Biological control agents, livestock grazing, and revegetation practices.

Chemical (Chem)
Selective herbicides based on the plant and the specific location. Check our weed fact sheets for specific control information.

Links

Yellow Starthistle Fact Sheet

Centaurea solstitialis

Asteraceae Family

Left & center photos by Steve Dewey, Utah State University, Bugwood.org

Distinguishing Features:

❶ **Flowers:** Single yellow flowers per branch.
❷ **Seeds:** A single plant can produce 150,000 seeds per year.
❸ **Leaves:** Sparse along the stem; Woolly and deeply lobed.
❹ **Flowering time:** June through August.
❺ **Life cycle:** Winter annual (i.e. germinates in the fall and then flowers the following summer).

Impacts:

- Yellow starthistle is extremely competitive with annual grasses on rangelands, pastures and fields.
- It often completely changes the natural habitat it invades, native plant communities are lost, erosion is increased, and wildlife forage is reduced.
- The large spines can also have significant damage animal mouths and eyes if grazed.
- When horses eat yellow starthistle, it causes "Chewing Disease," a fatal neurological disorder.
- Lastly, the large spines make it difficult for recreational activities such as hiking, biking, and horse riding.

Control:

- Yellow starthistle control is best achieved when a long-term approach is taken.
- As an annual, Yellow starthistle must produce seed every year in order to remain competitive; the most successful management methods include eliminating seed production.
- In both small and large infestations, plant competition by seeding disturbed areas with desirable grass species that will compete for resources but not be affected by the broad leaf herbicides is best for long-term management.

Salt Lake County Weed Program staff spray yellow starthistle near Little Dell Reservoir.

SALT LAKE COUNTY

Salt Lake County Weed Control Program
www.weeds.slco.org
801-562-6466
weeds@slco.org

DIVERSE SALT LAKE COUNTY

Find It

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- Noxious Weeds
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- Credits and References
- Public Works Home

Weed Control

Home › Noxious Weeds › Orange and Yellow Flowering Plants › Yellow Toadflax

Yellow Toadflax

Information | Images

Linaria vulgaris
Creeping perennial

View Larger Images

Identification and management tips

- Yellow toadflax flowers are bright yellow and resemble snapdragons.
- The leaves of yellow toadflax are easily distinguished from dalmation toadflax. Yellow toadflax leaves are narrow, lance-shaped, and pointed at both ends. The leaves of dalmation toadflax are shorter, wider, and broad-based.
- Yellow toadflax aggressively forms colonies through adventitious buds from creeping root systems.

- Flowering occurs from May through August and seeds mature from July through October.
- A mature plant can produce up to 30,000 seeds annually. These seeds can remain dormant for up to ten years.
- The key to controlling yellow toadflax is to limit vegetative spread of established colonies (by cutting, pulling, or spraying seed stalks prior to seed set, or by using insects to destroy flowers, seeds, or damage plants).
- Hand pulling toadflax before seed set each year can be an effective control method especially in coarse-textured soils where large portions of the roots can be pulled. However, this method must be repeated as long as there are viable seeds in the soil (up to 10 years).
- Yellow toadflax is difficult to control with herbicides, and the effectiveness is highly variable.
- Herbicides should be applied during flowering when carbohydrate reserves in the root of the plants are at their lowest. Picloram or dicamba at 1 lb. ai/acre, or glyphosate at 1.5 lb. ai/acre, will kill yellow toadflax plants in some situations.

Most effective control methods and timing

March	April	May	June	July	Aug	Sept	Oct
	Prev Mech	Prev Mech	Prev Mech	Prev Mech Chem	Prev Mech Chem	Prev Mech	Prev Mech

Prevention (Prev)
Monitor and destroy new plants before seed production.

Mechanical (Mech)
Hand pulling, digging, cutting, mowing and tilling.

Cultural (Cult)

Biological control agents, livestock grazing, and revegetation practices.

Chemical (Chem)
Selective herbicides based on the plant and the specific location. Check our weed fact sheets for specific control information.

Links

- Colorado State Parks Weed Profile
- University of Nevada Cooperative Extension

Photo credits

Left to right:

- Michael Shephard, USDA Forest Service, Bugwood.org
- John Cardina, The Ohio State University, Bugwood.org
- L.L. Berry, Bugwood.org

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APPENDIX H

"Wildlife-Aquatic-Safe" Herbicides Approved for Use within the Jordan River Corridor

(Product Labels)

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"WILDLIFE - AQUATIC SAFE"
- PHRAGMITES
- CATTAIL

Specimen Label

Dow AgroSciences

Rodeo®

Herbicide

For control of annual and perennial weeds and woody plants in forests, non-crop sites, and in and around aquatic sites; also for use in wildlife habitat areas, for perennial grass release, and grass growth suppression and grazed areas on these sites.

Avoid contact of herbicide with foliage, green stems, exposed non-woody roots or fruit of crops, desirable plants and trees, because severe injury or destruction may result.

Active Ingredient(s):	
glyphosate† N-(phosphonomethyl)glycine, isopropylamine salt	53.8%
Inert Ingredients	46.2%
Total Ingredients	100.0%

†Contains 5.4 pounds per gallon glyphosate, isopropylamine salt (4 pounds per gallon glyphosate acid).

EPA Reg. No. 62719-324

Keep Out of Reach of Children

CAUTION PRECAUCION

Si usted no entiende la etiqueta, busque a alguien para que se la explique a usted en detalle. (If you do not understand the label, find someone to explain it to you in detail.)

Precautionary Statements

Hazards to Humans and Domestic Animals

Harmful If Inhaled

Avoid breathing spray mist. Remove contaminated clothing and wash before reuse. Wash thoroughly with soap and water after handling.

Personal Protective Equipment (PPE)

Applicators and other handlers must wear:

- Long-sleeved shirt and long pants
- Shoes plus socks.

Follow manufacturer's instructions for cleaning/maintaining PPE (Personal Protective Equipment). If no such instructions for washables, use detergent and hot water. Keep and wash PPE separately from other laundry.

Engineering Controls

When handlers use closed systems, enclosed cabs, or aircraft in a manner that meets the requirements listed in Worker Protection Standard (WPS) for agricultural pesticides [40 CFR 170.240 (d) (4-6)], the handler PPE requirements may be reduced or modified as specified in the WPS.

User Safety Recommendations

Users should:

- Wash hands before eating, drinking, chewing gum, using tobacco, or using the toilet.
- Remove clothing immediately if pesticide gets inside. Then wash thoroughly and put on clean clothing.

First Aid

If inhaled: Move person to fresh air. If person is not breathing, call 911 or an ambulance, then give artificial respiration, preferably mouth-to-mouth if possible. Call a poison control center or doctor for further treatment advice.

Have the product container or label with you when calling a poison control center or doctor, or going for treatment. You may also contact 1-800-992-5994 for emergency medical treatment information.

Environmental Hazards

Do not contaminate water when cleaning equipment or disposing of equipment washwaters. Treatment of aquatic weeds can result in oxygen depletion or loss due to decomposition of dead plants. This oxygen loss can cause fish suffocation.

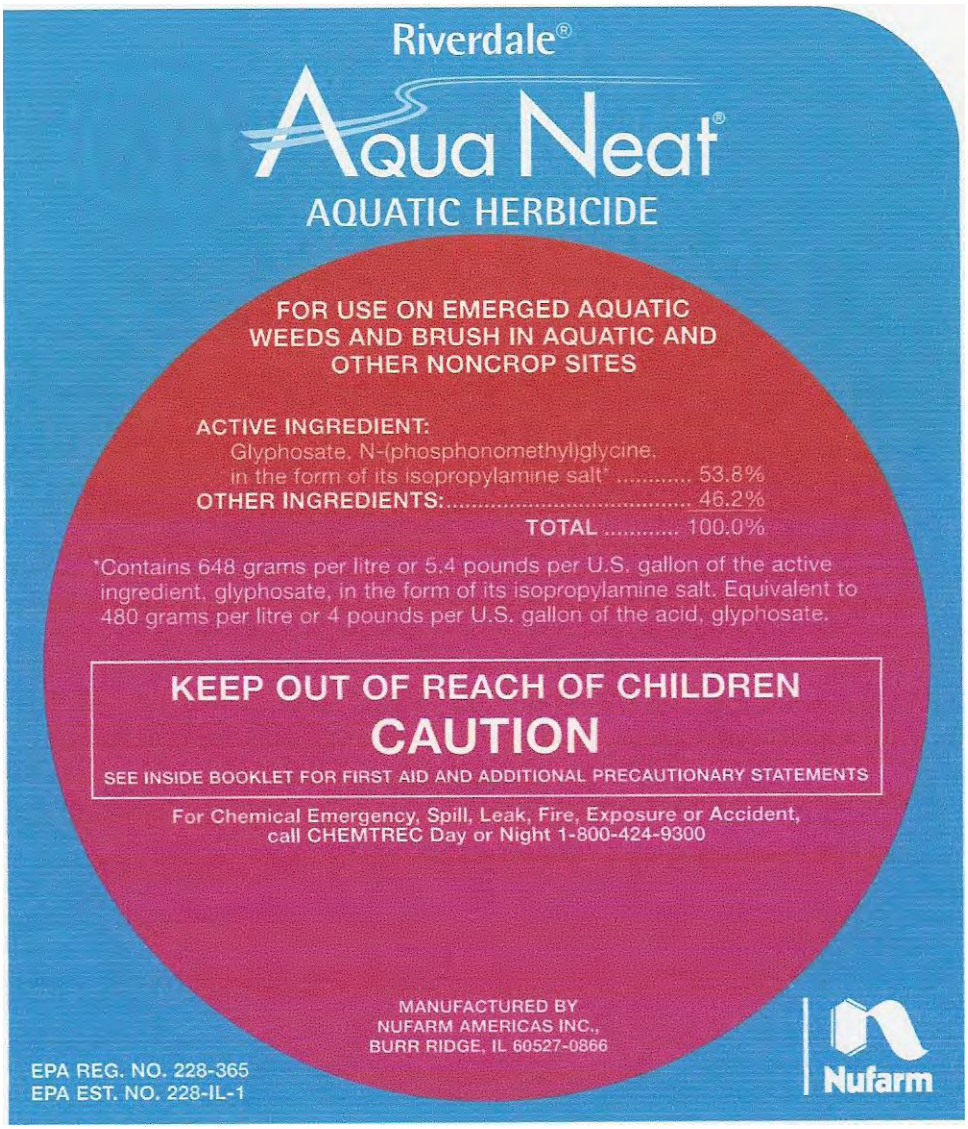
In case of leak or spill, soak up and remove to a landfill.

Physical or Chemical Hazards

Spray solutions of this product should be mixed, stored and applied using only stainless steel, aluminum, fiberglass, plastic or plastic-lined steel containers.

Do not mix, store or apply this product or spray solutions of this product in galvanized steel or unlined steel (except stainless steel) containers or spray tanks. This product or spray solutions of this product react with such containers and tanks to produce hydrogen gas, which may form a highly combustible gas mixture. This gas mixture could flash or explode, causing serious personal injury, if ignited by open flame, spark, welder's torch, lighted cigarette or other ignition source.

Notice: Read the entire label. Use only according to label directions. **Before using this product, read Terms and Conditions of Use, Warranty Disclaimer, Inherent Risks of Use, and Limitation of Remedies elsewhere on this label. If terms are unacceptable, return at once unopened.**


Riverdale®
Aqua Neat®
AQUATIC HERBICIDE
FOR USE ON EMERGED AQUATIC WEEDS AND BRUSH IN AQUATIC AND OTHER NONCROP SITES
ACTIVE INGREDIENT:
Glyphosate, N-(phosphonomethyl)glycine, in the form of its isopropylamine salt* 53.8%
OTHER INGREDIENTS: 46.2%
TOTAL 100.0%
*Contains 648 grams per litre or 5.4 pounds per U.S. gallon of the active ingredient, glyphosate, in the form of its isopropylamine salt. Equivalent to 480 grams per litre or 4 pounds per U.S. gallon of the acid, glyphosate.
KEEP OUT OF REACH OF CHILDREN
CAUTION
SEE INSIDE BOOKLET FOR FIRST AID AND ADDITIONAL PRECAUTIONARY STATEMENTS
For Chemical Emergency, Spill, Leak, Fire, Exposure or Accident, call CHEMTREC Day or Night 1-800-424-9300
MANUFACTURED BY
NUFARM AMERICAS INC.,
BURR RIDGE, IL 60527-0866
EPA REG. NO. 228-365
EPA EST. NO. 228-IL-1
Nufarm

FOR CONTROL OF UPLAND WEEDS ALONG JORDAN RIVER PARKWAY TRAIL

Specimen Label

Dow AgroSciences

Milestone®

SpecialtyHerbicide

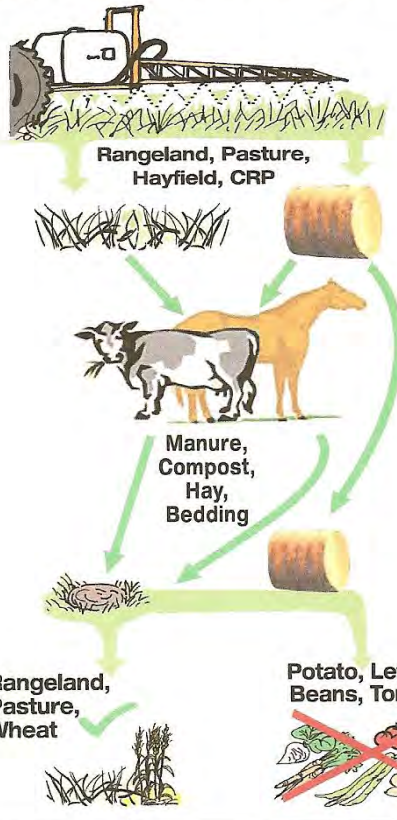
® ™Trademark of Dow AgroSciences LLC

- **For control of susceptible weeds and certain woody plants, including invasive and noxious weeds, on rangeland, permanent grass pastures, Conservation Reserve Program (CRP) acres, non-cropland areas (such as roadsides), non-irrigation ditch banks, natural areas (such as wildlife management areas, wildlife openings, wildlife habitats, recreation areas, campgrounds, trailheads and trails), and grazed areas in and around these sites.**

IMPORTANT ADVISORY TO PREVENT INJURY TO DESIRABLE PLANTS

- It is mandatory to follow the ***"Use Precautions and Restrictions"*** section of this product label.
- Carefully read the section ***"Plant Residues or Manure."***
- Manure and urine from animals consuming treated grass or hay may contain enough aminopyralid to cause injury to sensitive broadleaf plants.
- Inform the recipient of hay or manure from animals grazing pastures or feeding on hay from areas treated with aminopyralid of the label use precautions and restrictions.
- Consult with a Dow AgroSciences representative if you do not understand the "Use Precautions and Restrictions". **Call [1-(800) 263-1196] Customer Information Group.**

Hay and Manure Management



"Russian Olive / Salt Cedar Stump Treatment"

Specimen Label

Dow AgroSciences

Garlon® 4 Ultra

Specialty Herbicide

®Trademark of Dow AgroSciences LLC

For the control of woody plants and annual and perennial broadleaf weeds in non-crop areas, including industrial manufacturing and storage sites, rights-of-way such as electrical power lines, communication lines, pipelines, roadsides, railroads, fence rows, non-irrigation ditch banks, forests and in the establishment and maintenance of wildlife openings. Use on these sites may include application to grazed areas.

Active Ingredient:	
triclopyr: 3,5,6-trichloro-2- pyridinyloxyacetic acid, butoxyethyl ester	60.45%
Other Ingredients	39.55%
Total	100.00%

Acid equivalent: triclopyr – 43.46% - 4 lb/gal

EPA Reg. No. 62719-527

Keep Out of Reach of Children

CAUTION PRECAUCION

Si usted no entiende la etiqueta, busque a alguien para que se la explique a usted en detalle. (If you do not understand the label, find someone to explain it to you in detail.)

Precautionary Statements

Hazards to Humans and Domestic Animals

Causes Moderate Eye Irritation • Harmful If Swallowed • Prolonged Or Frequently Repeated Skin Contact May Cause Allergic Reactions In Some Individuals

Avoid contact with skin, eyes, or clothing. Wear gloves and protective clothing. Wash thoroughly with soap and water after handling and before eating, drinking, chewing gum, or using tobacco.

Personal Protective Equipment (PPE)

Some materials that are chemical-resistant to this product are listed below. If you want more options, follow the instructions for category E on an EPA chemical resistance category selections chart.

WPS Uses: Applicators and other handlers who handle this pesticide for any use covered by the Worker Protection Standard (40 CFR Part 170) – for this product, forestry sites -- must wear:

- Long-sleeved shirt and long pants
- Chemical-resistant gloves (≥14 mils) such as barrier laminate, nitrile rubber, neoprene rubber, or viton
- Shoes plus socks

Non-WPS Uses: Applicators and other handlers who handle this pesticide for any use NOT covered by the Worker Protection Standard (40 CFR Part 170) – for this product, non-forestry sites -- must wear:

- Long-sleeved shirt and long pants
- Chemical-resistant gloves
- Shoes plus socks

Follow the manufacturer's instructions for cleaning/maintaining PPE. If no such instructions for washables, use detergent and hot water. Keep and wash PPE separately from other laundry.

Engineering Controls

When handlers use closed systems, enclosed cabs, or aircraft in a manner that meets the requirements listed in the Worker Protection Standard (WPS) for agricultural pesticides (40 CFR 170.240(d)(4-6)), the handler PPE requirements may be reduced or modified as specified in the WPS.

User Safety Recommendations

Users should:

- Wash hands before eating, drinking, chewing gum, using tobacco, or using the toilet.
- Remove clothing immediately if pesticide gets inside. Then wash thoroughly and put on clean clothing.
- Remove PPE immediately after handling this product. Wash the outside of gloves before removing. As soon as possible, wash thoroughly and change into clean clothing.

First Aid

If on skin or clothing: Take off contaminated clothing. Rinse skin immediately with plenty of water for 15-20 minutes. Call a poison control center or doctor for treatment advice.
If in eyes: Hold eye open and rinse slowly and gently with water for 15-20 minutes. Remove contact lenses, if present, after the first 5 minutes, then continue rinsing eye. Call a poison control center or doctor for treatment advice.
If swallowed: Call a poison control center or doctor immediately for treatment advice. Have person sip a glass of water if able to swallow. Do not induce vomiting unless told to do so by a poison control center or doctor. Do not give anything by mouth to an unconscious person.

Have the product container or label with you when calling a poison control center or doctor, or going for treatment. You may also contact 1-800-992-5994 for emergency medical treatment information.

"Generic For Garlon"

TAHOE™ 4E
HERBICIDE

FOR THE CONTROL OF WOODY PLANTS AND BROADLEAF WEEDS ON RIGHTS-OF-WAY, INDUSTRIAL SITES, NON-CROP AREAS, NON-IRRIGATION DITCH BANKS, FORESTS, AND WILDLIFE OPENINGS, INCLUDING GRAZED AREAS ON THESE SITES.

ACTIVE INGREDIENTS:

Triclopyr: 3,5,6-trichloro-2-pyridinyloxyacetic acid, butoxyethyl ester	61.6%
OTHER INGREDIENTS:	38.4%
Total	100.0%

Contains petroleum distillates

Acid Equivalent: triclopyr ..... 44.3%, 4 lbs./gal.

KEEP OUT OF REACH OF CHILDREN

CAUTION - PRECAUCION

Si usted no entiende la etiqueta, busque a alguien para que se la explique a usted en detalle. (If you do not understand the label, find someone to explain it to you in detail.)

See Inside Booklet for First Aid and Additional Precautionary Statements

For Chemical Spill, Leak, Fire, Exposure Call CHEMTREC (800) 424-9300.
For Medical Emergencies Only, Call 877-325-1840.

EPA Reg. No. 228-517 **EPA Est. No. 228-IL-1**

PRECAUTIONARY STATEMENTS
HAZARDS TO HUMANS AND DOMESTIC ANIMALS
CAUTION - PRECAUCION

Harmful if swallowed, inhaled, or absorbed through skin. Avoid contact with eyes, skin, or clothing. Avoid breathing mists or vapors. Avoid contamination of food.

PERSONAL PROTECTIVE EQUIPMENT (PPE)

Some materials that are chemical-resistant to this product are listed below. If you want more options, follow the instructions for category E on an EPA chemical resistance category selections chart.

WPS Uses: Applicators and other handlers who handle this pesticide for any use covered by the Worker Protection Standard (40 CFR Part 170) - in general, agricultural-plant uses are covered - must wear:

- Long-sleeved shirt and long pants
- Chemical-resistant gloves such as Barrier Laminate, Nitrile Rubber, Neoprene Rubber, or Viton
- Shoes plus socks

Non-WPS Uses: Applicators and other handlers who handle this pesticide for any use NOT covered by the Worker Protection Standard (40 CFR Part 170) - in general, only agricultural-plant uses are covered by the WPS - must wear:

- Long -sleeved shirt and long pants
- Shoes plus socks

Follow manufacturer's instructions for cleaning/maintaining PPE. If no such instructions for washables, use detergent and hot water. Keep and wash PPE separately from other laundry.

USER SAFETY RECOMMENDATIONS

Users should:

- Wash hands before eating, drinking, chewing gum, using tobacco, or using the toilet.
- Remove clothing immediately if pesticide gets inside. Then wash thoroughly and put on clean clothing.

FIRST AID

IF ON SKIN	• Rinse skin immediately with plenty of water for 15 to 20 minutes. • Call a poison control center or doctor for treatment advice.
IF SWALLOWED	• Call a poison control center or doctor immediately for treatment advice. • Have person sip a glass of water if able to swallow. • Do not induce vomiting unless told to do so by the poison control center or doctor. • Do not give anything by mouth to an unconscious person.

HOT LINE NUMBER

Have the product container or label with you when calling a poison control center or doctor, or going for treatment. You may also contact 1-877-325-1840 for emergency medical treatment information.

NOTE TO PHYSICIAN

Probable mucosal damage may contraindicate the use of gastric lavage.

ENVIRONMENTAL HAZARDS

This pesticide is toxic to fish. Do not apply directly to water, to areas where surface water is present, or to intertidal areas below the mean high water mark. Do not contaminate water when disposing of equipment washwaters.

PHYSICAL OR CHEMICAL HAZARDS

Do not use or store near heat or open flame. Do not cut or weld container.

DIRECTIONS FOR USE

It is a violation of Federal law to use this product in a manner inconsistent with its labeling. Read all Directions for Use carefully before applying.

Do not apply this product in a way that will contact workers or other persons, either directly or through drift. Only protected handlers may be in the area during application. For any requirements specific to your state or tribe, consult the agency responsible for pesticide regulation.

Agricultural Chemical: Do not ship or store with food, feeds, drugs or clothing.

AGRICULTURAL USE REQUIREMENTS

Use this product only in accordance with its labeling and with the Worker Protection Standard, 40 CFR Part 170. This standard contains requirements for the protection of agricultural workers on farms, forests, nurseries, and greenhouses, and handlers of agricultural pesticides. It contains requirements for training, decontamination, notification, and emergency assistance. It also contains specific instructions and exceptions pertaining to the statements on this label about personal protective equipment (PPE) and restricted-entry interval. The requirements in this box only apply to uses of this product that are covered by the Worker Protection Standard.

Do not enter or allow worker entry into treated areas during the restricted-entry interval (REI) of 12 hours. PPE required for early entry to treated areas that is permitted under the Worker Protection Standard and that involves contact with anything that has been treated, such as plants, soil, or water, is:

- Coveralls
- Chemical-resistant gloves such as Barrier Laminate, Nitrile Rubber, Neoprene Rubber or Viton
- Shoes plus socks

AGRICULTURAL USE REQUIREMENTS FOR FORESTRY USES: For use of this product on forestry sites, follow PPE and Reentry restrictions in the Agricultural Use Requirements section of this label.

USE REQUIREMENTS FOR NON-CROPLAND AREAS: No Worker Protection Standard worker entry restrictions or worker notification requirements apply when this product is applied to non-cropland.

NON-AGRICULTURAL USE REQUIREMENTS

The requirements in this box apply to uses of this product that are NOT within the scope of the Worker Protection Standard for Agricultural Pesticides (40 CFR Part 170). The WPS applies when this product is used to produce agricultural plants on farms, forests, nurseries, or greenhouses.

Entry Restrictions for Non-WPS Uses: For applications to non-cropland areas, do not allow entry into areas until sprays have dried, unless applicator and other handler PPE is worn.

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APPENDIX I

"Mutt Mitt" Station Information

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Mutt Mitt®
1-800-697-6084

100% degradable, 2-ply construction - Mutt Mitts are designed to protect you and the environment.

Environment

Degradable

Landfill

Watershed

Mutt Mitts - 100% Degradable

- Most plastic bags are not designed to breakdown in a landfill
- Non-degradable plastic bags trap air increasing landfill volume
- Mutt Mitts break down in aerobic and anaerobic environments (such as a landfill)
- The Mutt Mitt degradation process is triggered by sunlight or elevated temperature
- Due to Mutt Mitt's environmentally friendly design, they should be used within one year of purchase

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BBB ACCREDITED BUSINESS

Mutt Mitt®
1-800-697-6084

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100% degradable, 2-ply construction - Mutt Mitts are designed to protect you and the environment.

Environment

Degradable

Landfill

Watershed

Landfills

The major function of a landfill is the containment of solid waste (trash). Mutt Mitts are the ideal product for degradation within a landfill.

- A bottom liner is applied to the landfill to prevent contact with the groundwater
- Heavy equipment compacts the cell (one day's trash) to maximize capacity
- The cell is covered daily with soil and compacted further
- With minimal oxygen and water, landfills serve as a poor environment for biodegradation
- Mutt Mitts are designed to break down in a landfill environment - this process reduces landfill volume

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BBB ACCREDITED BUSINESS

Mutt Mitt®
1-800-697-6084

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Home Go Green Product Resources ORDER

100% degradable, 2-ply construction - Mutt Mitts are designed to protect you and the environment.

Environment

Degradable

Landfill

Watershed

Watershed

A watershed is an area of land from which water drains into a common waterway.

- Waterways include: creeks, streams, lakes, rivers, wetlands, and even oceans
- Runoff contaminated with pet waste can carry harmful viruses, bacteria, and parasites into our waterways
- Some of the above mentioned include: E. coli, fecal coliform bacteria, giardia, roundworms, and tapeworms
- Pet waste increases the amount of nutrients in the water which throws the ecosystem out of balance resulting in excessive algae growth and fish die-offs

When Mutt Mitts are provided people use them. As a matter of fact, they rave about them.

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APPENDIX J

Jordan River Corridor
Open Space and Habitat Conservation Master Plan
Maps