THE GREAT SALT LAKE SHORELANDS PRESERVE

The Nature Conservancy

Preserving a haven for birds and the community on the shores of Great Salt Lake

January 2023

The Shorelands Preserve

The Shorelands Preserve is part of the Great Salt Lake ecosystem which provides crucial habitat to an estimated 10 million migrating birds in the Pacific Flyway. The Preserve's 4,418 acres of wetlands and uplands provide places for birds to rest and feed during migration, raise young during the summer, and respite during the harsh winter months.

Within the 9,000 mile distance from Chile to northern Canada, the Great Salt Lake ecosystem is considered one of the most important wetlands for shorebirds; earning title of a "site of hemispheric importance" from the Western Hemisphere Shorebird Reserve. The existence of these wetlands is threatened and their preservation is of highest priority.

Birds are important because they bring me renewal. Every year with the changing of the season, the influx of birds is like seeing an old friend and they give me hope of a new beginning to the season that will be a prosperous, abundant and successful. It inspires my work to make their stay just as prosperous as I hope my summer to be.

- Chris Brown
Director of Stewardship &
Shorelands Preserve Manager

Major Threats

Thirty years after the establishment of the Shorelands Preserve, few could have anticipated the magnitude of change in and around the Shorelands Preserve.

A Changing Landscape

Between 1990 and 2021, Davis County's population doubled to over 367,000 people. Houses, lawns, and pavement have replaced nearly every neighboring farm and pastureland (Figure 1). Skirting the eastern boundary of the Preserve, the West Davis Corridor highway was approved in 2017 and major construction started in 2022.

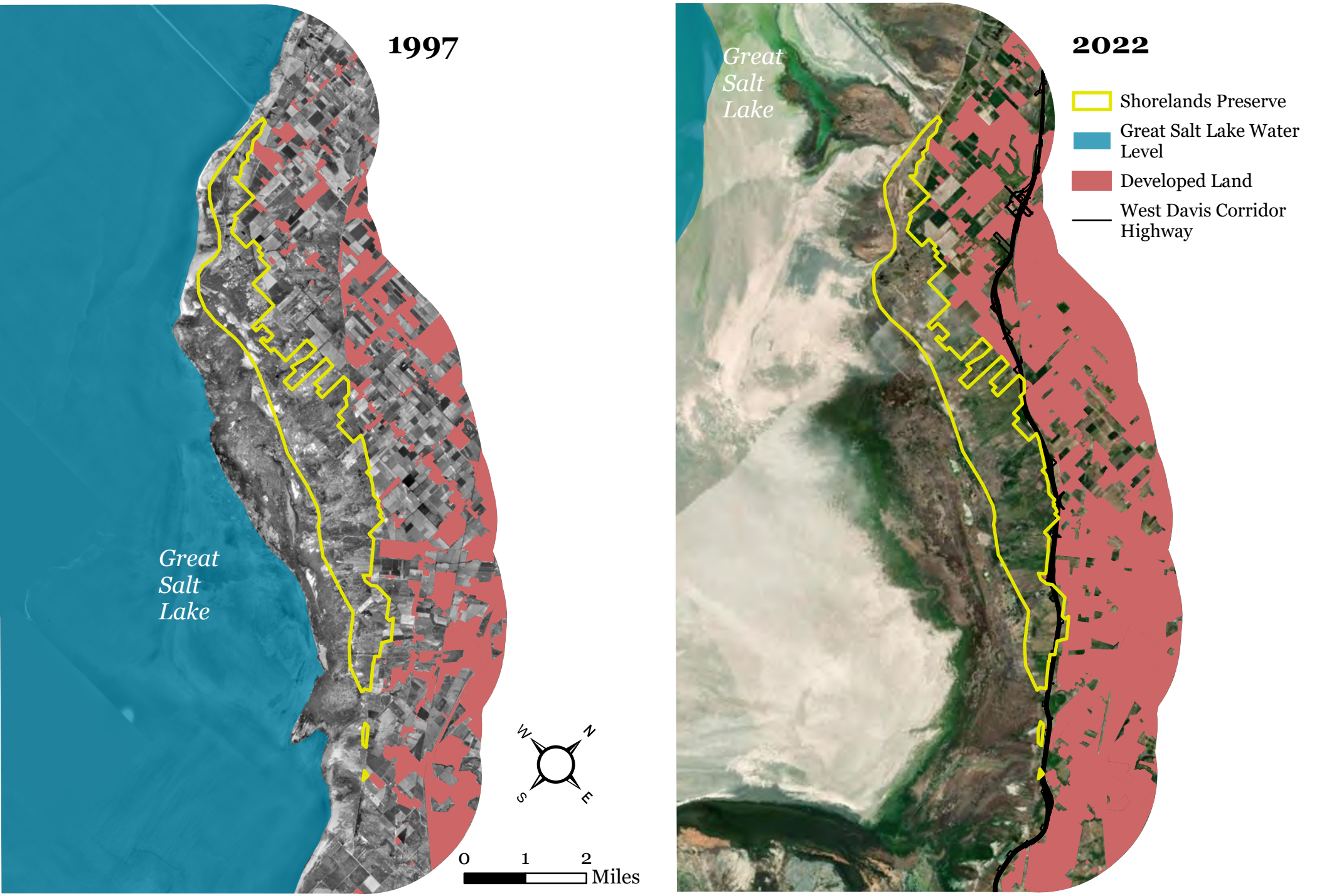
Development of open space has brought significant disturbance to the Shorelands Preserve. Water delivery to the Preserve's wetlands has been completely altered and stormwater that enters streams like Kay's Creek is polluted.

In human altered landscapes, animals such as feral cats and striped skunk thrive and increase predation on birds. Noise and light from neighboring homes and roads is disruptive to breeding birds.

Loss of Water

Along the western shores, the loss of the Great Salt Lake's water supply has disconnected the Shorelands Preserve from the Lake. When the Shorelands Preserve was created in the 1994, the briny waters of Great Salt Lake lapped at its shores. Today, you must walk **over two miles** to reach the shores of Great Salt Lake. Drought and over consumption of water has brought the Great Salt Lake to these historic lows. The loss of water has also dried up supply to the Preserve's interior wetlands. Managers have to make difficult decisions about which wetlands get allocated diminishing water supplies.

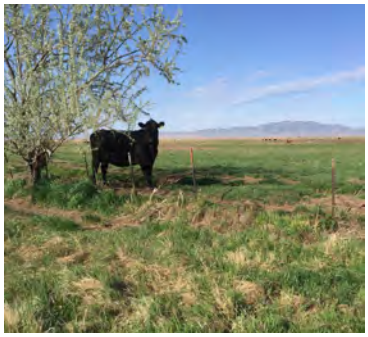
Figure 1.
Development and Lake Levels Around the Shorelands Preserve: 1997 vs. 2022



Invasive Phragmites

Phragmites is an invasive, noxious plant species that first showed up in Great Salt Lake's wetlands in the 1980s (Kettenring et al. 2020). By the 1990s, phragmites was identified as a serious issue on lands covered by the Shorelands Preserve. This plant creates dense, tall monocultures of vegetation that forces out native plants. Few bird species can utilize phragmites as habitat and an acre of phragmites is an acre lost to birds. Phragmites especially thrives along the western boundary of the Shorelands Preserve that is shared with lands managed by the Utah Department of Natural Resources.

Today, this local phragmites "patch" covers nearly 6,000 acres, 850 acres of which are on the Shorelands Preserve (Figure 2). Dedicated managers use decades of experience and research findings to combat phragmites with cattle grazing, herbicides, water control, and mowing. However, this site is considered the most challenging phragmites patch on Great Salt Lake to restore. The fight continues to bring back these wetlands as habitat for birds.



Phragmites creates monocultures of dense, tall vegetation that is low quality habitat for most birds. Mowing using Marsh Master vehicles and cattle helps control infestations.

Figure 2. Phragmites Vegetation in and around the Shorelands Preserve

Shorelands Preserve
Phragmites

0 1 2 Miles

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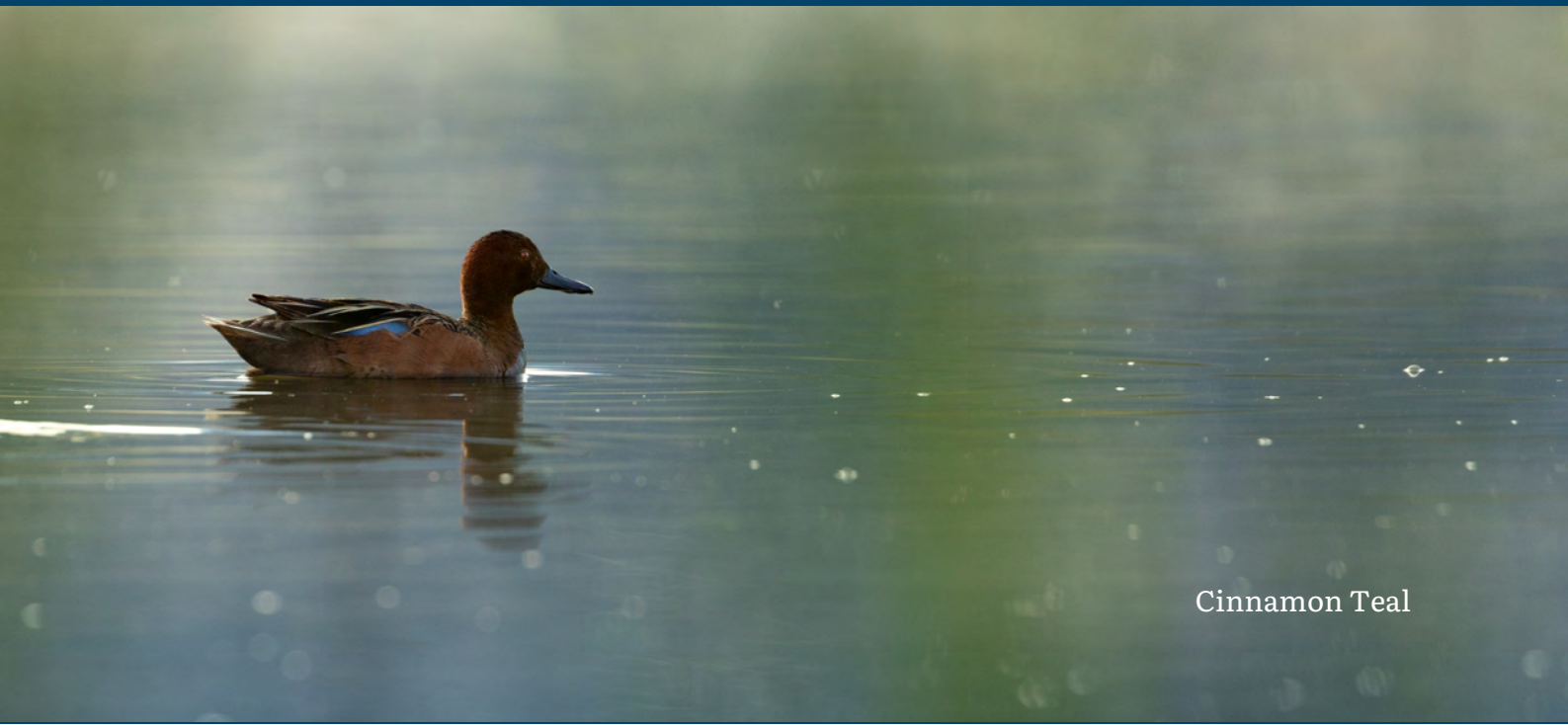
ESRI World Imagery, dated 2022

Bobolink

The Resources

Since 1984, The Nature Conservancy has been dedicated to bringing people together to help solve today's biggest conservation challenges.

The Nature Conservancy is committed to maintaining the Shorelands Preserve a resource to the community and a haven for birds. The Shorelands Preserve remains one of the last parcels of open space for the people of Kaysville, Layton, and Syracuse. The visitor center and board walk are popular among bird watchers, residents, and school programs. Portions of the Shorelands Preserve represent the last places for ring-necked pheasant and waterfowl hunting in Davis County.



Cinnamon Teal

White-faced Ibis

The Shorelands Preserve benefits over 200 species of birds throughout the year and few are more iconic than the White-faced Ibis. These iridescent-colored waterbirds travel in flocks and forage in meadow-like wetlands. Historically, White-faced Ibis thrived in both natural and irrigated pasturelands in the region. With these pasturelands being lost to development, White-faced Ibis have less habitat available and their populations have declined. They are identified as a Utah Species of Greatest Conservation Need. The Shorelands Preserve represents some of the last remaining white-faced ibis habitats along the eastern shores of Great Salt Lake.

White-faced Ibis

White-faced Ibis eat insects and worms from wetlands. Once plentiful, the Shorelands Preserve contains some of the last White-faced Ibis habitats in the region.

SHORELANDS PRESERVE

Monitoring Birds at the Preserve

To understand bird use of the Shorelands Preserve during breeding season, comprehensive surveys have been conducted for the past 3 years between April and early June. Bird surveys were conducted at 40 locations or "point counts" in the Preserve (Figure 3, Table 1). The Preserve was initially delineated into two areas based on the proximity to the West Davis Corridor highway. Survey sites were selected from a random selection of bird habitat accessible to surveyors and were not centered in areas with dense stands of phragmites or open water.

All bird surveys were conducted by one Certified Wildlife Biologist® and following methods outlined in the Integrated Monitoring in Bird Conservation Regions Point-Transect Method (Hanni et al. 2015). At each point count, a biologist recorded all audible and visual bird observations for 6 minutes. Each species is recorded, along with its distance from the point. For data analysis, distance sampling was used to estimate bird densities using DISTANCE 7 software (Buckland et al. 2001).

In analyses, only birds using the local habitat (not "fly overs") were included and counts were truncated to those detected within 250 meters of the point. The Preserve contains 880 acres dominated by phragmites and not considered suitable bird habitat. Therefore, density estimates used 3,538 acres as the effective project area on the Shorelands Preserve.

Full detail on survey and statistical methodology can be referenced in the Great Salt Lake Shorelands Preserve Bird Survey Plan.

Table 1. Survey effort.

Year	# Survey Points	# Survey Rounds	Total # Point Counts
2020	40	4	160
2021	40	5	198^
2022	40	5	200

^ two survey points were missed due to inaccessible conditions.

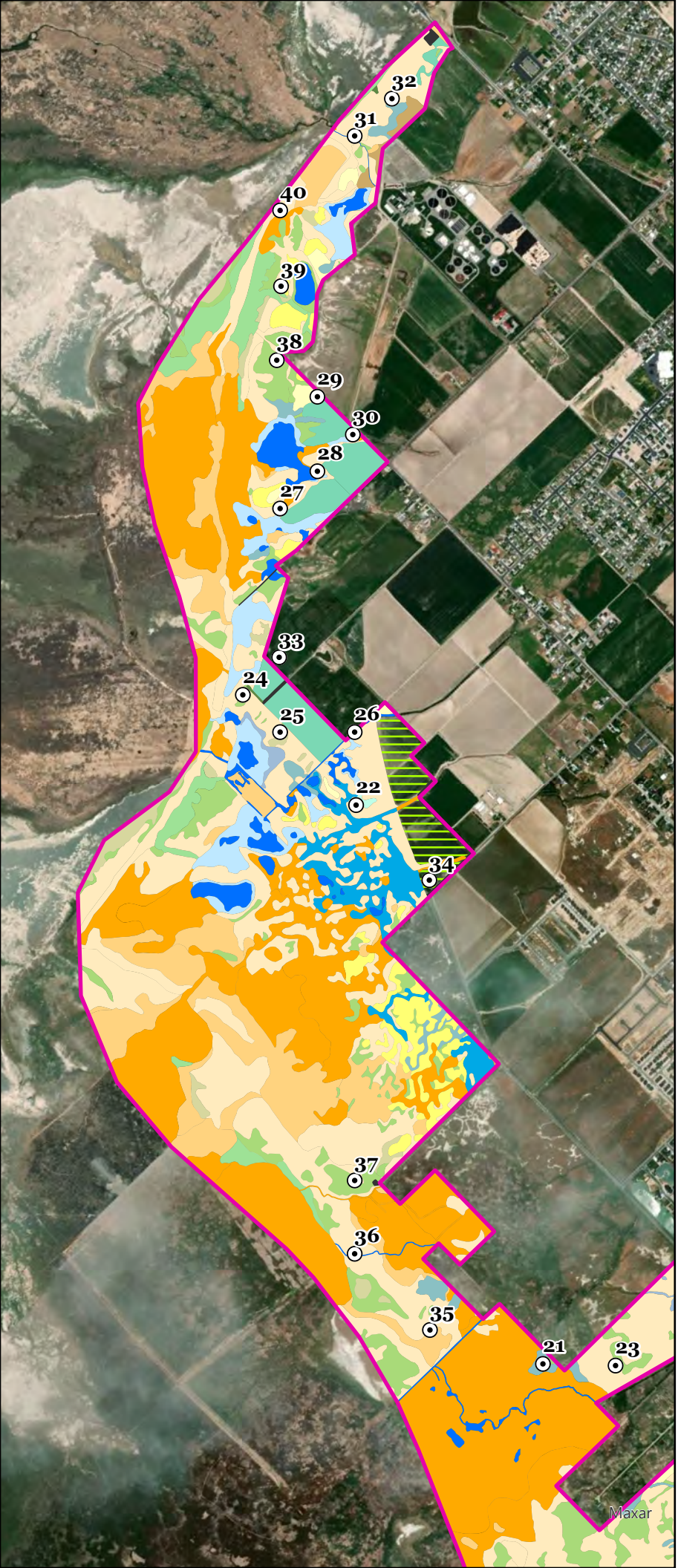


Figure 3 (a). Habitat Types and Bird Point Count Sites

- Shorelands Preserve
- Bird Point Count Site
- Artificial impervious surface
- Dense phragmites
- Mixed phragmites
- Annual grass upland
- Mesic grasses mesic meadow
- Artificial crops
- Shrubby upland
- Ruderal annual mesic meadow
- Barren playa
- Vegetated playa
- Permanent water
- Bulrush marsh
- Cattail marsh
- Unclassified marsh
- Fresh wet meadow
- Irrigated pasture and mesic meadow
- Saline wet meadow
- Dense saltgrass wet meadow
- Woody riparian

0 1 2 Miles

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ESRI World Imagery, dated 2022

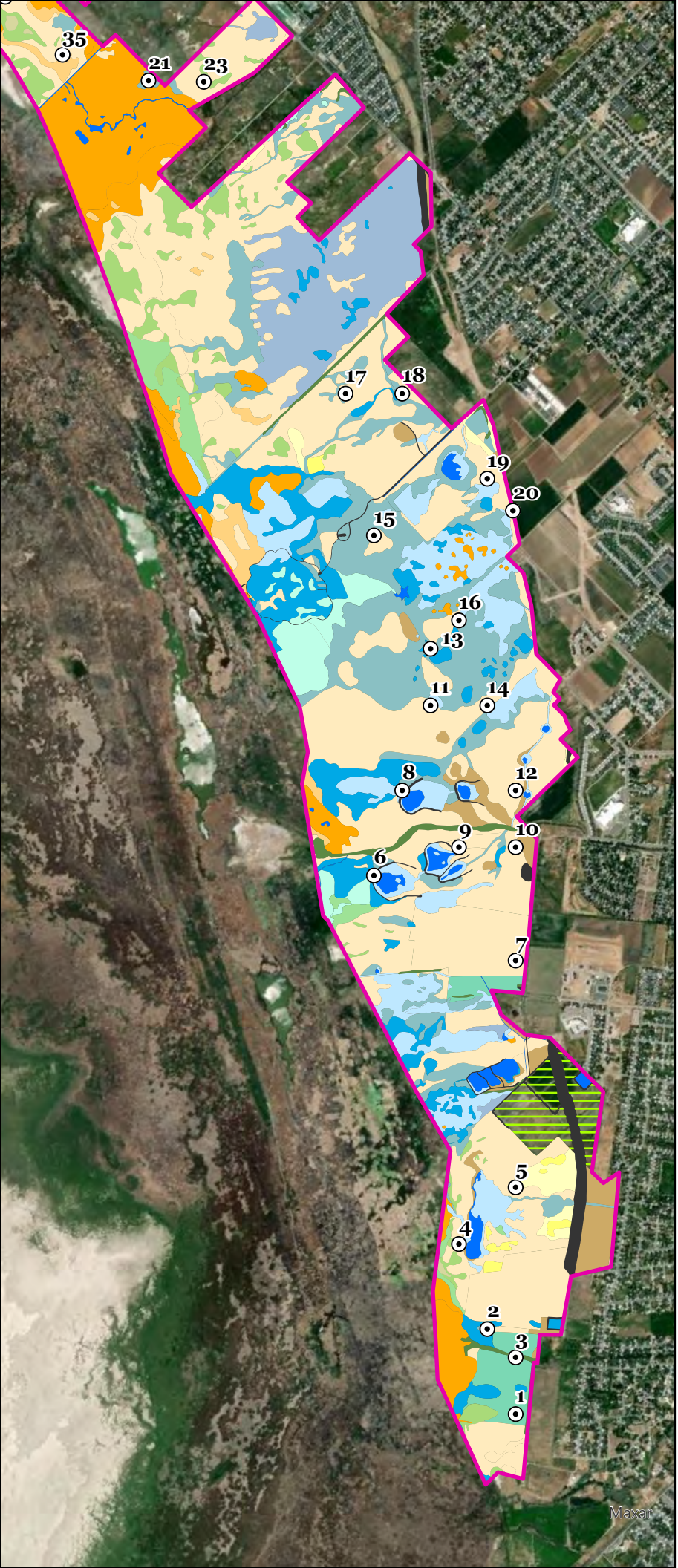

Figure 3 (b). Habitat Types and Bird Point Count Sites

- Shorelands Preserve
- Bird Point Count Site
- Artificial impervious surface
- Dense phragmites
- Mixed phragmites
- Annual grass upland
- Mesic grasses mesic meadow
- Artificial crops
- Shrubby upland
- Ruderal annual mesic meadow
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0 1 2 Miles

N W E S

ESRI World Imagery, dated 2022

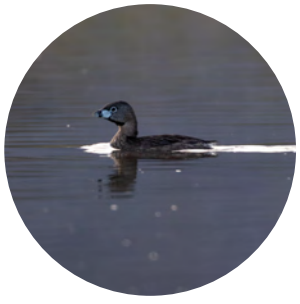
Bird Habitats

Bird habitats across the Shorelands Preserve are varied and include many types of uplands and wetlands. Each habitat type attracts many different species of birds. Examples of some species and habitats are highlighted below and correspond with bird points and vegetation communities on Figure 3.

Western Meadowlark, Annual grass upland

Wilson's Snipe, Saline wet meadow

American Avocet, Vegetated playa



Pied-billed Grebe, Permanent water & bullrush marsh

Eastern Kingbird, Woody Riparian

Bird Use

Over three years of breeding season surveys, 39,692 individual birds were counted representing 108 species (Table 2). Of these, 93 are believed to use the Shorelands Preserve or vicinity for nesting. The other species were migrants passing through (e.g., Long-billed Dowitcher, Red-necked Phalarope).

Of the species detected during the breeding season, they represented a number of bird guilds, Figure 4. Species richness, or the number of unique species detected at each point count, varied from 23 to 48 species (Figure 5).

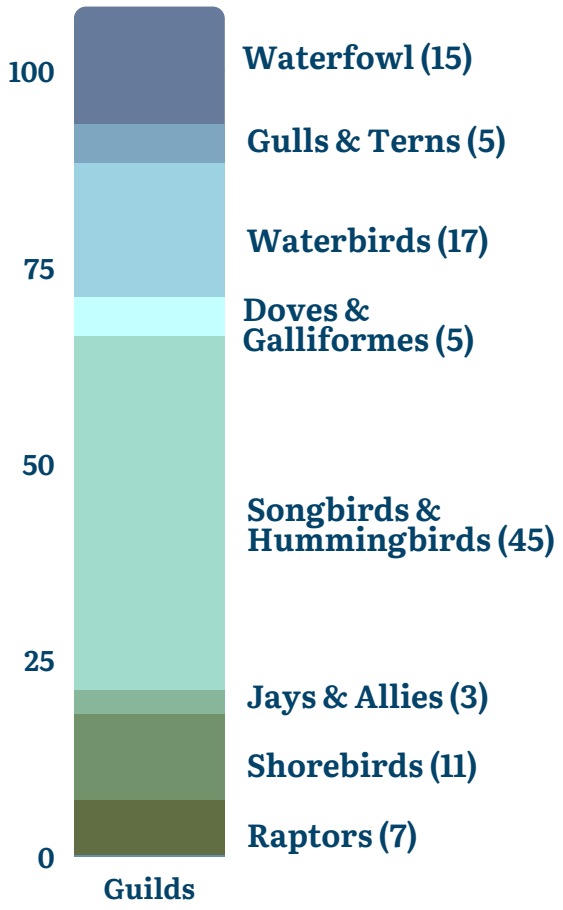


Figure 4. Number of species in major bird guilds.

Redhead

Figure 5. Species Richness at Bird Point Count Sites

Shorelands Preserve

Species Richness at Bird Point Counts

- 23 - 28 speices
- 29 - 32 species
- 33 - 37 species
- 38 - 42 species
- 43 - 48 species

0 1 2 Miles

N W E S

ESRI World Imagery, dated 2022

Table 2. Bird species detected during breeding bird surveys. Species suspected of breeding (i.e., nesting) within or near the Shorelands Preserve are in bold font. Other species (light font) are likely migrants.

Doves
Eurasian Collared Dove
Mourning Dove
Rock Pigeon
Gulls
California Gull
Franklin's Gull
Ring-billed Gull
Herons & Waterbirds
American Bittern
American Coot
American White Pelican
Black-crowned Night Heron
Cattle Egret
Clark's Grebe
Double-crested Cormorant
Eared Grebe
Great Blue Heron
Great Egret
Pied-billed Grebe
Sandhill Crane
Snowy Egret
Sora
Virginia Rail
Western Grebe
White-faced Ibis
Hummingbirds
Black-chinned Hummingbird
Broad-tailed Hummingbird
Jays & Allies
American Crow
Black-billed Magpie
Common Raven

Passerines
American Goldfinch
American Pipit
American Robin
Bank Swallow
Barn Swallow
Black-capped Chickadee
Bobolink
Brewer's Blackbird
Brewer's Sparrow
Brown-headed Cowbird
Bullock's Oriole
Chipping Sparrow
Cliff Swallow
Common Yellowthroat
Downy Woodpecker
Eastern Kingbird
European Starling
Great-tailed Grackle
Horned Lark
House Finch
Lincoln's Sparrow
Loggerhead Shrike
Marsh Wren
Northern Mockingbird
Northern Rough-winged Swallow
Orange-crowned Warbler
Red-winged Blackbird
Ruby-crowned Kinglet
Savannah Sparrow
Song Sparrow
Spotted Towhee
Tree Swallow
Violet-green Swallow
Western Kingbird
Western Meadowlark
Western Tanager
Western Wood Peewee
White-crowned Sparrow
Willow Flycatcher (*E. t. adastus*)
Wilson's Warbler
Yellow Warbler
Yellow-headed Blackbird
Yellow-rumped Warbler

Table 2. Continued.

Quail & Pheasant
California Quail
Ring-necked Pheasant
Raptors
American Kestrel
Barn Owl
Cooper's Hawk
Northern Harrier
Red-tailed Hawk
Swainson's Hawk
Turkey Vulture
Shorebirds
American Avocet
Black-necked Stilt
Killdeer
Long-billed Curlew
Long-billed Dowitcher
Marbled Godwit
Red-necked Phalarope
Spotted Sandpiper
Willet
Wilson's Phalarope
Wilson's Snipe

Terns
Caspian Tern
Forester's Tern
Waterfowl
American Wigeon
Blue-winged Teal
Canada Goose
Cinnamon Teal
Domestic Duck
Gadwall
Green-winged Teal
Lesser Scaup
Mallard
Northern Pintail
Northern Shoveler
Redhead
Ring-necked Duck
Ruddy Duck
Wood Duck

Each breeding season, the Shorelands Preserve supports up to 23,173 individual birds which equates to 6.6 birds per acre (Table 3). Abundance and density varied between years. Based on raw counts and including birds counted as "fly overs", the most abundant bird species encountered are listed in Figure 6. White-faced Ibis outnumber all other birds as the most abundant bird encountered, representing 59 percent of all species observations.

Individual point counts had varied bird density estimates from 1.5 to 21.0 birds per acre (Figure 7).

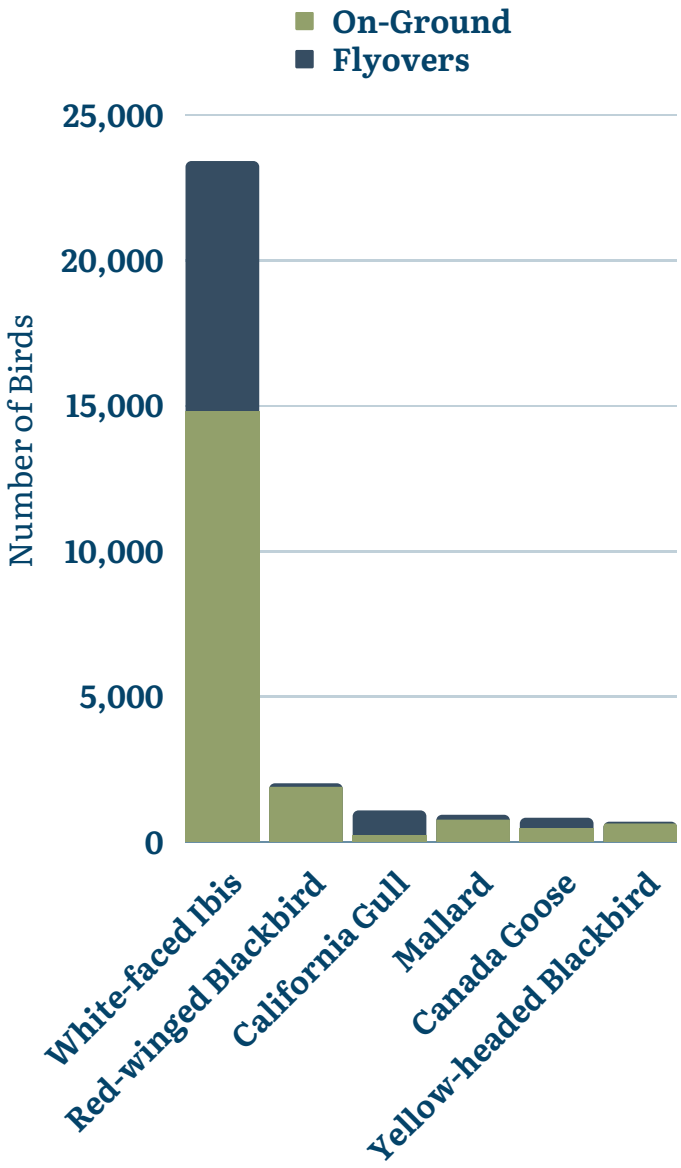


Figure 6. Most abundant species during 2020, 2021, and 2022 breeding seasons.

Table 3. Bird abundance (all species pooled) and density per acre at the Shorelands Preserve, by year.

Year	Bird Abundance	CIs	Bird Density /Acre	CIs
2020	23,173	15,437 - 34,784	6.6	4.4 - 9.8
2021	12,309	9,697 - 15,624	3.5	2.7 - 4.4
2022	17,565	11,461 - 26,920	5.0	3.2 - 7.6

Figure 7.
Density Estimates (Birds per Acre) at Bird Point Count Sites

All Species

Shorelands Preserve

Density Estimates at Point Counts

- 1.0 - 3.9 birds/acre
- 4.0 - 7.9 birds/acre
- 8.0 - 11.9 birds/acre
- 12.0 - 15.9 birds/acre
- 16.0 - 19.9 birds/acre
- 20.0 - 24.0 birds/acre

Density estimates calculated for "on-the-ground" (i.e., does not include flyovers) and those detected within 250m of Point Count sites.

0 1 2 Miles

N W E S

ESRI World Imagery, dated 2022

White-faced Ibis

White-faced Ibis are the most abundant bird at the Shorelands Preserve, outnumbering species like Red-winged Blackbird (Figure 4). Each breeding season, the Preserve supports up to 8,459 White-faced Ibis or 2.2 Ibis per acre each breeding season (Table 4). At individual point counts, ibis density varied and was concentrated in wetlands in the central area of the Shorelands Preserve (Figure 8).

White-faced Ibis are the most abundant on-the-ground species, but also comprise a large portion of birds characterized as "fly overs" meaning they were traveling over the survey area, but not necessarily using local habitats. Based on anecdotal observations, the Shorelands Preserve is likely a major travel corridor for White-faced Ibis as they move across the eastern shores of Great Salt Lake, especially between known nesting colonies at Farmington Bay and in the the North Davis Sewage District outflow.

Table 4. White-faced Ibis abundance and density per acre at the Shorelands Preserve, by year.

Year	Bird Abundance	CIs	Bird Density /Acre	CIs
2020	5,650	2,660 - 12,001	1.5	0.7 - 3.1
2021	1,997	996 - 4,004	0.5	0.3 - 1.0
2022	8,457	3,859 - 18,535	2.2	1.0 - 4.8

Figure 8.
Density Estimates (Birds per Acre) at Bird Point Count Sites

White-faced Ibis

Shorelands Preserve

Density Estimates at Point Counts

- 0.0 Ibis per Acre
- 0.1 - 1.9 Ibis per acre
- 2.0- 3.9 Ibis per acre
- 4.0 - 5.9 Ibis per acre
- 6.0 - 8.0 Ibis per acre

Density estimates calculated for "on-the-ground" (i.e., does not include flyovers) and those detected within 250m of Point Count sites.

0 1 2 Miles

N W E S

ESRI World Imagery, dated 2022

A Preserve of Highest Value

The Shorelands Preserve hosts a high abundance of birds during the breeding season. Of interest in 2022 is the intensifying drought which has led to record-breaking loss of wetlands and the Great Salt Lake's water supply. Yet, bird use remained high at the Shorelands Preserve. For White-faced Ibis, 2022 had the highest use. The Shorelands Preserve remains a haven for birds and may also be the only remaining refugia in an increasingly drying and developed landscape. The Shorelands Preserve supports far greater densities of White-faced Ibis compared to the region, outnumbering other areas by more than tenfold (Bird Conservancy of the Rockies 2022). Creating habitat conditions that can best support these birds through breeding season, like ample food supply, remains paramount for managers. Efforts to combat phragmites invasions and manage water supply were found to immediately attract birds.

The Shorelands Preserve supports four Utah Species of Greatest Conservation Need: American Bittern, American White Pelican, Caspian Tern, and White-faced Ibis. Birds of Conservation Concern (Great Basin, Region 9) that use the Shorelands Preserve are: Western Grebe, Clark's Grebe, American Avocet, Long-billed Curlew, Marbled Godwit, Willet, California Gull, Forster's Tern, Franklin's Gull, Broad-tailed Hummingbird, Short-eared Owl, Bobolink, and Northern Harrier.

Literature Referenced

Bird Conservancy of the Rockies. 2022. The Rocky Mountain Avian Data Center. [web application]. Brighton, CO. http://adc.rmbo.org. Accessed: July 1 2022

Buckland, S.T., D. R. Anderson, K. P. Burnham, J .L. Laake, D. L. Borchers, and L. Thomas. 2001. Introduction to distance sampling: estimating abundance of biological populations. Oxford University Press, Oxford, UK.

Hanni, D. J., C. M. White, N.J. Van Lanen, J. J. Birek, J.M. Berven, and M.F. McLaren. 2018. Integrated Monitoring in Bird Conservation Regions (IMBCR): Field protocol for spatially- balanced sampling of landbird populations. Unpublished report. Rocky Mountain Bird Observatory, Brighton, Colorado, USA.

Kettenring, Karin M., Chad R. Cranney, Rebekah Downard, Keith R. Hambrecht, Emily E. Tarsa, Diane R. Menuz, and Christine B. Rohal. “Invasive Plants of Great Salt Lake Wetlands: What, Where, When, How, and Why?.” In Great Salt Lake Biology, pp. 397-434. Springer, Cham, 2020.

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