Plant and Vertebrate Inventories of Jordan River State Park

Final Report

Prepared by

Utah Division of Wildlife Resources

for

Utah Division of Parks and Recreation

May 2003

Cooperative Agreement #030423

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Introduction

At the request of the Utah Division of Parks and Recreation, the Utah Division of Wildlife Resources' Utah Natural Heritage Program conducted literature reviews and field surveys during 2002 and 2003 to determine the plant and non-piscian vertebrate species occurring at Jordan River State Park. The results of these efforts are summarized in this report. It is hoped that these results will assist the Utah Division of Parks and Recreation in the development of the Jordan River State Park Land and Resource Management Plan.

Study Area

Jordan River State Park (Park), a rare open space in the lower elevation of the Salt Lake Valley, was inventoried during the fall of 2002 and the spring of 2003. Located at T1N R1W, Sections 10, 15, and 22 in Salt Lake City, between Redwood Road and I-215, the Jordan River forms the eastern boundary of the Park, a housing development is found on the southern boundary of the Park, and a canal, small pieces of farmland, and the freeway border the Park on the west and north. The Park exhibits evidence of past farming activity, such as ditches, collapsing fence lines, and remnants of furrows in the fields. The northern part of the Park has been landscaped with mounds for off-road vehicles, and facilities for model airplanes have been built in the southern part of the Park.

Inventory of the Plants of Jordan River State Park

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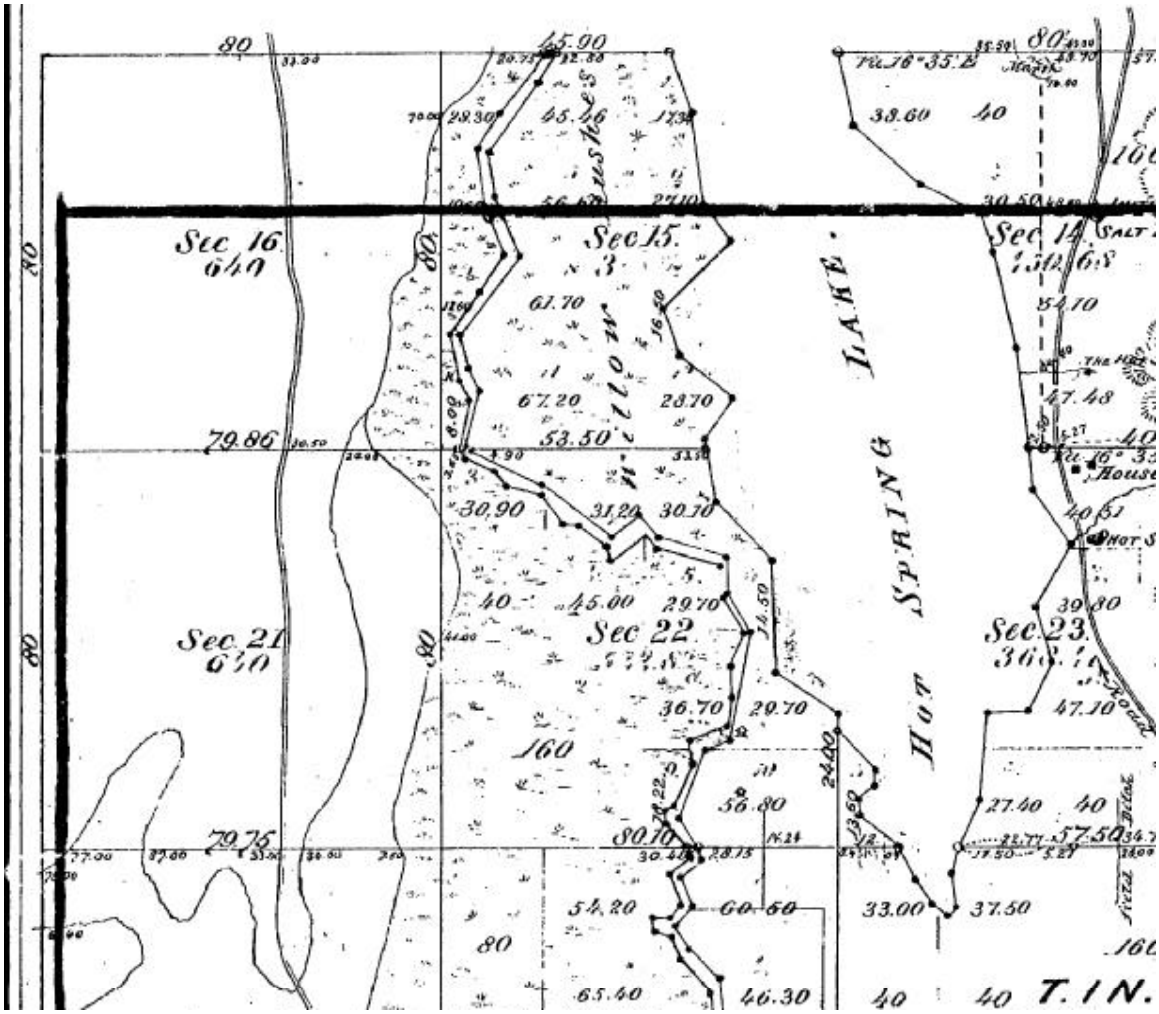
Historic Conditions

Vegetation

Much of the Park area is currently covered with plants adapted to dry or salty soils. Current conditions are markedly different from 1875, when Nathan Kimball (Kimball 1875) compiled a map of Salt Lake City (see below). Symbols for wetland vegetation, with "willow bushes," are noted on the map in the vicinity of the Park. Coyote willow, or sandbar willow, (*Salix exigua*), yellow willow (*Salix lutea*), and caudate willow (*Salix lasiandra*) were probably the species of the river corridor, according to willow expert Wayne Padgett (Padgett 2002).



Segment of an 1875 map surveyed by Nathan Kimball. Jordan River State Park occupies the area marked "Willow Bushes."

Early Utah resident C. W. Lockerbie (Lockerbie 1950) discussed the changes along the Jordan River between the 1890s and the 1930s:

> The Jordan River carried much more water then, consequently had a broader and more sharply defined channel than today. The banks on the undercut slope were generally vertical and unvegetated; whereas the opposite side was covered with sandbar willows from the stream edge back over the reclaimed channel to the valley floor. But before reaching the valley level, there often was a terrace (or former river level) on which grew an apparently different type of willow, though it may have been only the mature sand bar species. This in contrast to the straight smooth bark of the former, was a rough bark with crooked jointed, top-heavy growth.
>
> On a visit to the river years later, I was surprised to find the stream borders almost completely denuded of willows, but was informed they had been gathered for a firm of basket makers. Stands of one to five acres, which were common then, had in some cases given way to farming…. Today in many places one cannot tell from a short distance where the river channel is located, and the former sand bars are now mud bars, which support a thick growth of cattails, a plant I never saw along the Jordan in the [18]90s.

A 1902 photo at 9th North, near the present day Park, shows the riverbank almost devoid of vegetation, whereas another photo of a pumping station at 9th South in 1908 shows a thick stand of tall willows in the background (Utah State Historic Society).

Trees were not abundant along the Jordan River in the early days, and some have even speculated that Fremont cottonwoods were brought by Pioneer settlers from eastern Utah (Audubon 2000). However, there is evidence that Fremont cottonwoods naturally grew along the river. Pioneer journals report camping in cottonwood groves at Rose Park and near the mouth of Red Butte Creek, near present day 17th South (Bennion 1961). In addition, there are old Fremont cottonwood trees at Jordan River State Park, and an 1896 photo of a dense grove of trees along the Jordan River shows cottonwoods were abundant at that time (Utah State Historical Society photos). Beaver and floods might have been responsible for the small number of trees noted by early explorers along the river (Audubon 2000), but there is no doubt that they were present.

The River Channel

The Jordan River flows along the east side of the Park, where it is kept in check by levees. Old maps, however, show the river on the west side of the Park, and present day USGS maps still show the Park braided with intermittent stream channels. The sand along the riprap at the south end of the Park is evidence of the moving stream channel, which migrated from the 1870s west side channel shown on the Kimball map (Kimball 1875) to its present course by 1937, as shown on the USGS map from that year.

Spring floods were the dominant force in the Jordan River corridor at one time. In June 1827, Jedediah Smith crossed the river and was "very much strangled in the attempt" (Hooton 1996). Early settler Rawsell Gardner left this impression of the River: "Do you remember the Jordan River in the 'good old days' when it was filled to the banks and there were dangerous whirlpools, when the bridge between Midvale and West Jordan was washed out every spring?" (Richards 1966). The flooded river corridor, braided with changing stream channels, provided the habitat for the willows shown on Nathan Kimball's map.

Charles Lockerbie (Lockerbie 1950) described the change in the river channel by a dare taken by two friends: "…with hands tied behind their backs and feet and legs bound with young willows and bark, they were carried to the bank and pushed over into the deep water. Both made the crossing safely.... Today, salt grass grows across the big eddy area and the whirlpools have vanished."

The lives of the people in Salt Lake Valley centered on the use of water. "The first canal was brought from the river in 1850 for commercial purposes. It was two and one half miles long. As the years rolled along the irrigation system as we know it today was brought into use.... No water was wasted and with care and precision the west began to blossom as the rose" (Richards 1966).

The first dam in the Jordan River was installed in 1859. The narrows area of the river was impounded in 1872, and a dam at the head of the Jordan River completed in 1881 transformed Utah Lake into a reservoir and controlled much of the flooding. The water flow is diverted along the way at several other places, reducing water flow reaching Jordan River State Park. By 1900, 50,623 acres were irrigated by Utah Lake and the Jordan River. Canals built during the early 1900s watered thousands of additional acres (Hooton 1996). Because of the diversion of water, willows no longer dominate the landscape of Jordan River State Park.

Current Conditions

Methods

We surveyed the vegetation of Jordan River State Park in order to determine what habitats and plant species were present. Field trips were taken in the autumn and spring to help ensure finding plant species with late flowering periods, as well as plant species with early flowering periods. A list of all species detected is included in Appendix A (pages 10-12). Forays were conducted on September 10 and 11, 2002, as well as on April 17, May 5, and 21, 2003. The large cottonwood trees near the south end of the Park were cored with an increment borer to try to determine their age.

Habitats Present

Levee (Riparian Corridor): The area near the river is dominated by trees and accompanying understory plants.

Moist Area Behind the Levees: This area has small willows and shrubs.

Old Field: Much of the Park has remains of fences and furrows. Salt grass *Disticlis spicata*), cheatgrass (*Bromus tectorum*), whitetop (*Cardaria draba*), and Russian knapweed (*Centaria repens*) predominate in this area.

Sand: A small sandy area at the north end of the Park is home of sea purslane (*Sesuvium verrucosum*).

Compacted Soil: Roads, trails and earth mounds built for off-road vehicles. There is riprap along the road at the south end of the Park. Knotweed, quail plant, and other plants adapted to compacted soil survive here.

Very Salty Soils: Low-lying and excavated areas that contain pickleweed (*Salicornia Utahensis*).

Wetland: Although the river is hemmed in by levees, there is still space for stands of tall grasses (*Phragmites* and *Phalaris*), bulrushes (*Scirpus microcarpus*), and cattails (*Typha latifolia*). Small wet areas are also found in depressions scattered about the Park, where wiregrass (*Juncus arcticus*) forms dark green patches in the moist soil.

Trees

Siberian elm (*Ulmus pumila*) is the most abundant tree species. It occurs along the levees with black locust (*Robinia pseudoacacia*) and American elm (*Ulmus Americana*). Russian olive (*Eleagnus angustifolia*) predominates the south boundary of the Park, and is also scattered along the levees. These trees are all introduced species. Native trees found along the river include: Fremont cottonwood (*Populus fremontii*), peach leaf willow (*Salix amygdaloides*), and box elder (*Acer negundo*).

The largest trees in the Park are Fremont cottonwoods in the south part of the Park. The cores we took age the trees to over 78 years, but due to decay in the center of the trees, the exact age could not be determined. The cores represent less than half the radius of the trees.

Shrubs

Coyote willow (*Salix exigua*) crowds the edge of the river in areas not shaded by trees. These plants are also scattered in open areas behind the levees. Wild roses (*Rosa woodsi*i) are quite abundant on the levees. Golden currants (*Ribes areum*) are found in

the moist area near the river; some of these have been planted, to augment the naturally occurring population.

Weeds

Noxious weeds cover large areas of Jordan River State Park. Russian knapweed (*Centauria repens*) infests the southwest old field and is abundant on the Park perimeter. Hoary cress, or whitetop, (*Cardaria draba*) covers much of the central area of the Park, and is common everywhere. These weeds form dense stands that could be a fire hazard when dry.

The other plants on the state noxious weed list found in the Park are: quackgrass (*Agropyron repens*), Scotch thistle (*onopordium acanthium*), and field bindweed, or morning glory, (*Convolvulus arvensis*). Dyer's woad (*Isatis tinctoria*) was rumored to be growing in the Park, and was found west of the metal storage building.

Other invasive weeds not on the state noxious weed list are found in the Park. Cheatgrass (*Bromus tectorum*), foxtail barley (*Hordeum jubatum*), and bulbous bluegrass (*Poa bulbosa*) form uninterrupted patches in the Park.

Native Plants

Native plants now constitute a little less than half of the species at Jordan River State Park, but the most abundant plants are introduced species. No native plant species of conservation concern were found to occur on the Park.

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Photo 02055 from 1896, of boat in the Jordan River with cottonwood trees.

Photo 02053 from 1902, Jordan River at 9th North Street.

Photo 24673 from 1908, pump at 9th South Street, with willows in background.

Appendix A. Plants observed at Jordan River State Park. Field surveys occurred on September 10 and 11, 2002, as well as on April 17, May 5, and 21, 2003.

Jordan River State Park Flora List

Common Name	Genus	Species	Habitat	Comment
Box Elder	*Acer*	*negundo*	Levee	Native tree
Quackgrass	*Agropyron (Elymus)*	*repens*	Old Field	State Noxious list, weedy grass
Intermediate Wheatgrass	*Agropyron (Thinopyrum)*	*intermedium*	Roadside	Introduced grass
Prostrate pigweed	*Amaranthus*	*blitoides*	Sand	Native annual forb
Ragweed	*Ambrosia*	*artemisiifolia*	Levee	Native forb
Hemp Dogbane	*Apocynum*	*cannabinum*	Old Field	Native perennial
Burdock	*Arctium*	*minus*	Levee	Introduced perennial
Milkweed	*Asclepias*	*speciosa*	Levee	Native perennial
Asparagus	*Asparagus*	*officinalis*	Old Field	Introduced perennial
Common Catchweed	*Asperugo*	*procumbens*	Levee	Introduced annual
Everywhere aster	*Aster*	*chilensis*	Levee	Native perennial
Spearscale, Fathen Saltplant	*Atriplex*	*patula*	Old Field, under trees	Native annual
Garden Orache	*Atriplex*	*hortensis*	Roadside	Introduced annual
Cheat Grass	*Bomus*	*tectorum*	Old Field, Roadside	Introduced annual weed
Shepherd's Purse	*Capsella*	*bursa pastoris*	Roadside	Introduced annual weed
Whitetop	*Cardaria*	*draba*	Old Field	State Noxious list, introduced perennial
Russian Knapweed	*Centauria*	*repens*	Old Field	State Noxious List, introduced perennial
Lambsquarter	*Chenopodium*	*album*	Levee	Introduced annual
Blue Mustard	*Chorispora*	*tenella*	Old Field	Introduced annual
Chicory	*Cichorium*	*intybus*	Old Field	Introduced perennial
Canada Thistle	*Cirsium*	*arvense*	Levee	State Noxious List, perennial weed
Poison Hemlock	*Conium*	*maculatum*	Levee	Introduced biennial
Bindweed, Morning Glory	*Convolvulus*	*arvense*	Old Field	State Noxious list, introduced perennial
Salt Grass	*Distichlis*	*spicata*	Old Field	Native perennial grass
Spring Draba	*Draba*	*verna*	Roadside, Old Field	Introduced annual
Russian olive	*Eleagnus*	*angustifolius*	Levee	Introduced tree
Autumn willowherb	*Epilobium*	*brachycarpum*	Old Field	Native annual
Speading Daisy	*Erigeron*	*divergens*	Roadside	Native annual
Tall Fescue	*Festuca*	*arunidinacea*	Old Field	Introduced perennial grass
Common Fumitory	*Fumaria*	*officinalis*	Riprap	Introduced annual
American Licorice	*Glycerrhiza*	*lepidota*	Roadside	Native perennial

Autumn Sneezeweed	*Helenium*	*autumnale*	Behind Dam	Native perennial
Sunflower	*Helianthus*	*annus*	Old Field	Native annual
Quail Plant, Salt Heliotrope	*Heliotropium*	*curassavicum var. obovatum*	Bike Track	Native annual
Jagged Chickweed	*Holosteum*	*umbellatum*	Old Field	Introduced annual
Foxtail, Wild Barley	*Hordeum*	*jubatum*	Roadside	Native annual grass
Dyer's Woad	*Isatis*	*Tinctoria*	Old Field	Introduced
Poverty Sumpweed	*Iva*	*axillaris*	Old Field	Native perennial
Wiregrass, Arctic Rush	*Juncus*	*arcticus*	Old Field	Native perennial
Prickly Lettuce	*Lactuca*	*serriola*	Old Field, Roadside	Introduced biennial
Broadleaf Pepper Plant	*Lepidium*	*latifolium*	Old Field	Introduced perennial
Dalmatian Toadflax	*Linaria*	*dalmatica*	Roadside, Gravel	Introduced perennial
Alfalfa	*Medicago*	*sativa*	Old Field	Introduced perennial
Yellow Sweetclover	*Melilotus*	*officinalis*	Old Field	Introduced annual or biennial
Mulberry	*Morus*	*Species*	Cultivated	Introduced tree
Watercress	*Nasturtium*	*officionale*	Behind Dam	Aquatic perennial, introduced
Catnip	*Nepeta*	*cataria*	Levee	Introduced perennial
Scotch Thistle	*Onopordium*	*acanthium*	Roadside	State Noxious list, Introduced biennial
Reed Canarygrass	*Phalaris*	*arundinacea*	Riverside	Native perennial
Common Reed	*Phragmites*	*australis*	Roadside	Native perennial
Bulbous Bluegrass	*Poa*	*bulbosa*	Roadside	Introduced perennial
Annual Bluegrass	*Poa*	*annua*	Roadside	Introduced annual grass
Water Lady's Thumb	*Polygonum*	*amphibium*	Behind Dam	Aquatic perennial, Native
Prostrate Knotweed, Devil's Shoestrings	*Polygonum*	*aviculare*	Roadside	Native annual
Spotted Lady's Thumb	*Polygonum*	*persicaria*	Old Field	Introduced annual
Fremont Cottonwood	*Populus*	*fremontii*	Old Field	Native tree
Plum	*Prunus*	*domestica*	Levee	Introduced tree
Golden Currant	*Ribes*	*aureum*	Riprap, levee	Native shrub
Black Locust	*Robinia*	*pseudoacacia*	Levee	Introduced tree
Wild Rose	*Rosa*	*woodsii*	Levee	Native shrub
Willow Dock	*Rumex*	*salicifolius*	Roadside	Native perennial
Pickleweed	*Salicornia*	*utahensis*	Old Field	Native perennial
Peach Leaf Willow	*Salix*	*amygdaloides*	Levee	Native tree
Coyote, or Narrow Leaf Willow	*Salix*	*exigua*	Levee	Native shrub
Crack Willow	*Salix*	*fragilis*	Levee	Introduced tree
Panicled bulrush	*Scirpus*	*microcarpus*	Wetland	Native perennial
Sea Purslane	*Sesuvium*	*verrucosum*	Sand	Native perennial
Alkalai Mallow	*Sida*	*heteracea*	Levee	Native perennial
False Solomon's Seal	*Smilacina*	*racemosa*	Levee	Native perennial
Bittersweet Nightshade	*Solanum*	*dulcamara*	Levee	Introduced perennial
Tamarisk	*Tamarix*	*Species*	Old Field	Introduced Shrub

Goatsbeard, Yellow Salsify	*Tragopogon*	*dubius*	Old Field	Introduced annual or biennial
Cattail	*Typha*	*latifolia*	Behind Dam	Native perennial
American Elm	*Ulmus*	*Americana*	Levee	Introduced tree
Siberian Elm	*Ulmus*	*pumila*	Levee	Introduced tree
Stinging Nettle	*Urtica*	*dioica*	Levee	Native perennial

Inventory of the Vertebrates of Jordan River State Park

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Methods

Utah Division of Wildlife Resources (UDWR) zoologists conducted field surveys of Jordan River State Park (the Park) on 8 October 2002, 9 October 2002, 31 March 2003, 1 April 2003, 2 April 2003, 14 April 2003, 15 April 2003, 19 May 2003, and 20 May 2003. Field techniques that were employed to detect non-piscine (i.e., tetrapod) vertebrates included visual encounter searches (hiking the property looking for active vertebrates), turning of surface cover objects such as logs, rocks, and boards (to detect inactive vertebrates), and trapping (for small mammals). With the exception of a few birds that were only glimpsed and could not be identified, all vertebrates that were detected were identified, and detailed notes were recorded in a field notebook at the time of the observation.

Trapping for small mammals was accomplished using standard Sherman live traps and pit-fall can traps. Twenty Sherman live traps were set for three nights (the nights of 31 March 2003, 14 April 2003, and 19 May 2003) for a total of 60 trap-nights. Three habitat types were trapped in this manner: the riparian corridor (trees), the old fields, and a thicket of low (4- to 6-ft-tall) willows. Twenty pit-fall traps, intended for the capture of shrews, were constructed by removing the tops of aluminum soft drink cans. The cans were then set into the ground with the open tops flush with the soil surface on 1 April 2003 in a low, wet area dominated by giant reed (*Phragmites australis*). These pit-fall traps were checked periodically and were removed from the Park on 20 May 2003, for a total of 980 trap-nights.

Results

A total of 54 species of tetrapod vertebrates (one amphibian, 41 birds, and 12 mammals) were identified in and adjacent to the Park by UDWR zoologists or, in a few cases, reported to UDWR zoologists by a UDWR botanist who was conducting the plant inventory of the Park. Accounts of the species detected are presented below.

Live-trapping resulted in the capture of 14 animals (23.3% trap success), as reported below in the species accounts. All of the captured animals were released unharmed. No vertebrates were captured in the pit-fall can traps.

Because of the timing of the zoological inventory, many vertebrate species that probably inhabit the Park were not detected. No reptiles were found in the course of field investigations; however, only for parts of the last two days of field work were temperatures within the range that reptiles could be expected to be active. Similarly, only the last two days of field work were within the nesting season for the birds that occur in the Park, and nesting was confirmed for only a few species during the last two days of field work. (More than a few of the birds that likely nest in the Park do not begin

breeding until later—a few, in fact, do not even arrive on their breeding grounds in Utah until June.) Thus, the current inventory must be regarded as preliminary and as what might be called a "rapid ecological assessment." To achieve a more complete inventory of vertebrates of the Park would require more field time as well as scheduling that would include more of the warm season (i.e., early summer).

In addition to the species accounts, a list of tetrapod vertebrates—those known to occur in the Park and those for which there is a reasonably strong possibility of their occurrence in the Park—is provided in Appendix B (pages 27-30). (Domestic species are not included in Appendix B, but do appear in the species accounts.) This list includes many species of hypothetical or potential occurrence in the Park. In constructing this list, the two most important considerations for inclusion of a species were (1) the current distribution of the species and (2) availability of habitat suitable, in its areal extent and its quality, to support the species in the Park. Sources that were utilized in preparation of the hypothetical parts of the list included Schwinn and Minden (1979) and Oliver (1997) for amphibians and reptiles; Behle and Perry (1975), Hayward et al. (1976), Walters and Sorensen (1983), Behle, Sorensen, and White (1985), and Oliver (1997) for birds; and Crane (1948), Durrant (1952), and Oliver (1997, 2000) for mammals.

In the case of birds, all species that were detected are included in Appendix B, whether they likely breed in the Park or not. However, species of hypothetical occurrence in the Park are included in Appendix B *only if it is believed that they may nest in the Park*; such breeding bird species are often referred to as summer residents. Some birds breed in the vicinity and undoubtedly fly over the Park but probably never alight in the Park (such as the American white pelican and many other shore, wading, and water birds of the Great Salt Lake, and others like the turkey vulture) and are not included in the hypothetical list unless they were seen during field work. It is certain that many other bird species that do not nest in the Park (and, again, are not included in Appendix B unless they were detected in the course of field investigations in the Park) utilize the Park either briefly or for extended periods of time outside the breeding season. Thus excluded as hypotheticals from the list are spring and fall migrants that pass through the Park, winter residents, and birds of unexpected and unpredictable occurrence in the area, referred to in avian or ornithological literature as "accidentals," "vagrants," or species of "casual" or "occasional" occurrence. In all temperate (i.e., non-tropical) locations the numbers of species of such nonbreeding birds—migrants, wintering species, and accidentals—greatly surpass the number of breeding species. For the purposes of resource management and bird conservation, however, the breeding species are, by far, of the greatest importance and often are the only bird species to which truly meaningful conservation efforts can be directed. Furthermore, if appropriate efforts are made to manage and conserve the breeding birds of a particular area, it can be assumed that the non-breeding species will be adequately managed as well.

Important Habitats

For vertebrates detected in, or speculated to occur (e.g., turtles) in, the Park, important habitats can be categorized:

- aquatic—the Jordan River and canals or ditches
- riparian—the river margins, especially the woodland corridor
- brushy—stands of low willows (~4–6 ft high), patches of giant reed
- old field—open areas of grasses and low weedy vegetation

For tetrapod vertebrates, the aquatic habitats are of most importance to the semiaquatic mammals of the Park, to ducks and other waterfowl, and to turtles (if present). The riparian woodland is the focal habitat for the Park's avifauna, particularly for nesting. Trapping results suggest that the riparian zone also supports the highest density of small mammals, at least currently (i.e., during the time that field work was conducted). However, in a "boom" year for voles, the old fields may have the highest populations of small mammals. The old fields are also of importance to many birds, both grassland or open-ground species and woodland birds, many of which were observed to forage in the open fields. The "brushy" areas are of smaller extent in the Park but provide habitats of special value to certain species. For example, patches of giant reed in the Park are attractive to the red-winged blackbird, which probably nests in these areas, and probably many other birds as well. Stands of low willows are utilized by many ecological "edge" species, particularly foraging birds.

Accounts of Species

Great Basin spadefoot, *Spea intermontana*. A dead individual of this species was found on the road at the model airplane facility on 19 May 2003.

double-crested cormorant, *Phalacrocorax auritus*. One individual of this species was observed flying southwest over the Park on 2 April 2003. Twice on 14 April 2003 individual cormorants were seen flying west over the south end of the Park. An individual was seen flying west over the Park again on 19 May 2003.

Canada goose, *Branta canadensis.* This species was observed flying over the Park many times on 9 October 2002 and 31 March, 1 April, 2 April, and 14 April 2003, usually in small groups. On 2 April 2003, a very windy day, at least two groups of these geese were observed on the ground in the Park. The first group consisted of 13 individuals, in approximately the middle of the Park, evidently foraging—bending their heads down toward the ground and presumably eating. Another group of two birds was seen on the ground in the northeastern part of the Park. Two geese were also seen on the ground in the extreme northeastern part of the Park; however, it is possible that these were the same two observed earlier.

mallard, *Anas platyrhynchos*. This species was regularly observed (9 October 2002 and 31 March, 1 April, 2 April, 14 April, 15 April, 19 May, and 20 May 2003), typically in pairs, on the Jordan River and flying over the Park. It may nest in the Park; if so, predation on eggs by raccoons and foxes may be high.

great blue heron, *Ardea herodias*. This very large species of heron was detected at the Park on 9 October 2002.

black-crowned night heron, *Nycticorax nycticorax*. An adult of this species was seen in trees on the west side of the Jordan River, about midway along the length of the Park, on 14 April 2003.

American avocet, *Recurvirostra americana*. An individual of this species was seen flying up the river, following its course, on 19 May 2003. Whether this species actually utilizes the Park, rather than merely flying over it, is uncertain. It is unlikely that this species nests in the Park.

American coot, *Fulica americana*. A fresh road-kill of this species was found on 31 March 2003 adjacent to the southwestern corner of the Park near the drainage ditch or canal. It is likely that this species utilizes the Jordan River in the Park at least intermittently.

killdeer, *Charadrius vociferus*. This species was detected at the Park on 9 October 2002. On 20 May 2003 a killdeer was heard and seen flying in the east-central part of the Park near the river, and later that day a individual was observed in the road along the west boundary of the Park. This species may nest in the Park, but whether nesting would be successful in the Park is questionable. This species nests in open, beach-like settings devoid of ground cover. In vegetated areas it often situates its "nest" (strictly speaking, not a nest, since it is not constructed of collected materials) in dirt roads, frequently in the ruts. Because almost the only suitable nest sites in the Park are its dirt roads, mainly those used for motocross activities, it is likely that any eggs laid in the Park would be destroyed by vehicles or that repeated disturbance would cause abandonment of nests.

California gull, *Larus californicus*. This species was observed almost every day that field work was conducted (31 March, 1 April, 2 April, 14 April, 19 May, and 20 May 2003) flying over the Park, usually in small numbers. It is unlikely that this species nests in the Park.

Franklin's gull, *Larus pipixcan*. Two individuals were observed, at different times, flying over the Park on 15 April 2003. It is unlikely that this species nests in the Park.

Forster's tern, *Sterna forsteri*. On 19 May 2003 an individual of this species was seen hovering (to dive for a fish) over the canal or drainage ditch just outside the Park near its southwest corner. The same day an individual was also seen flying west over the model airplane area of the Park. It is unlikely that this species nests in the Park.

red-tailed hawk, *Buteo jamaicensis*. An immature individual of this species was seen at the Park on 9 October 2002, and an adult of this species was observed, at first perched in a tree along the west side of the river, on 31 March 2003.

Swainson's hawk, *Buteo swainsoni*. One individual of this species was seen on 15 April 2003 at the south end of the Park. It was perched on a fence post on the south boundary

when first seen. It then flew northward into the Park and perched on another fence post in the open fields.

prairie falcon, *Falco mexicanus*. A single individual of this species was observed several times in the middle and southern parts of the Park on 14 April 2003. The falcon stayed close to the river and the riparian woodland along the east side of the Park, where, at times, it appeared to be hunting. It is unlikely that this species nests in the Park.

American kestrel, *Falco sparverius.* This species was seen at the Park on 8 October and 9 October 2002, and an individual of this species was seen perched on a power line about half a mile south of the Park on 15 April 2003. It is possible that this species may nest somewhere in the Park, perhaps in the riparian woodland.

ring-necked pheasant, *Phasianus colchicus*. This species was detected in the Park on 9 October 2002, and several males of this species were seen in taller grass in the east-central part of the Park on 19 May 2003. Two of these males were only ~150 feet apart. It can be assumed that the species nests in the Park.

mourning dove, *Zenaida macroura*. One individual of this species was seen flying over the south end of the Park on 1 April 2003 and another over the northern part of the Park on 2 April 2003. However, on 14 April, 19 May, and 20 May 2003, mourning doves, many of them in pairs, were observed in many parts of the Park, especially in the trees along the river, where they likely nest.

rock dove, *Columba livia*. This species was seen at the Park on 8 October 2002, and on 2 April 2003 two individuals of this species were seen flying southeast over the northern part of the Park. This is an exotic species and one that is usually found near buildings in urban areas.

downy woodpecker, *Picoides pubescens*. This small woodpecker was seen in the Park on 9 October 2002.

northern flicker, *Colaptes auratus*. This species was seen regularly (8 October, 9 October 2002 and 31 March and 2 April 2003) in the Park in dead trees along the river. This species is unusual among woodpeckers in its habit of spending considerable amounts of time on the ground, where it feeds on ants.

western kingbird, *Tyrannus verticalis.* Many individuals of this species were seen in all parts of the Park on 19 and 20 May 2003. An active nest of this species was located in the Park on 20 May 2003. An adult that was observed to fly to the nest and to sit on it, presumably either incubating eggs or brooding newly hatched young (air temperature was just above freezing when this observation was made). The nest was situated about 18 feet above the ground in a vertical crotch where a large limb joined a main trunk of a large willow (about 35 feet tall) on the west bank of the Jordan River. Another adult kingbird, probably the mate of the incubating individual, was perched a few feet away from the nest on a small limb.

cliff swallow, *Petrochelidon pyrrhonota*. About half a dozen cliff swallows were observed flying over the canal or ditch and into or through culverts, near the southwest corner of the Park, on 19 May 2003. The swallows probably nest in these culverts.

barn swallow, *Hirundo rustica*. Two barn swallows, probably a breeding pair, were seen at the model airplane pavilion on 19 May 2003. When first seen, one was perched on the roof of the wind-sock building and the other was perched nearby on the chain-link fence. A moment later, the individual that had been on the roof moved to perch on the fence beside—less than 2 inches from—the other bird. Although search for a nest (e.g., under the eaves of the buildings) was unsuccessful, it is likely that this species nests on the walls of buildings in the Park or in the culverts of the canal or ditch along the west boundary of the Park. Other barn swallows were seen along the west side of the Park, near the canal.

black-billed magpie, *Pica hudsonia*. This is perhaps the most obvious of birds in the Park and is an unmistakable species. The species was observed in the Park almost every day that field work was conducted (8 October, 9 October 2002 and 31 March, 1 April, 2 April, 14 April, 19 May, and 20 May 2003). These birds roost in the trees along the Jordan River and nest there as well, as indicated by the many conspicuous old nests in these trees. They can be seen flying over the more open areas of the Park and appear to forage in the fields. On 20 May 2003 two fledglings, still young enough to have difficulty flying and accompanied by an adult, were observed west of the river near the south end of the Park.

loggerhead shrike, *Lanius ludovicianus*. A single individual of this species was observed on 14 and 15 April 2003 at the south end of the Park.

American robin, *Turdus migratorius*. This is a very common species in the Park. It is especially numerous in the riparian corridor (i.e., along the river) but was seen throughout the Park. It was observed on almost every visit to the Park (9 October 2002, 31 March, 2 April, 14 April, 19 May, and 20 May 2003) and is a species that almost certainly nests in the Park.

black-capped chickadee, *Parus atricapillus*. This is another bird that was regularly encountered in the riparian zone along the Jordan River (31 March, 1 April, and 14 April 2003). It was also detected in the Park on 9 October 2002.

house wren, *Troglodytes aedon*. This species was seen in the Park on 8 October and 9 October 2002.

ruby-crowned kinglet, *Regulus calendula*. This species was seen in the Park on 9 October 2002, probably in migration. It is highly improbable that this species nests in the Park.

blue-gray gnatcatcher, *Polioptila caerulea*. An individual of this species was observed on 14 April 2003 as it foraged in a willow thicket near the middle of the Park. The species was also detected in the Park on 9 October 2002.

European starling, *Sturnus vulgaris.* This species was seen at the Park on 8 October and 9 October 2002. Single individuals as well as flocks of this species were observed flying over the Park on 14 April 2003. Many individuals and small groups of this species were seen throughout the Park on 19 and 20 May 2003. Several individuals foraging on the ground in the fields on 20 May 2003 were seen flying toward the river carrying invertebrate prey, which appeared to be arthropods and worms, in their bills. Although some passerines carry food to store it, this usually occurs in autumn and usually involves seed-eating birds (e.g., chickadees and nuthatches). Almost all birds that feed their young at all (some precocial species, such as ducks, do not), even those that eat primarily or exclusively seeds, fruit, nectar, or other plant foods, feed animal prey to their young. The carrying of animal prey—especially in spring and summer and especially by passerines—typically occurs only when adults are returning to their young, either nestlings or fledglings, to feed them, and such food-carrying is generally interpreted as evidence of nesting. Thus, observations in the Park on 20 May 2003 suggest that European starlings were feeding young. Although the starlings foraging in the Park could have been returning to young outside the Park, it is very likely that the species does nest in the Park. The European starling is arguably the worst of all the exotic avian pests that have been introduced into North America; it is thought to have greater negative effects on the native avifauna than any other introduced bird species. The presence of this aggressive, cavity-nesting pest has particularly serious consequences for native cavity-nesting species, especially woodpeckers. In some places certain species of woodpeckers now experience alarmingly low reproductive success because of starlings, which usurp the woodpeckers' nest holes almost as fast as the woodpeckers can excavate them. The woodpecker of most concern in the vicinity of Jordan River State Park is Lewis' woodpecker (*Melanerpes lewis*), which formerly nested in the area and may at least attempt to do so now. Specimens of Lewis' woodpecker from Bountiful, Centerville, Farmington, and Salt Lake City, many of them collected during the breeding seasons of 1937–1939, are in the collection of the Utah Museum of Natural History of the University of Utah (Rich 1967). Because European starlings inhabit the Park, any Lewis' woodpeckers that might attempt to nest in the Park now would likely fail. The same would likely be true for other woodpeckers and perhaps other cavity-nesting birds in the Park, especially those of the approximate size of starlings. Lewis' woodpecker has experienced a precipitous population decline in the Salt Lake City area during the last half-century (Jolles 1986, Sorensen 1986, Tobalske 1997), and a likely cause for this alarming decline is nest usurpation by, and competition (for food and nest sites) with, the introduced European starling (Sorensen 1986, Tobalske 1997), which first appeared in the Salt Lake City area in 1940 (Sorensen 1986), having spread to Utah from eastern North America, where it had been intentionally introduced (in New York City) in 1890 and 1891 (Cabe 1993).

yellow warbler, *Dendroica petechia*. An adult of this species was observed in trees along the Jordan River on 19 May 2003, and singing individuals were heard on 19 and 20 May 2003 near the river. This species probably nests in the trees along the river in the Park.

yellow-rumped warbler, *Dendroica coronata*. This species was seen in the Park on 8 October and 9 October 2002, probably in migration. It is unlikely that this species nests in the Park.

spotted towhee, *Pipilo maculatus.* This species was seen in the Park on 9 October 2002.

song sparrow, *Melospiza melodia*. This species was present in the Park on 9 October 2002.

Lincoln's sparrow, *Melospiza lincolnii*. An individual of this species was seen at the south end of the Park on 15 April 2003.

white-crowned sparrow, *Zonotrichia leucophrys*. Small flocks of this species were seen regularly (31 March and 2 April 2003) in the riparian habitat along the Jordan River. Additionally, one individual was captured in this habitat on 1 April 2003 in a Sherman live trap set for small mammals. The species was also present in the Park on 9 October 2002. It is unlikely that this species nests in the Park.

red-winged blackbird, *Agelaius phoeniceus.* Many individuals of this species were seen and heard in the more open parts of the Park on 19 and 20 May 2003. It was also present in the Park on 8 October and 9 October 2002. This species probably nests in the Park.

Bullock's oriole, *Icterus bullockii*. Many old nests of this species were observed in the trees along the Jordan River, and on 19 and 20 May 2003 several individuals, most of them in pairs, were seen in the Park. At the least, three pairs were detected on 20 May 2003, and it is believed that from five to ten pairs may nest in the Park. On 20 May 2003 a nest that was being constructed was discovered in a large willow (~35 feet tall) on the west bank of the Jordan River, about midway along the length of the Park. The nest was near the top of the tree, ~30 feet above the ground. When first seen, the nest, about half finished, was being worked on by the male oriole. When the nest was observed again a few hours later, the female bird was working on it; she then left and ≤15 seconds later returned with grass and resumed construction. Interestingly, this nest was in the same tree with—and almost directly above—the active western kingbird nest mentioned above in the account of that species. Although Bullock's oriole, unlike some species of orioles, is aggressive in protecting its nest, and this is probably also true of the western kingbird, neither species showed any interest in or reaction to the other. Since neither of these birds engages in nest predation or in brood parasitism, it is likely that they do not regard each other as threats. In fact, there may be mutual advantage in their nesting fairly close to each other and in the same tree, since both species will direct aggression toward brood parasites (such as cowbirds) and nest predators (such as jays) and may not only alert each other of unwelcome visitors but also may cooperatively harass or attack intruding nest parasites or brood predators.

western meadowlark, *Sturnella neglecta*. Several individuals of this species were seen and heard singing in the Park (2 April, 14 April, 15 April, 19 May, and 20 May 2003). In most cases song perches were small trees or shrubs in the fields. Although this bird was encountered throughout the open areas (i.e., all areas except the riparian corridor), it was

most numerous in the northern half of the Park. It was also detected in the Park on 9 October 2002. This species probably nests in the Park.

house sparrow, *Passer domesticus.* A few of these introduced weaver finches (not true sparrows) were seen on power lines and other perches along the road on the west side of the Park, mainly on 20 May 2003. The horse stables immediately west of this road provide excellent habitat for this species. This species may nest in the Park, particularly on or around the buildings. It was also seen in the Park on 9 October 2002.

Uinta ground squirrel, *Spermophilus armatus*. An individual of this species was seen in the grassy fields on the west side of the river near the southeast corner of the Park on 19 May 2003. Another, possibly the same individual, was observed in the same area on 20 May 2003.

yellow-bellied marmot, *Marmota flaviventris.* Robert Fitts, a UDWR botanist, reported that he saw a marmot near a pile of rip-rap at the north end of the Park in fall 2002. Although this species typically inhabits mountainous terrain such as exists on the east side of Salt Lake City, it also occurs sporadically in the Salt Lake Valley, west of the Wasatch Front, and this reported observation is considered credible, though unconfirmed by the zoological work conducted in the Park.

American beaver, *Castor canadensis.* Abundant sign (gnawed trees, burrows, trails) of this large semiaquatic rodent was observed along the Jordan River in the Park. A UDWR botanist, Robert Fitts, reported seeing a beaver in the Park on 5 May 2003.

Botta's (or valley) pocket gopher, *Thomomys bottae*. Gopher mounds were observed in the fields throughout the Park. Because of the low elevation of the Park as well as its geographic location, it is probable that the mounds were those of Botta's pocket gopher. Durrant (1952) examined 58 specimens of this species from "Salt Lake City and environs" and mentioned locations on both sides of the Jordan River, and he reported a specimen from Bountiful, Davis County. Although Durrant also had specimens of a closely related species, the northern pocket gopher, *Thomomys talpoides*, from Salt Lake County, all were from canyons on the east side of Salt Lake City or farther east at higher elevations. He did, however, report specimens of *Thomomys talpoides* from low elevations in Davis County (e.g., Kaysville and Farmington), which is somewhat surprising since the northern pocket gopher is generally considered to be a montane species.

deer mouse, *Peromyscus maniculatus*. This species is common in the Park. Nine individuals were captured in Sherman live traps set in the riparian belt along the Jordan River, near the southeastern corner of the Park, on 1 April 2003. All of these were adults, but none was reproductively active. Another adult individual was discovered in its nest under a sheet of plywood east of the motocross area on 2 April 2003. Four more adults were captured on 20 May 2003 in a willow thicket not far from the river in the east-central part of the Park; none of these was reproductively active.

unidentified species of vole, *Microtus* sp. Vole runways were observed in the grassy areas or fields throughout the Park. Attempts were made to trap the voles by setting live traps adjacent to runways, but none was captured. Further examination of the runways also failed to reveal any current use, which is usually evident in the form of fresh grass cuttings and fresh scats. Voles experience extreme population variations, usually in predictable cycles over several years, and, depending on the year, may be astoundingly abundant or undetectably rare. Seemingly the runways, which can endure unused for years, were from population "boom" years, and the current year may be in a population "bust" year. However, a piece of relatively fresh mammal skin that appeared to be that of a vole (*Microtus* sp.), with pelage still attached, was found in the trail west of the river, about midway along the north–south length of the Park on 14 April 2003. The skin was probably discarded by a predator, and, if correctly identified, indicates the continued presence of voles in the Park, despite unsuccessful attempts to trap them. Although three vole species (genus *Microtus*) are of possible occurrence in the Park, two of the three species are much more likely to be present than is the remaining species. The two likely possibilities are the montane vole (*Microtus montanus*), the most common and widespread vole species in Utah, and the meadow vole (*Microtus pennsylvanicus*), which occurs in Utah only at low elevations along the Wasatch Front from Cache County to southern Salt Lake County or Utah County.

muskrat, *Ondatra zibethicus*. A UDWR botanist, Robert Fitts, reported seeing a muskrat in the Park on 5 May 2003. This observation seems credible, for this giant, semiaquatic vole is common in the Salt Lake City area and is a species that would be predicted to occur in the Park.

nutria, *Myocastor coypus*. A medium-sized semi-aquatic mammal was glimpsed as it swam and then dove underwater in the ditch immediately west of the road along the west side of the Park on 31 March 2003. Although this animal was not positively identified, it appeared to be a coypu or nutria (*Myocastor coypus*) rather than either of the other moderately large semi-aquatic rodents expected in this area—the American beaver (*Castor canadensis*) or the muskrat (*Ondatra zibethicus*). This exotic species was first imported into Utah in 1939, and, since then, repeated introductions into the wild, both intentional and unintentional, have occurred, particularly from Lehi (in 1939) to Woods Cross (in 1943), most of the introductions having been along the Jordan River (Popov and Low 1950). This species is native to southern South America and is considered an invasive pest in most places in North America where it has become established. In some places in North America it has completed displaced both the muskrat, which is a smaller species, and the American beaver, which is larger than the nutria, but displacement of these species is not known to have occurred in Utah. The nutria has remarkable reproductive potential. Nutrias mature rapidly and begin to reproduce during their first year, they give birth frequently, producing multiple litters a year, and they often produce large litters. It is believed that the nutria's high reproductive potential confers competitive advantage over the native semi-aquatic rodents with which it competes for resources.

common raccoon, *Procyon lotor*. The unmistakable tracks of this species were seen along the west edge of the Jordan River on 14 April 2003. Whether this species is native

to Utah or whether it should be considered an introduced species in this state is debatable. Durrant (1952) presented evidence that suggests that the raccoon did occur naturally in Utah but that it was very rare and was limited, historically, to the extreme southwest and northwest corners of the state. Since Durrant's time, however, it is likely that raccoons have been released, intentionally or unintentionally, in the state. Certainly raccoons have increased greatly in numbers and distribution in Utah, now being abundant in many parts of the state, including the Salt Lake City area, where they were unknown half a century ago and where human alterations of the environment have greatly benefited this species. It may never be known whether the species became established along the Wasatch Front through introductions or whether, instead, native raccoons dispersed to this part of the state from small natural populations in Box Elder County or Washington County.

dog, *Canis familiaris.* Tracks of this species were seen along trails and paths throughout the Park. Dogs were seen accompanying hikers on the trial along the east side of the Jordan River on 2 April and on 20 May 2003. It is likely that most, if not all, of the dogs in the Park are domestic pets.

red fox, *Vulpes vulpes*. This species was detected in the Park on 8 October and 9 October 2002. Although it was not seen in the spring, sign (scats), possibly of this species, were observed in several places in the Park. While many people maintain that the red fox is not native to Utah but was introduced to this state, the species almost certainly did occur naturally in Utah, at least at higher elevations. Durrant (1952) considered it to be rare in this state. However, since Durrant's time the red fox has become abundant in some parts of Utah, including low-elevation areas in the Salt Lake Valley. This may be a natural response to human alterations of habitats that have favored this species. This species has been introduced in many places as a sport animal (in the English tradition of fox hunting) and as a furbearer, and it is likely that red foxes from other places have escaped from fur farms in Utah or have been intentionally released for hunting and trapping.

horse, *Equus cabalus*. Tracks of shod horses were seen along trails in the Park, clearly the result of equestrian use. Thus this species is present in the Park only occasionally and as a domestic animal. This species was native to Utah prehistorically. It was extirpated from various parts of North America between 2,000 and 10,000 years ago along with nearly all of the prehistoric "megafauna", presumably through the use of fire as a hunting tool by indigenous people, and was later reintroduced, about 500 years ago, by Spanish explorers.

Conclusions

Although the Park has been radically altered, historically, from its original natural state, now being far from pristine, it was found to support a more complex and interesting fauna than originally was expected by UDWR zoologists. We conclude that, despite the altered and somewhat degraded condition of its natural habitats, the Park continues to possess wildlife value. If it were deemed desirable to place more management emphasis on this wildlife value (e.g., as a birding or wildlife viewing area), natural processes such

as ecological succession could be expected to gradually improve conditions in the Park to some degree.

Although exotic, introduced species are often ignored by zoologists, who typically find such species to be thoroughly uninteresting, such species can serve as a measure of ecosystem health. A number of nonnative bird species were detected in the Park (viz. the ring-necked pheasant, the rock dove, the European starling, and the house sparrow), but the presence of only one of these exotic birds, the European starling, is of particular concern in the Park (as discussed above in the account for this species). The rock dove may not actually utilize any of the resources of the Park other than the air above it, through which the species was observed to fly. Also, somewhat surprisingly, the house sparrow has not invaded the Park in any ecologically important way.

A semiaquatic mammal thought to have been a nutria was seen in the canal or ditch on the west side of the Park, and the possible presence this exotic species may be of some concern (see species account). However, no evidence was obtained that indicated the presence of such species as the house mouse (*Mus musculus*), the black rat (*Rattus rattus*), or the Norway rat (*Rattus norvegicus*). Whether native or introduced, the common raccoon and the red fox (see species accounts) may be unnaturally abundant in the Park. Although a few domestic animals (dogs and horses, see accounts) enter the Park with their human owners, no feral domestic animals were detected—the domestic cat (*Felis catus*) being one of the least desirable of the feral possibilities because of its predatory impact on native birds and small mammals.

As discussed above, the Park does continue to possess value for wildlife despite habitat alterations and the presence of some nonnative species. On the other hand, the Park is in a suburban setting, already surrounded by industrial and residential development, and, as the Salt Lake City metropolitan area continues to grow, the Park will become increasingly insular and isolated from natural habitats. As a result its fauna may become less diverse in the future. Also, no animal species that are federally listed or are candidates for listing under provisions of the Endangered Species Act and no animals on the state Sensitive Species List were found. Thus, it would be an exaggeration to claim that the Park holds great biological or ecological significance. It is more accurate to say that the Park has some favorable natural qualities and favorable natural potential that could be encouraged through management for outdoor recreation such as hiking, birding, and general wildlife viewing.

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Appendix B. Species detected in Jordan River State Park (boldface) and species of hypothetical occurrence (see text for explanation of criteria for inclusion in list). Nonnative species are indicated with asterisks (*). Bird species for which breeding in the Park was confirmed are indicated.

tiger salamander, *Ambystoma tigrinum*
Woodhouse's toad, *Bufo woodhousii*
western chorus frog, *Pseudacris triseriata*
Great Basin spadefoot, *Spea intermontana*
*American bullfrog, *Rana catesbeiana*
*green frog, *Rana clamitans*
northern leopard frog, *Rana pipiens*

*common snapping turtle, *Chelydra serpentina*
*pond slider, *Trachemys scripta*
tiger whiptail, *Aspidoscelis tigris*
western skink, *Eumeces skiltonianus*
eastern racer, *Coluber constrictor*
striped whipsnake, *Masticophis taeniatus*
gophersnake, *Pituophis catenifer*
terrestrial gartersnake, *Thamnophis elegans*
common gartersnake, *Thamnophis sirtalis*
Pacific rattlesnake, *Crotalus oreganus*

pied-billed grebe, *Podilymbus podiceps*
eared grebe, *Podiceps nigricollis*
double-crested cormorant, *Phalacrocorax auritus*
American bittern, *Botaurus lentiginosus*
great blue heron, *Ardea herodias*
great egret, *Ardea alba*
snowy egret, *Egretta thula*
cattle egret, *Bubulcus ibis*
green heron, *Butorides virescens*
black-crowned night-heron, *Nycticorax nycticorax*
Canada goose, *Branta canadensis*
wood duck, *Aix sponsa*
green-winged teal, *Anas crecca*
mallard, *Anas platyrhynchos*
northern harrier, *Circus cyaneus*
sharp-shinned hawk, *Accipiter striatus*
Cooper's hawk, *Accipiter cooperii*
Swainson's hawk, *Buteo swainsoni*
red-tailed hawk, *Buteo jamaicensis*
American kestrel, *Falco sparverius*
prairie falcon, *Falco mexicanus*
ring-necked pheasant, *Phasianus colchicus
*California quail, *Callipepla californica*

sora, *Porzana carolina*
American coot, *Fulica americana*
sandhill crane, *Grus canadensis*
killdeer, *Charadrius vociferus*
American avocet, *Recurvirostra americana*
spotted sandpiper, *Actitis macularia*
Wilson's snipe, *Gallinago delicata*
Franklin's gull, *Larus pipixcan*
California gull, *Larus californicus*
Forster's tern, *Sterna forsteri*
rock dove, *Columba livia*
mourning dove, *Zenaida macroura*
yellow-billed cuckoo, *Coccyzus americanus*
barn owl, *Tyto alba*
western screech-owl, *Otus kennicottii*
great horned owl, *Bubo virginianus*
long-eared owl, *Asio otus*
short-eared owl, *Asio flammeus*
burrowing owl, *Athene cunicularia*
common nighthawk, *Chordeiles minor*
black-chinned hummingbird, *Archilochus alexandri*
belted kingfisher, *Ceryle alcyon*
Lewis' woodpecker, *Melanerpes lewis*
red-naped sapsucker, *Sphyrapicus nuchalis*
downy woodpecker, *Picoides pubescens*
hairy woodpecker, *Picoides villosus*
northern flicker, *Colaptes auratus*
western wood-pewee, *Contopus sordidulus*
willow flycatcher, *Empidonax traillii*
Say's phoebe, *Sayornis saya*
ash-throated flycatcher, *Myiarchus cinerascens*
western kingbird, *Tyrannus verticalis* (breeding)
eastern kingbird, *Tyrannus tyrannus*
loggerhead shrike, *Lanius ludovicianus*
warbling vireo, *Vireo gilvus*
plumbeous vireo, *Vireo plumbeus*
western scrub-jay, *Aphelocoma californica*
black-billed magpie, *Pica hudsonia* (breeding)
American crow, *Corvus brachyrhynchos*
common raven, *Corvus corax*
horned lark, *Eremophila alpestris*
purple martin, *Progne subis*
violet-green swallow, *Tachycineta thalassina*
northern rough-winged swallow, *Stelgidopteryx serripennis*
bank swallow, *Riparia riparia*
cliff swallow, *Petrochelidon pyrrhonota*
barn swallow, *Hirundo rustica*

black-capped chickadee, *Poecile atricapilla*
house wren, *Troglodytes aedon*
marsh wren, *Cistothorus palustris*
ruby-crowned kinglet, *Regulus calendula*
blue-gray gnatcatcher, *Polioptila caerulea*
veery, *Catharus fuscescens*
American robin, *Turdus migratorius*
gray catbird, *Dumetella carolinensis*
northern mockingbird, *Mimus polyglottos*
European starling, *Sturnus vulgaris
yellow warbler, *Dendroica petechia*
yellow-rumped warbler, *Dendroica coronata*
American redstart, *Setophaga ruticilla*
common yellowthroat, *Geothlypis trichas*
yellow-breasted chat, *Icteria virens*
spotted towhee, *Pipilo maculatus*
chipping sparrow, *Spizella passerina*
Brewer's sparrow, *Spizella breweri*
vesper sparrow, *Pooecetes gramineus*
lark sparrow, *Chondestes grammacus*
lark bunting, *Calamospiza melanocorys*
Savannah sparrow, *Passerculus sandwichensis*
grasshopper sparrow, *Ammodramus savannarum*
fox sparrow, *Passerella iliaca*
song sparrow, *Melospiza melodia*
Lincoln's sparrow, *Melospiza lincolnii*
white-crowned sparrow, *Zonotrichia leucophrys*
lazuli bunting, *Passerina amoena*
bobolink, *Dolichonyx oryzivorus*
red-winged blackbird, *Agelaius phoeniceus*
western meadowlark, *Sturnella neglecta*
yellow-headed blackbird, *Xanthocephalus xanthocephalus*
Brewer's blackbird, *Euphagus cyanocephalus*
brown-headed cowbird, *Molothrus ater*
Bullock's oriole, *Icterus bullockii* (breeding)
house finch, *Carpodacus mexicanus*
pine siskin, *Carduelis pinus*
lesser goldfinch, *Carduelis psaltria*
American goldfinch, *Carduelis tristis*
house sparrow, *Passer domesticus

masked shrew, *Sorex cinereus*
Preble's shrew, *Sorex preblei*
vagrant shrew, *Sorex vagrans*
little brown myotis, *Myotis lucifugus*
long-eared myotis, *Myotis evotis*
long-legged myotis, *Myotis volans*

California myotis, *Myotis californicus*
western small-footed myotis, *Myotis ciliolabrum*
silver-haired bat, *Lasionycteris noctivagans*
western pipistrelle, *Pipistrellus hesperus*
big brown bat, *Eptesicus fuscus*
western red bat, *Lasiurus blossevillii*
hoary bat, *Lasiurus cinereus*
spotted bat, *Euderma maculatum*
Townsend's big-eared bat, *Corynorhinus townsendii*
Brazilian free-tailed bat, *Tadarida brasiliensis*
mountain cottontail, *Sylvilagus nuttallii*
black-tailed jackrabbit, *Lepus californicus*
least chipmunk, *Tamias minimus*
yellow-bellied marmot, *Marmota flaviventris*
Uinta ground squirrel, *Spermophilus armatus*
Piute ground squirrel, *Spermophilus mollis*
rock squirrel, *Spermophilus variegatus*
Botta's pocket gopher, *Thomomys bottae*
Great Basin pocket mouse, *Perognathus parvus*
American beaver, *Castor canadensis*
western harvest mouse, *Reithrodontomys megalotis*
deer mouse, *Peromyscus maniculatus*
[**unidentified vole, *Microtus* sp.**—see text]
meadow vole, *Microtus pennsylvanicus*
montane vole, *Microtus montanus*
long-tailed vole, *Microtus longicaudus*
sagebrush vole, *Lemmiscus curtatus*
muskrat, *Ondatra zibethicus*
nutria, *Myocastor coypus
*black rat, *Rattus rattus*
*Norway rat, *Rattus norvegicus*
*house mouse, *Mus musculus*
western jumping mouse, *Zapus princeps*
North American porcupine, *Erethizon dorsatum*
coyote, *Canis latrans*
red fox, *Vulpes vulpes*
ringtail, *Bassariscus astutus*
common raccoon, *Procyon lotor*
long-tailed weasel, *Mustela frenata*
American mink, *Mustela vison*
American badger, *Taxidea taxus*
western spotted skunk, *Spilogale gracilis*
striped skunk, *Mephitis mephitis*
bobcat, *Lynx rufus*