Bear River

MIGRATORY BIRD REFUGE

VISITOR INFORMATION
AND TOUR GUIDE

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A Visitor Information Booklet and Tour Guide

Front Cover:
Canada goose and young.

Inside Front Cover:
White-faced ibis.

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The National Wildlife Refuge System

When the first colonists reached America, they found a land of abundant soil, forests, and wildlife. The settlers that followed them and continued to push westward were not concerned about the future of wildlife and the other resources of the land; to them it seemed there was enough to satisfy all demands. But as expansion continued, great areas of wildlife habitat gave way to the ax and plow, and wildlife numbers dwindled under the pressure of uncontrolled hunting. By the late 1800's a few species had disappeared, and it seemed that many would meet the same fate. During this period, conservation-minded leaders realized the need for setting aside the best remaining wildlife areas for the use of future generations.

The first National Wildlife Refuge was created in 1903 when President Theodore Roosevelt set aside Pelican Island on the east coast of Florida to protect a nesting colony of brown pelicans and herons. He later established additional refuges on public lands, and Congress and later presidents continued to add more areas. In 1929 the Migratory Bird Conservation Act provided the authority for purchase of wetlands, and many waterfowl refuges were added to the system.

Today there are more than 300 refuges totalling 28,750,000 acres which in combination make up the National Wildlife Refuge System. These refuges protect many types of wildlife and preserve varied habitats and breeding sites, but are particularly important to migratory birds, with three-fourths of the refuges being established for these birds. Also part of the National Refuge System are numerous small pothole marshes in the prairie states. These areas produce large numbers of ducks, and emphasis has been placed on their acquisition to prevent drainage and conversion to farmland. Approximately 2,000,000 acres of these small wetland areas have been scheduled for purchase, lease, or easement.

Often refuges have been created from areas that were misused in the past through drainage, lumbering, burning, or overgrazing, and have been restored to good habitat by building dikes or replanting. The Bear River Refuge is one of these refuges that consists largely of reclaimed lands. Administration of the National Wildlife Refuge System is by the Bureau of Sport Fisheries and Wildlife in the Fish and Wildlife Service, which falls under the supervision of the Department of the Interior.

THE UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF SPORT FISHERIES AND WILDLIFE • FISH AND WILDLIFE SERVICE

UNITED STATES GOVERNMENT PRINTING OFFICE, WASHINGTON, 1968

For sale by the Superintendent of Documents, U.S. Government Printing Office
Washington, D.C. 20402 - Price 30 cents

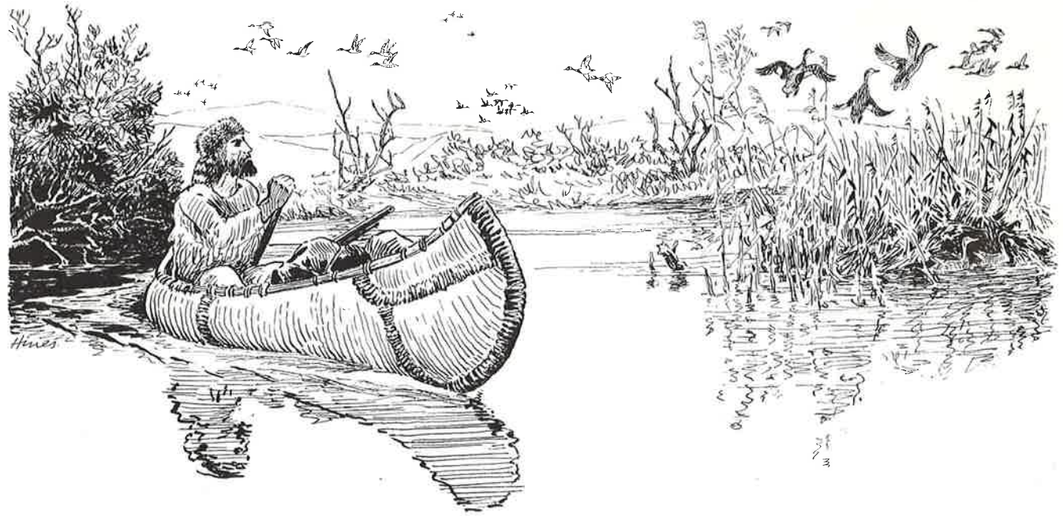
Bear River Migratory Bird Refuge

Welcome to Bear River Refuge. Located on the delta of Bear River where it empties into the Great Salt Lake in northern Utah, the refuge constitutes an area of approximately 65,000 acres, most of which is excellent waterfowl habitat. The refuge is divided into five units of open water and marsh areas surrounded by earthen dikes. A dam across Bear River near the refuge headquarters helps regulate the variable water flow entering the refuge, and a system of canals carries water to the marsh areas. When originally built, the outer dikes were intended to prevent the highly saline waters of the Great Salt Lake from intruding into the fresh water developments but due to decreased rainfall and increased demand for water by agriculture, industry, and communities, the level of the lake has fallen and the shore is presently about 12 miles beyond the dikes.

HISTORY OF THE REFUGE AREA

When the first white men entered Great Salt Lake Valley, they found it inhabited by wildlife and Indians. Recent archaeological findings have shown that waterfowl were an important item in the diet of these Indians, and this source of food may have been one reason for their gathering in the otherwise dry and desolate valley.

Early explorers found an extensive marsh area on the delta where the Bear River empties into Great Salt Lake, and such men as Jim Bridger and Captain John C. Fremont reported seeing great numbers of waterfowl. One such explorer, Captain Howard Stansbury, gave the following description of what he saw at Bear



Artist Bob Hines has pictured his concept of how it may have looked when Jim Bridger came down the Bear River and entered the bay.

River Bay in October 1849. "The marshes were covered by immense flocks of wild geese and ducks among which many swans were seen, being distinguishable by their size and the whiteness of their plumage. I had seen large flocks of these birds before, in various parts of our country, and especially upon the Potomac, but never did I behold anything like the immense numbers here congregated together. Thousands of acres, as far as the eye could reach, seemed literally covered with them, presenting a scene of busy, animated cheerfulness, in most graceful contrast with the dreary, silent solitude by which we were immediately surrounded."

The first settlers arrived in the valley of the Great Salt Lake in 1847. Because of the aridness of the land irrigation was necessary to grow crops, and water from the Bear River was used extensively for this purpose. As settlements grew the demands for water from the Bear River and its tributaries became intense, and by the early 1900's little remained of the once extensive marshes at the mouth of the river.

Loss of habitat combined with unrestricted hunting cut deeply into the great waterfowl flocks. From 1877 to 1900, market hunters killed more than 200,000 ducks annually and shipped them to eastern markets.

Avian botulism was another factor in further reducing the waterfowl populations. It was first noticed around 1900, and in 1910 about half a million ducks died near the mouth of the Bear River during late summer. In an effort to save the rapidly dwindling waterfowl and habitat, large portions of the remaining marsh areas were bought or leased by sportsmen's groups and the Utah Fish and Game Commission.

Through their efforts and those of Federal officials, the Bear River Migratory Bird Refuge was established by a special act of Congress on April 23, 1928. Its primary purpose was to preserve suitable resting, feeding, and breeding areas for migratory birds. A secondary objective was to minimize losses to botulism.

REFUGE ACTIVITIES

Headquarters of the refuge are about 15 miles west of Brigham City, and consist of an administration building, a research laboratory, residences, and several utility buildings. Rest rooms, drinking water, camping, and picnic areas are provided for visitor comfort. There is also a 100 foot tower which offers a fine view of the refuge and surrounding area.

The numerous aspects of the refuge offer interest to all visitors, and whether you have come as a tourist, naturalist, photographer, sportsman, or student, you will find something here to enjoy. Fishing is allowed in the water near headquarters and is popular during the summer months. Catches include carp, black bullhead, and channel catfish. A portion of the refuge is open to public hunting during the fall and winter and offers excellent shooting. Please check at headquarters for information about hunting and fishing.

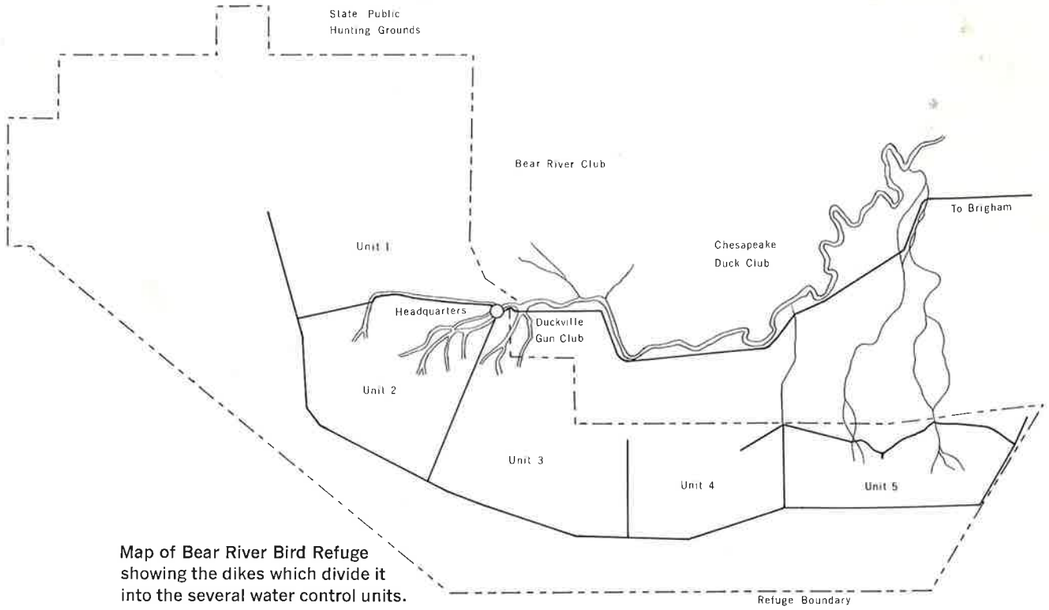
Tour of the Refuge

Visitors are invited to drive their cars around the 12 miles of dike road surrounding Unit Two. For those with limited time, the drive can be made in about 45 minutes.

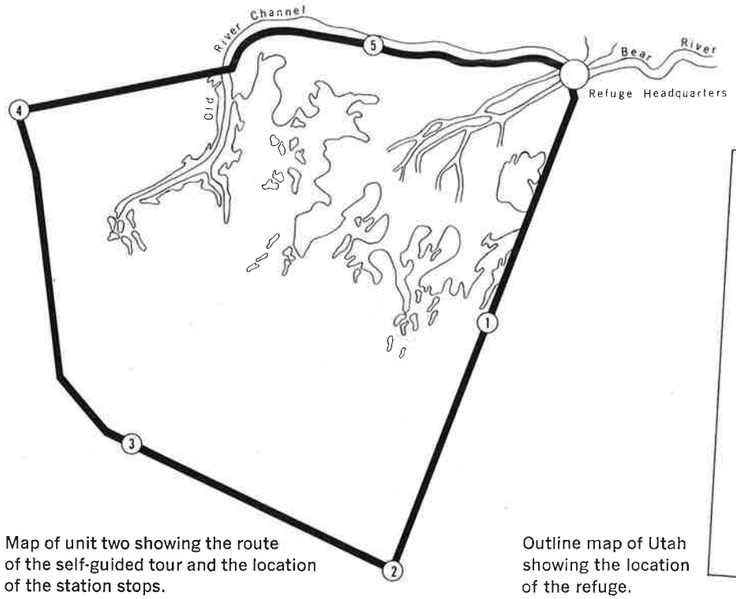
This booklet will serve as your guide for the tour, which is outlined on the refuge map. As you drive around the dike you will see numbered signs which correspond to sections in this booklet. These stops are designed to point out certain features of the area and suggest points of special interest. Take as much time as you like and enjoy yourself, but please remember to stay on the dike road and prevent any unnecessary disturbance to the wildlife. The care and respect you show will insure the same amount of pleasure for those who follow.

We hope this booklet will enhance your visit and make the memory of your trip to the refuge a pleasant one.

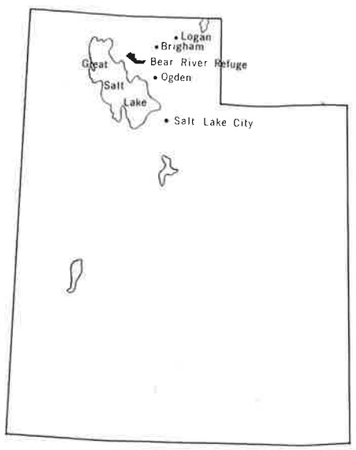
The loss of ducks to botulism in the early 1900's was a motivating factor in the establishment of the Bear River Refuge. Pictured below is the result of a botulism outbreak in Willard Bay, near the refuge.



Map of Bear River Bird Refuge showing the dikes which divide it into the several water control units.

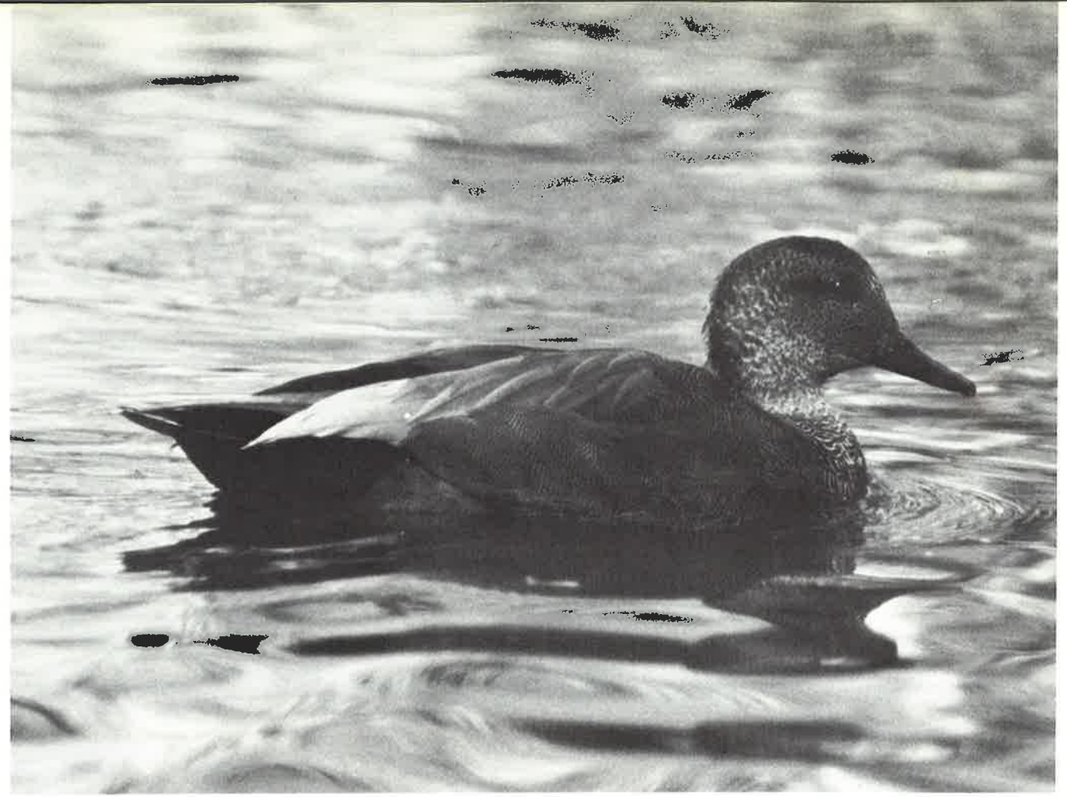


Map of unit two showing the route of the self-guided tour and the location of the station stops.



Outline map of Utah showing the location of the refuge.

Mallards *(right)* are a common dabbling duck on the refuge throughout most of the year.



The gadwall is the most common dabbling duck on the refuge in the spring and is the most abundant nester.

Refuge Ducks

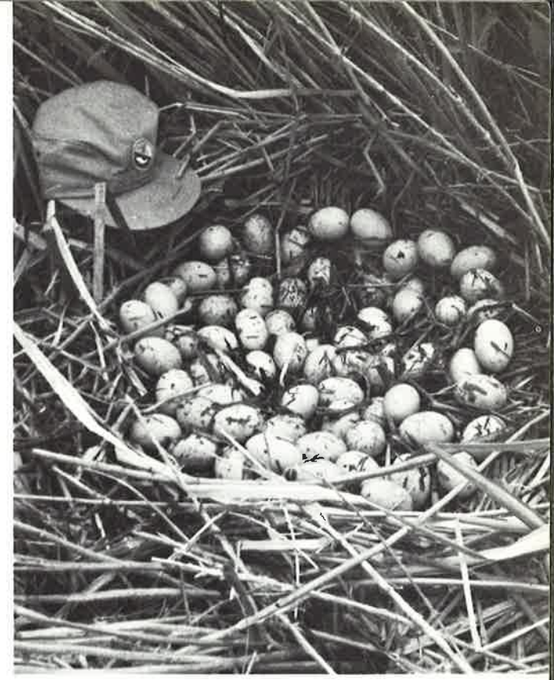
The refuge has two different types of ducks, and several examples of these may be seen shortly after beginning the tour. The first, called dabblers or surface-feeding ducks, are most characteristic of shallow water ponds and marshes. They obtain food by dabbling and tipping up with their heads under water, and when alarmed spring directly into the air instead of pattering along the surface of the water before taking off.

Eight species of these dabblers are common on the refuge and are frequently seen during spring, summer, and fall. They are the gadwall, mallard, pintail, American widgeon or baldpate, shoveler, green-winged teal, cinnamon teal, and blue-winged teal.

In the spring the gadwall, a slender gray duck with a white belly, is most common and is the refuge's most abundant nester. The drakes leave the females shortly after the eggs have been laid, gather into flocks, and undergo a complete molt. The flight feathers are shed rapidly and the birds are flightless for 2 or 3 weeks during this molting period. In the fall, when the refuge sometimes hosts a million ducks, the pintail and green-winged teal are most abundant.

The second type of ducks is the divers, primarily birds of more open bodies of water, although they breed in marshes. They all dive beneath the water surface for food, and when taking flight, do not spring directly upward, but must patter along the surface while getting underway.

The redhead, canvasback, goldeneye, bufflehead, and lesser scaup are common on the refuge, but only the redhead nests here. The females often lay eggs in common unattended nests called "dump" nests. These nests are not incubated and may contain several dozen eggs, none of which hatch.



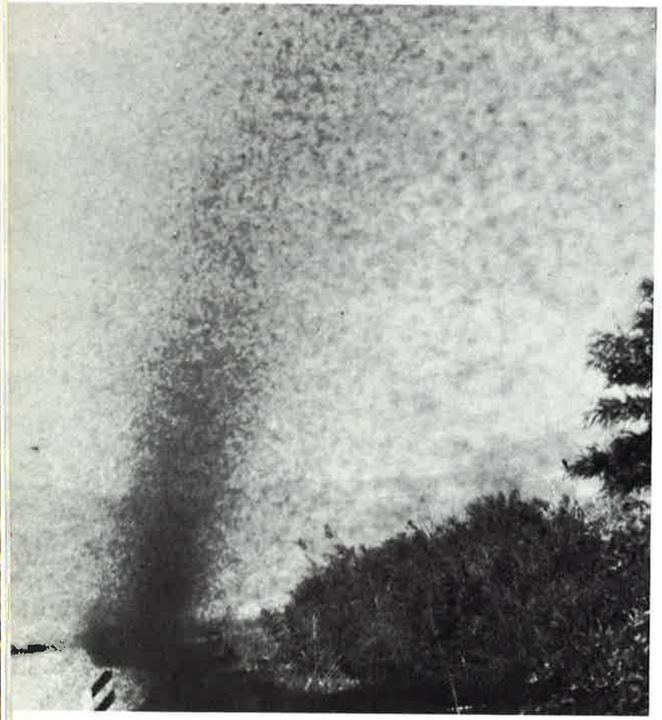
The bright blue bill and white cheek patch of the male ruddy duck *(upper left)* make him easy to identify. *(bottom)* The ring-necked duck, one of the divers, is seen on the refuge in the spring and fall. Redheads, also diving ducks, often lay eggs in common unattended "dump" nests, which do not produce young. This one (*upper right*) had 81 eggs.

Included with the diving duck group but rather different from them is the ruddy duck, the male of which is a small rusty-red bird with white cheeks and a blue bill. Ruddy ducks often cock their tails vertically like a wren, and thus are easily recognized. Although one of the smallest of ducks, the female ruddy lays the largest egg of any. Ruddies dive for most of their food.

First Stop—Station One

The large body of water west of the station sign is Unit Two, which contains 4,300 acres of open water, and 1,400 acres of marsh. The water level in each of the refuge units is regulated by controlling inflow at the dam near headquarters and outflow at several points on the south dike. During the summer months, the greatest depth for this unit is about 30 inches, with an average depth of about 12 inches.

Large black columns of midges like the one below are formed by mating swarms in the spring and fall.



Midges are an important food for many birds on the refuge.

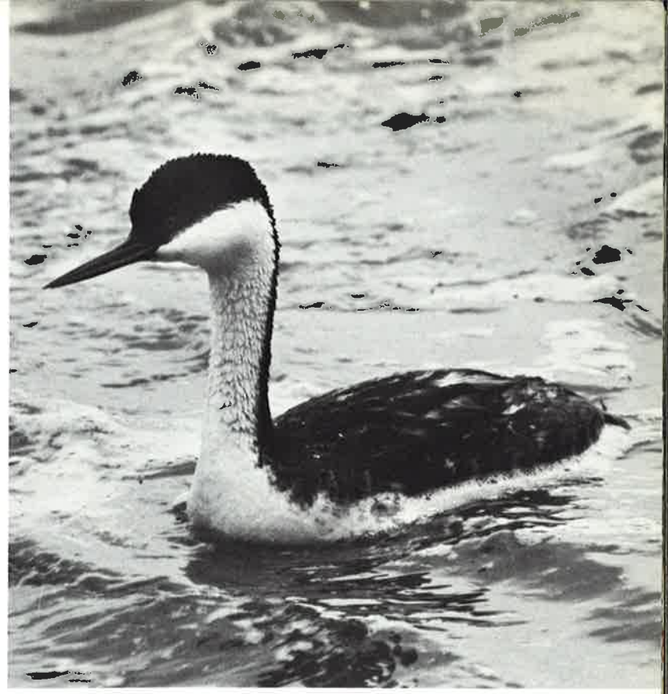
SWARMING MIDGES

Large black columns of swarming midges are often seen along the dike road, and are commonly mistaken for mosquitos. The non-biting adults emerge throughout the summer, but are most common during May, June, and September. The large columns formed are mating swarms composed almost entirely of males, and mating takes place when females enter the swarm. Midge eggs are deposited in gelatin-enclosed masses on the plentiful floating debris and aquatic plants produced in the shallow water. One of the most important food items for many water birds is midge larvae, called "blood worms" because of their reddish color. Adult midges also serve as food for many birds on the refuge.

CANADA GOOSE

The Canada goose is the only goose nesting on the refuge, and may be seen on dikes and in the water next to the road. These geese begin breeding when 2 or 3 years old and may mate for life. The nest, with four to six eggs, is placed in the cover of salt grass or roadside weeds, or on a muskrat mound. The female incubates with her long neck outstretched to avoid detection. Incubation period is about 30 days, and during this time the gander remains near the nest and will attack with loud hissing and powerful wing blows any enemy which threatens his mate. From the time the goslings hatch in May until the next breeding season, the family stays together. These family groups are often seen swimming about in search of food, the gander leading and the female bringing up the rear. The refuge produces about 2,500 Canada geese each year.

With a wingspan of between 5 and 6½ feet and a weight of 7 to 14 pounds, the Canada goose is surpassed in size among waterfowl only by the swan. Because of its size, wariness, and excellent table qualities, the "honker" in probably the most sought after game bird in America. Considered by many as the grandest of all waterfowl, the Canada goose is found here at all times of the year.



Western grebes (*above*) are often seen in the summer with their young riding on their backs. *(below)* This brood of Canada geese is an exceptionally large one, which has been picked up from other parents. Average brood size is five or six young.

The American avocet is a common shore bird on the refuge and builds a flat nest near the water's edge.

WESTERN GREBE

A common sight on the canals and open water areas of the refuge during the spring and summer months is the western grebe. These grebes dive under the water for their food of small fish and insects, and propelled by large, lobed feet can swim long distances before coming to the surface. Visitors in the spring may witness the strange "water ballet" courtship ritual performed by the male and female. As they swim side by side, they suddenly stand with wings tight to the body, neck arched, beak down, and run along the surface of the water for several feet.

Later in the summer, young grebes may be seen riding on their parents' backs, sometimes almost concealed among the feathers. Western grebes have difficulty arising from the water and usually dive when alarmed or approached too closely.

Station Two

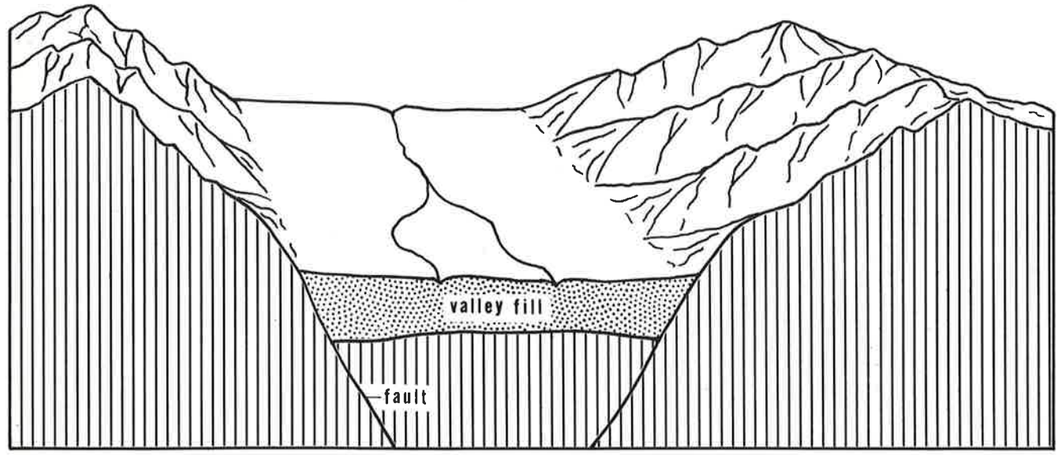
The western half of Utah and most of Nevada make up the Great Basin, a unique area characterized by series of isolated oblong mountain ranges which create many smaller basins. This situation has come about as a result of numerous faults or fractures in the earth's crust, which permitted some sections to move upward and others to settle. Mountains formed in this way rise abruptly from adjacent basins and are called fault block mountains or "horsts." Bear River Refuge and the surrounding valley make up a basin formed by the Wasatch Fault, which like others in the area, is still active. Geologists feel that if the valley floors were not constantly settling into the earth, this basin would eventually fill with stream sediments and Great Salt Lake would drain into the ocean.

SHORE BIRDS

Shallow water areas beyond the outer dike and along the dike roads attract shore birds who hunt insects while wading. The American avocet and the black-necked stilt are the most striking in appearance. The avocet, a large black and white bird with a brown head, has a distinctive habit of sweeping its long up-

The long legs of the black-necked stilt are useful for feeding in shallow water.

Diagram illustrating the formation of fault block mountains. The fault or fracture in the earth's crust allows the valley floor to settle while the surrounding mountains rise.



turned bill from side to side in the water while feeding. By doing so the insects and other aquatic organisms which make up its diet are encountered and swallowed.

The black-necked stilt is also a black and white bird, and has long reddish legs. Both stilts and avocets build flat nests of a few sticks or grass on dry ground, and the young are able to run after their parents just a few hours after hatching. Other common shore birds include the killdeer, dowitcher, godwit, phalarope, willet, yellowlegs, and sandpipers.

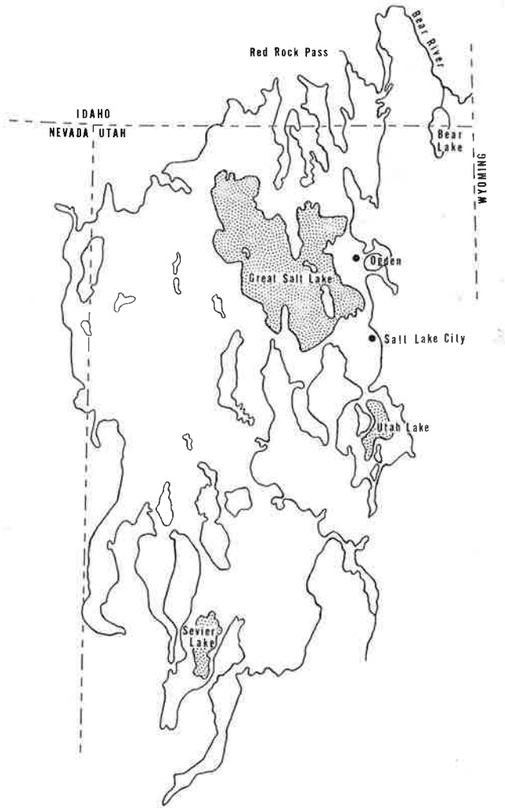
Station Three

GREAT SALT LAKE

In 1928, the refuge outer dikes separated the salty waters of Great Salt Lake from the fresh waters of the refuge, but in recent years irrigation and other demands on upstream water have caused the lake shore to recede about 12 miles to the south. At its maximum depth in 1873, the Great Salt Lake had an area of about 2,200 square miles, while today it covers only 1,700 square miles. The lack of an outlet is responsible for the high salt concentration, which varies with fluctuations in the lake level, and may reach 25 percent or more. In this high salt concentration no fish can survive, and the only life the lake supports is tiny brine shrimp, brine flies, flagellate protozoans, and blue-green algae.

The surrounding flats have highly alkaline soil which must be leached by fresh water before it can support vegetation. One of the common small plants on these flats is salt-tolerant glasswort, a good fall food for waterfowl.

To the south and west of the refuge are some of the larger islands; Antelope, Fremont, and Carrington, and the Promontory Mountains, which form a peninsula into the lake. Hidden behind the Promontory Mountains is Gunnison Island, the traditional nesting site of the white pelicans seen on the refuge. Some of the smaller islands serve as nesting areas for herons, cormorants, terns, and gulls.



(*Upper right*) Map showing the area covered by Lake Bonneville at its greatest depth. The ancient lake drained through Red Rock Pass in Cache Valley. (*below*) A whistling swan family group. The young do not acquire pure white plumage until the second year.

(*Above*) Whistling swans visit the refuge in large numbers on their fall and spring migrations. (*below*) A carp taken from the Bear River is proudly displayed.

CLIFF SWALLOWS

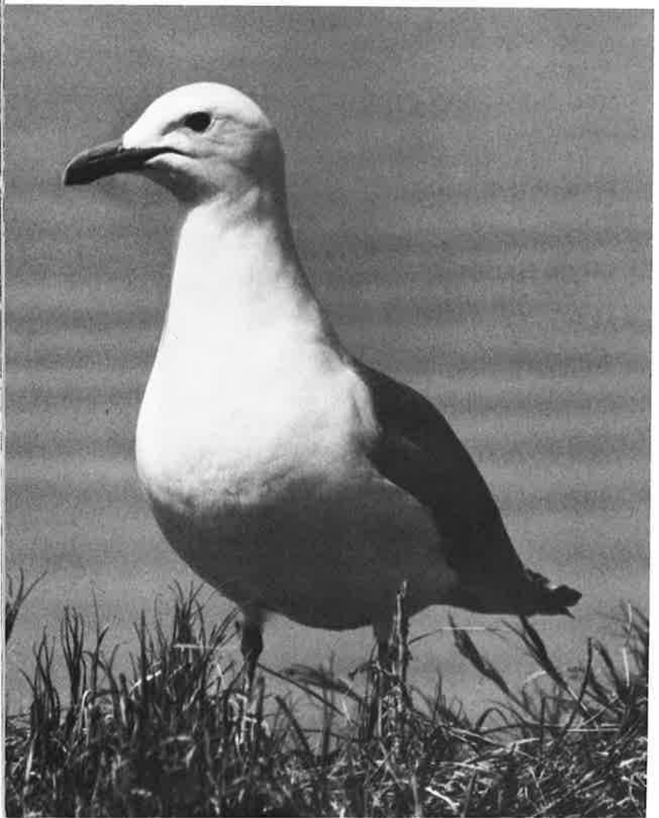
At this station, visitors in the spring enjoy watching the cliff swallows build nests on the tower. The gourd-like nests are shaped from mud carried to the tower and are lined with feathers and grass.

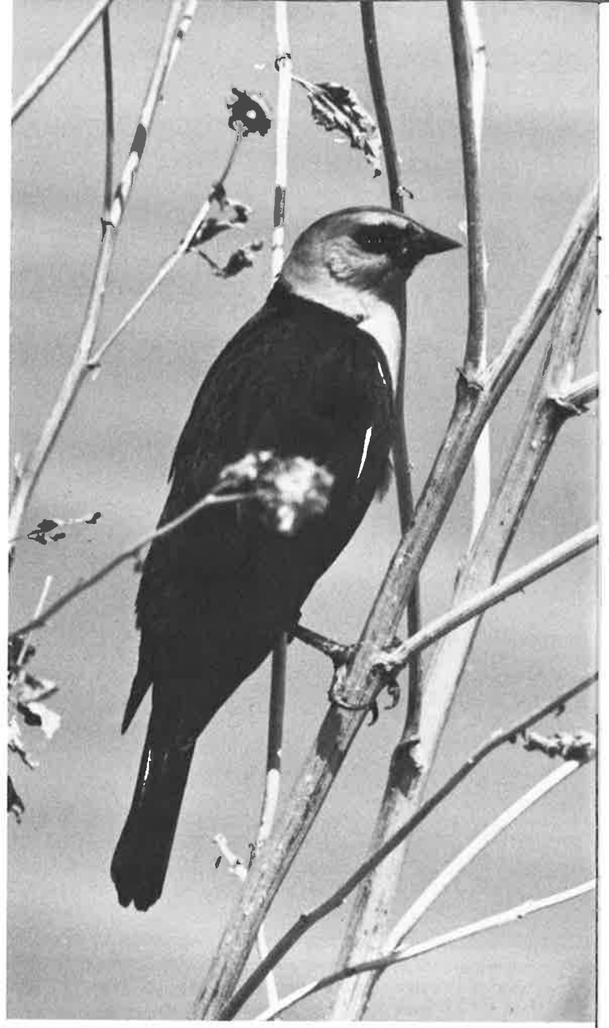
Station Four

LAKE BONNEVILLE

The Great Salt Lake today is a remnant of ancient Lake Bonneville, which existed about 25,000 years ago and covered a large part of Utah and Nevada. At its greatest size Lake Bonneville had a depth of nearly 1,000 feet and covered 20,000 square miles. Early lake levels are visible as "bench" marks along the mountains, especially on the Promontory foothills to the west. The highest mark is the Bonneville level, the next and most conspicuous is the Provo level, and the third and lowest is the Stansbury level.

Large numbers of California gulls, Utah's State bird, nest on the refuge, and though mostly a beneficial bird, the gulls often do harm by eating duck eggs and young.





The yellow-headed blackbird (*above*), redwing, and Brewer's blackbird are all common summer residents.

WHISTLING SWAN

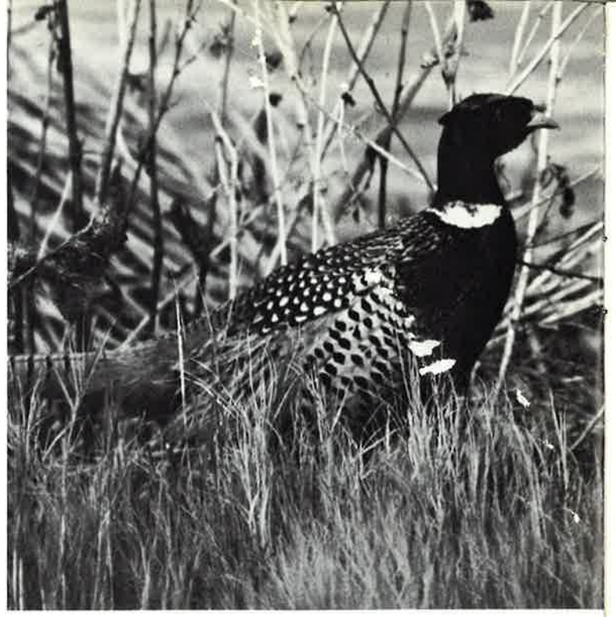
During the fall and early spring the refuge has one of the largest concentrations of whistling swan anywhere. They usually arrive about mid-October and as many as 20,000 may be seen, most of which congregate in the unit just north of this one. The swan that pass through the refuge during migration nest in the arctic, and the young stay the first year with their parents, which usually mate for life. Although they may reach a weight of 20 pounds, whistling swan are slightly smaller than the more famous but less abundant trumpeter swan.

The pintail is the most abundant duck on the refuge in the fall, and it and the green-winged teal are the ones most often taken by hunters.

Station Five

The refuge is home to several large wading birds. Many of them nest in the heron colony or rookery about one-third mile southeast of this stop. Most common are the graceful white snowy egret and the stately great blue heron, which are often seen catching the small fish which make up their diet. The young of these birds are helpless when hatched and remain in or near the nest until they can fly.

This station concludes the tour of the refuge, and we sincerely hope it has been an enjoyable one. Refuge headquarters are straight ahead, and you must return to Brigham City on the same road by which you entered the refuge.



The colorful ring-necked pheasant is a common game bird on the refuge and is frequently seen on the dikes and edges of the marshes.

Other Points of Interest

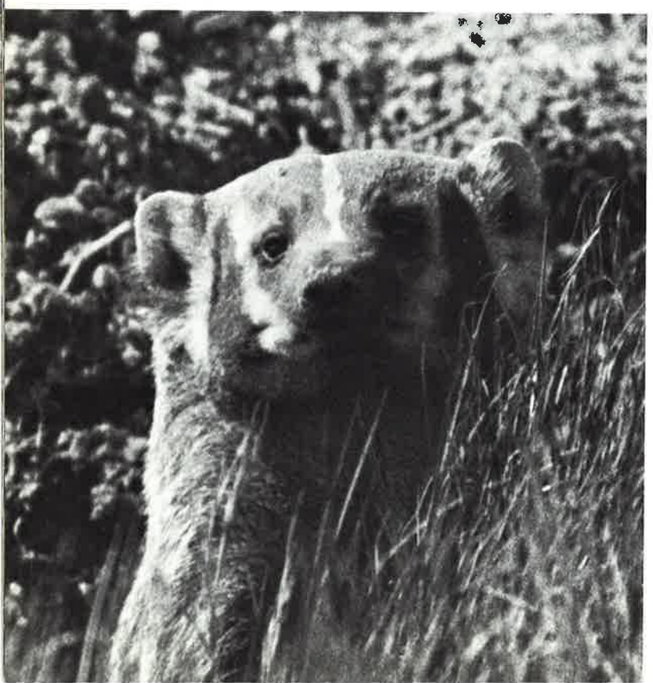
There are approximately 160 different plant species growing on the refuge. Sago pondweed is the most prominent duck food. Large quantities of sago, muskgrass, and widgeon grass are produced in the open water areas. The emergent vegetation of the marsh areas includes alkali bulrush, hardstem bulrush, and cattail, while the dominant plant of the higher ground is saltgrass.

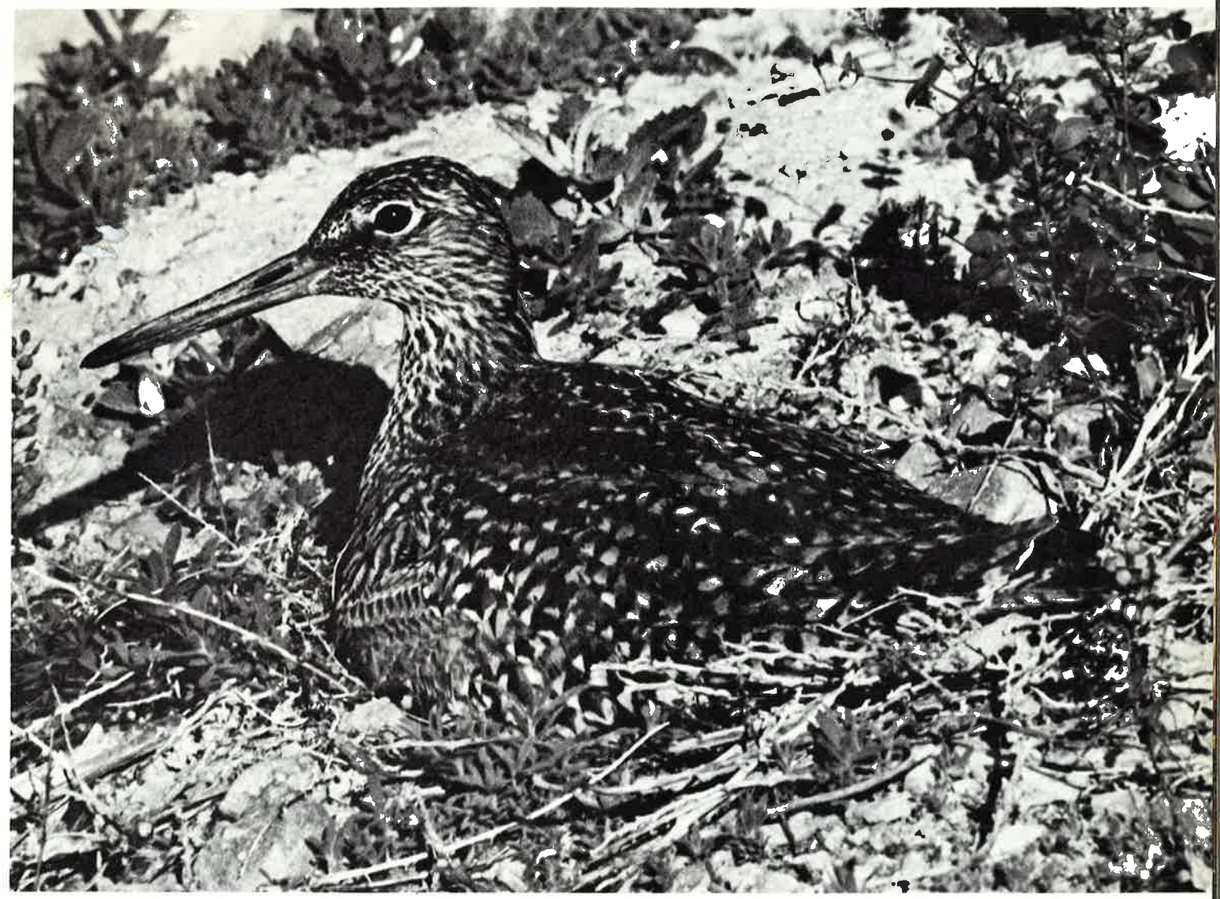
The most abundant fish in refuge waters is the carp, which was introduced in America in 1870, and Utah in 1881. When carp are small they serve as food for such fish-eating birds as pelicans, cormorants, herons, grebes, and gulls. In the warm, shallow waters of the refuge, they often reach excessive numbers. Large carp are detrimental to waterfowl habitat, and when they reach these large numbers they destroy aquatic plants which serve as duck food. Periodic control of carp is carried out on the refuge to prevent undue damage to waterfowl food.

In Bear River, 20 pound carp are common, and occasionally one will weigh as much as 35 pounds.

The refuge is home to many mammals, some of which are occasionally seen by visitors. Most common of these is the muskrat, which builds the mounds dotting the marsh areas. A few beaver live in some of the canals, and other mammals that might be seen are jackrabbits, skunks, and badgers.

Badgers (*below*) are sometimes seen on the refuge. Other common mammals include the muskrat, skunk, jackrabbit, and weasel.





The willet, a medium sized shore bird, can be recognized by its striking wing pattern when in flight, and by its distinct call.

Bear River Research Station

The building just south of the administration building houses the Bear River Research Station, which was originally established to study methods of controlling botulism in the Great Basin. It is a branch of the Denver Research Center, employs a permanent staff, and has facilities for research on various waterfowl diseases, parasites, waterfowl ecology, and habitat development.

At present treatment and control of diseases like avian botulism, aspergillosis, and cholera as they affect waterfowl, are being studied at the laboratory. This type of research attacks one of the least understood phases of wildlife management, and requires a vast amount of time and intimate knowledge of the organisms involved. Little information exists on the effect of disease on wild birds and animals, and a great amount of work remains to be done.

The research station collaborates with the U.S. Public Health Service, Utah State University, and other institutions and individuals who are involved in providing a continuing wildlife resource for future recreation.

A snowy egret,
one of the large wading birds
of the refuge.

The Utah Travel Council assisted with
the production of this publication.

Inside Back Cover:
Sunset on the
Bear River Refuge.

Back Cover:
Killdeer shading her young
from the hot sun.

ILLUSTRATION CREDITS

Bob Hines, Bureau of Sport Fisheries and Wildlife, p. 4; William F. Martins, p. 10 (lower left); Steven J. Kohler, Bureau of Sport Fisheries and Wildlife, front cover, inside front cover, p. 3, 6, 7, 8, 9 (upper left and bottom), 10 (upper right), 11, 12, 13, 14 (upper right), 15 (lower right), 16, 17, 18, 19, 20, inside back cover, back cover; Utah State Dept. of Fish and Game, p. 5; Bureau of Sport Fisheries and Wildlife, p. 9 (upper right), 14 (bottom), 15 (top).

Created in 1849, the Department of the Interior—a department of conservation—is concerned with the management, conservation, and development of the Nation's water, fish, wildlife, mineral, forest, and park and recreational resources. It also has major responsibilities for Indian and Territorial affairs.

As the Nation's principal conservation agency, the Department works to assure that nonrenewable resources are developed and used wisely, that park and recreational resources are conserved for the future, and that renewable resources make their full contribution to the progress, prosperity, and security of the United States—now and in the future.

☆ U.S. GOVERNMENT PRINTING OFFICE : 1968—O-292-422

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