

GREAT SALT LAKE REGIONAL WATERFOWL DISEASE CONTINGENCY PLAN

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U.S. Fish and Wildlife Service

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Great Salt Lake Region Waterfowl Disease Contingency Plan

I. INTRODUCTION

A. Area Defined

The purpose of this contingency plan is reduce waterfowl losses from disease, primarily avian botulism, along the eastern shore of the Great Salt Lake in Utah (Figure 1). The Region encompasses some 400,000 acres of wetlands; of which roughly 65,000 acres is under the stewardship of the U.S. Fish and Wildlife Service, 60,000 acres are directly managed by the Utah State Division of Wildlife Resources, and 50,000 acres are held in private hunting preserves. The remaining acreage is generally considered under state supervision. A description of each area follows:

Federal areas:

Bear River Migratory Bird Refuge is located approximately 15-miles west of Brigham City, Utah. The Refuge lies along the northern end of the Great Salt Lake in Box Elder County which has an elevation that ranges from the 4,200 feet at the lake to more than 9,000 feet in the nearby mountains.

State areas:

The Utah Division of Wildlife Resources owns and manages 20 waterfowl management areas throughout the State. See Appendix 1 for State-managed areas, maps and description.

Managed areas on the eastern shore of the Great Salt Lake include Harold Crane, Ogden Bay, Howard Slough, and Farmington Bay. Unmanaged areas include the Bear River Bay and Layton-Kaysville Marsh. Bear River Bay is the shallow, brackish northeast arm of the Great Salt Lake. It receives tremendous annual shorebird and waterfowl use and has a history of severe botulism outbreaks. Layton-Kaysville Marsh is a natural marsh located on the east shore of the Great Salt Lake between the cities of Layton and Kaysville.

Private clubs:

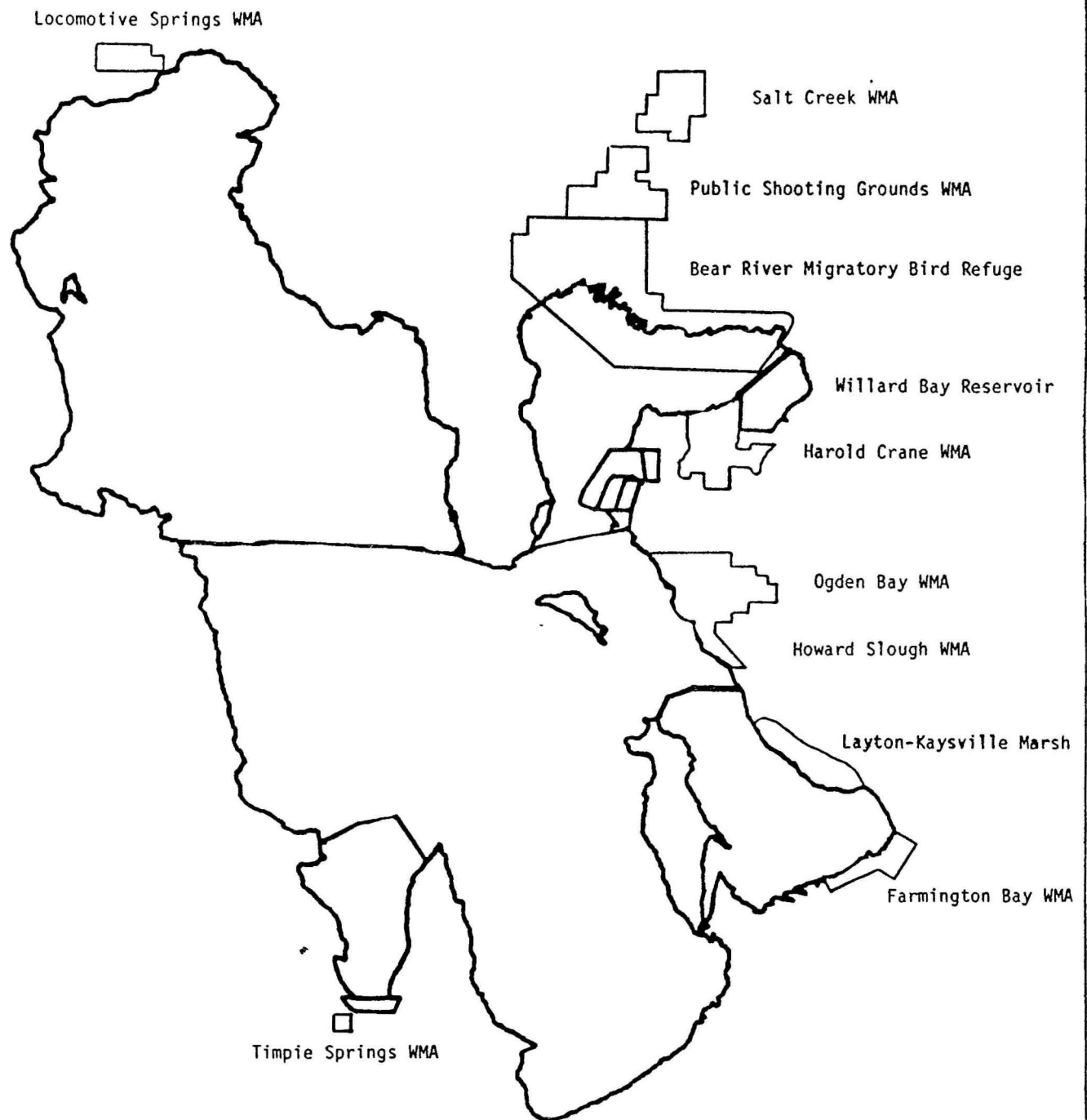
The Bear River Club is one of the largest private waterfowl marshes in the state. This Club borders the northeastern edge of the Bear River MBR. The Chesapeake Club is located northeast and borders the southeast boundary of the Bear River Club. Both these private clubs have had a history of botulism losses.

The South Salt Lake Gun Clubs form an expansive block of privately managed waterfowl habitat. Many of the clubs are dry during the summer but some maintain water levels throughout the

FIGURE 1

1a

Great Salt Lake



year. Significant botulism problems have occurred in recent years. Those clubs generally lie south and west of Farmington Bay WMA.

This Region serves as a staging and migrational area for thousands of waterfowl that nest in Alaska and Canada. Additionally, the area is important for marsh birds, shorebirds, and waterfowl nesting. (See Appendix for species information.) Peregrine falcons frequent the area during migrations and nest at a number of locations. Bald eagles are frequent winter visitors and tundra swans use the area during their migrations.

The climate is typified by moderate spring and fall seasons, short, cold winters and hot, dry summers. Due to the long growing season, agriculture remains a mainstay of the economy although much of the Wasatch Front is becoming industrialized and impacted by development as the cities increase in population.

B. Disease History

The Great Salt Lake Region has a long history of avian botulism (botulism type C). Although mortality had been observed earlier, major attention was drawn to the disease from 1909 to 1913 as a result of heavy losses in three locales in the West; one locale being along the rivers flowing into the Great Salt Lake. Alexander Wetmore, working for the U.S. Biological Survey in Utah, was the first of a number of individuals to study botulism in the Region. He accurately described the characteristic signs in ill birds and environmental conditions now associated with botulism die-offs, terming it "western duck sickness" or "alkali disease". It was not until the 1930's that the mortality was found to be caused by the toxin produced by a bacteria, Clostridium botulinum, and not alkaline poisoning from the salts so common in the region as concluded by Wetmore. (See Tables 1 and 2 for historic losses.)

While other researchers worked with botulism over the years, the next sustained funding came in the 1940's when the Bear River Research Station was established on the Bear River Migratory Bird Refuge near Brigham City, Utah. This research station functioned until the early 1980's when it was disassembled. While early scientists working with botulism answered many of the basic disease and management questions that provide the basis for decisions made by wildlife managers today, significant outbreaks of avian botulism still occur.

During flooding of the Salt Lake from 1984 to 1987, no significant botulism losses were observed in the Wasatch Region. With water levels rising 12 feet, the Great Salt Lake covered most of the adjacent freshwater wetlands, effectively dispersing many of the waterfowl to other wetlands throughout the Rocky Mountain Region. In 1988, flood waters began receding and the marshes slowly emerged. Botulism returned, killing an estimated 23,000 birds in

TABLE 1

AVIAN BOTULISM LOSSES ON UTAH MARSHES

2a

YEAR	AREA	ESTIMATED LOSS	YEAR	AREA	ESTIMATED LOSS
1893	GSL	"Thousands"	1954	GSL	1,000
1910	GSL	200,000-300,000	1955	GSL	42,000
1912	GSL	75,000	1956	GSL	4,300
1913	GSL	46,723	1957	OB, FB	3,800
1914	GSL	8,000-10,000	1958	OB	3,789
1921	GSL	over 500,000	1959	OB	300
1922	WRD	over 100,000	1960	OB	300
1923	WRD	over 100,000	1961	OB	0
1924	WRD	over 100,000	1962		unknown
1925	WRD	over 100,000	1963		unknown
1926	WRD	over 100,000	1964	BRB	10,000
1927	WRD	over 100,000	1965	BRB	10,000
1928	WRD	over 100,000	1966		unknown
1929	GSL	100,000-300,000	1967		unknown
1930	WRD	over 100,000	1968		unknown
1931	WRD	over 100,000	1969		unknown
1932	GSL	65,000-150,000	1970		unknown
1933	WRD	over 100,000	1971	BRB	60,000
1934	WRD	over 100,000	1972	BRB, PB	800 (200 in spring)
1935	WRD	5,600	1973	OB, FB, PS	2,800
1936	WRD	16,500	1974		unknown
1937	WRD	12,000	1975		unknown
1938	OB	5,000	1976		unknown
1939	OB	20,200	1977	OB	<100
1940	OB	27,500	1978	OB	<100
1941	OB	9,000	1979	OB, FB, PB	2,200
1942	OB	over 50,000	1980	BRB	105,000
1943	OB	400	1981	OB	<100
1944	OB	1,800	1982	FB, PS, BRB	5,000
1945	OB	800	1983	OB	<100
1946	OB, FB	2,500	1984	HC, FB, BRB	5,000
1947	OB, FB	2,000	1985	HC	100
1948	OB, FB	5,500	1986	OB	<100
1949	OB, FB, PS	9,000	1987	OB	<100
1950	OB, FB, BRB	42,000	1988	FB, PB	23,000
1951	OB, FB, PS, BRB	17,000	1989	OB	<100
1952	OB, FB, BRB	50,000	1990	OB, FB, BRB, HC	50,000
1953	OB, FB, BRB	3,800			

GSL: Great Salt Lake Marshes

PS: Public Shooting Grounds

WRD: Weber River Delta

BRB: Bear River Bay

OB: Ogden Bay

HC: Harold Crane

FB: Farmington Bay

PB: Provo Bay

Botulism losses on Utah's marshes have not been consistently surveyed or recorded through time on state areas and consequently documentation of historic losses are sketchy and imprecise. The estimates provided have been drawn from a variety of both published and informal sources and in most cases represent a minimum level. Losses listed for GSL and BRB in some cases include losses on the federal Bear River Bird Refuge.

TABLE 2

2b

BOTULISM LOSSES FROM 1931-1990
BEAR RIVER MIGRATORY BIRD REFUGE

YEAR	BIRDS LOST	YEAR	BIRDS LOST
1931	800	1961	3,000
1932	33,000	1962	5,800
1933	900	1963	43,200
1934	800	1964	2,150
1935	300	1965	20,000
1936	2,000	1966	700
1937	10,000	1967	15,000
1938	5,000	1968	1,000
1939	14,000	1969	1,500
1940	20,000	1970	2,300
1941	7,000	1971	40,000
1942	20,500	1972	550
1943	2,300	1973	1,500
1944	3,800	1974	1,750
1945	17,000	1975	5,000
1946	7,200	1976	1,000
1947	3,000	1977	1,000
1948	2,700	1978	0
1949	4,200	1979	15,000
1950	22,000	1980	55,500
1951	14,800	1981	5,100
1952	28,200	1982	22,200
1953	1,200	1983	20,000
1954	2,000	1984	3,300
1955	17,000	1985	2,000
1956	80	1986	0
1957	4,600	1987	0
1958	12,100	1988	0
1959	1,100	1989	0
1960	2,400	1990	24,000

1988 and 50,000 birds in 1990. (See Appendix for hydrological information.)

Until further research finds the key to preventing the disease, wildlife managers must be prepared to deal with outbreaks. While this Disease Contingency Plan primarily addresses avian botulism, and, indeed, botulism is the only disease of historic significance in the region, the principles and guidelines addressed herein could be utilized for any disease outbreak.

II. DISEASE SURVEILLANCE, REPORTING, AND NOTIFICATION

Because of the ecological relationships of the habitats in the Great Salt Lake Region, botulism should be considered a regional problem. Each marsh is part of the whole, not a separate "island unto itself". Waterfowl move readily from marsh to marsh, ignoring ownership boundaries. Disease control activities should also be approached on a regional basis. This requires an integrated contingency plan encompassing all management authorities.

A. Communications

The single most important element for an effective botulism management program is communication between key personnel - (1) Utah Division of Wildlife Resources; (Waterfowl Coordinator), (2) Bear River Migratory Bird Refuge; (Manager), and, (3) the National Wildlife Health Research Center; (Pacific Flyway Representative). Depending on the location of the disease outbreak, other participants may need to be consulted. (See Figure 2 for general schematic of notification and telephone list.)

This Disease Council should communicate weekly during botulism season to report negative as well as positive findings. During a botulism outbreak, interagency calls may be needed more often in order to make management decisions and coordinate staff, equipment and supplies. Optimally, conference calls would be used but cost and logistics may sometimes preclude their use.

B. Surveillance

Early detection of a die-off is vitally important to ensure that carcasses can be removed as soon as possible from the wetland. Surveillance routes will be determined prior to the onset of the disease season allowing for a regular surveillance schedule. Botulism surveillance will be started in mid-July and continue until mid-October or until hunting season begins. Ideally, each area should be checked at least once weekly; however it is understood that limitations in staff and equipment occasionally do not permit checks more often than bi-weekly. In the event of a die-off, surveillance and carcass pickup must be stepped up for adequate control and monitoring.

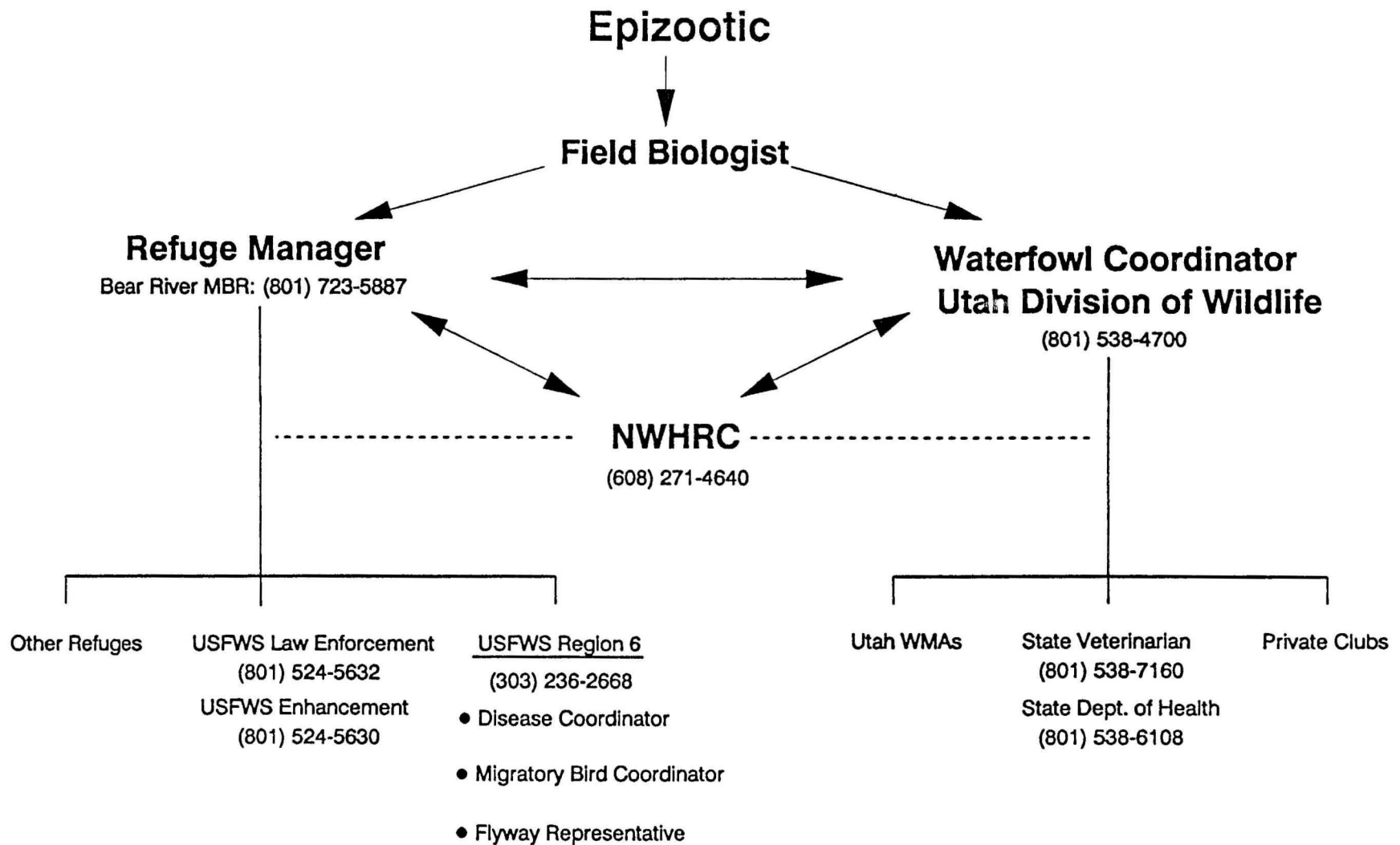


FIGURE 2.

Cooperation between agencies will be necessary to ensure that a complete surveillance is accomplished on all important wetlands in the region. Pooling of staff and equipment will be necessary at times in order to get the job done quickly and efficiently.

Aerial surveys are valuable for determining location and size of bird populations, but they are not sufficient for mortality surveillance due to the difficulty in sighting carcasses in tall vegetation from overhead. Effective surveillance is possible only from ground vehicles, watercraft and/or on foot.

A preprinted form (Figure 3) will be carried in the field during surveillance operations and completed each day; recording carcass pickup, sick birds sighted and total number of birds observed. These reports will be filed with the Utah State Waterfowl Coordinator for permanent record as well as with each agency. The reports will assist with planning field operations.

III. DISEASE RESPONSE ACTIONS

A. Management Options

Once an epizootic is observed, mortality will be reported immediately to the other coordinating agencies (preferably by conference call). The most appropriate management response will then be determined by considering all known variables. Above all, the Great Salt Lake marshes will be considered as one ecosystem. Risks to all other areas will be considered before any management operations are undertaken on known "hotspots" (focal areas of high mortality). Successes will be measured on the whole of the Salt Lake basin area, not just from observing apparent success on individual areas. Finally, it is important to maintain surveillance of bird populations if they are dispersed to other areas to ensure that dispersal was not counter-productive.

An accurate diagnosis of the cause of death and identification of the disease agent is important before final decisions can be made as control and management techniques utilized in a given die-off; this should be obtained by submission of samples to NWHRC or another qualified veterinary diagnostic laboratory. (See Appendix 1.5 for carcass shipping instructions.) Determination of whether the disease agent is contagious or non-contagious markedly changes management options available. Dispersal techniques could move birds incubating a disease agent to another locale, potentially initiating a new focus of disease. Management tools that may be used during epizootics include: water drawdowns, flushing with fresh water, circulating fresh water, hazing birds from entire wetlands or portions thereof, baiting or attracting birds into "clean" areas and opening/closing public waterfowl hunting to move birds. All management actions undertaken should be documented for later joint assessment of positive and/or negative effects. The

FIGURE 3.
DAILY LOG

4a

Date: ___/___/___ Location: _____ Name: _____

Total Estimated 1) Population: _____ 2) Mortality: _____ (all species)

GROUP	SPECIES	ESTIMATED TOTAL		# CARCASSES PICKED UP	PERCENTAGES					
		POP.	#SICK/DEAD		Fresh	Rotten	M	F	Ad	Im
Geese	Canada Snow									
Ducks/ Dabblers	Pintail									
	Mallard									
	Wigeon									
	Gadwall									
	Shoveler									
	G.W. Teal									
	B.W. Teal									
	C. Teal									
Ducks/ Divers	Canvasback									
	L. Scaup									
	Redhead									
	Ruddy									
	Bufflehead									
	Goldeneye									
	Merganser									
Shorebirds	Phalarope									
	Avocet									
	Stilt									
	Gull									
Other										
TOTALS										

Search effort (# of people, hours spent) _____

Water Quality Information: Temperatures: Air _____ Water _____ Mud _____

Turbidity _____ Dissolved O2 _____ pH _____ Conductivity _____

Comments: _____

importance of communication between agencies cannot be overstated in developing regional disease control.

High priority will be given to rapid carcass pickup and disposal as a measure to check and reduce the spread of disease. Efforts among agencies will need to be pooled at times to deal with problem areas. Frequent communication will be the key in coordinating all available staff and equipment to areas which have the worst problems--regardless of land ownership boundaries.

Each pick-up crew will be given a carcass pickup form (Figure 3 - same form used by surveillance teams) to be filled out in the field. One form should be filled out for each unit if several areas are covered in a single day. The form will have pertinent information for management decisions and long-term records. The form includes the number of birds picked up by species, location, environmental conditions and general comments.

Even though type C botulism is not known to affect humans, it is recommended that rubber gloves and other protective clothing be used by pickup crews as a safety measure against undiagnosed diseases and pathogens that may be present in decomposing carcasses. Botulism type C and some other infectious diseases can affect dogs under certain circumstances. If dogs are to be used in carcass pickup operations, check with NWHR or other wildlife disease specialists for precautionary measures. Additionally, managers should know and allow for any health limitations of staff members. During a die-off, those persons should be delegated less strenuous duties.

B. Logistics

1. Personnel Sources

a. USFWS

1. Bear River Migratory Bird Refuge
866 South Main
Brigham City, Utah 84302
(801) 723-5887
Al Trout, Refuge Manager
2. Fish and Wildlife Enhancement, Salt Lake Office
1745 West 1700 South
2078 Administration Bldg.
Salt Lake City, Utah 84104-5110
(801) 524-5630
Bruce Waddell, EC Specialist

3. Law Enforcement, Special Agent
P.O. Box 27048
Salt Lake City, Utah 84127-0048
(801) 524-5632
S.A. Douglas McKenna
S.A. George Domenici

b. Utah Division of Wildlife Resources

1. Headquarters
1596 West North Temple
Salt Lake City, Utah 84116
(801) 538-4700
Tom Aldrich, Waterfowl Coordinator

c. Private Groups

1. Bear River Club, Co.
Gordon Shafer, Manager
(801) 744-2420
2. Utah Airboats
Gerald Cory
(801) 466-5114
3. Ducks Unlimited
(801) 546-4619
4. Utah Audubon Society
(801) 272-0526

2. Equipment Sources

See Appendix 2 for complete listing of equipment.

a. Federal sources

1. Bear River MBR
2. Fish and Wildlife Enhancement
3. Fish Springs NWR
4. Ouray NWR

b. State sources

1. Salt Lake City Headquarters and Regional Offices
2. Wildlife Management Areas

c. Private sources

1. Bear River Club
2. Utah Airboats

3. Supply Sources

Limited quantities of some supplies are maintained on hand. Utah State Department of Natural Resources Warehouse can supply rubber gloves, plastic bags, trash cans, pitch forks, and other items for purchase by Government Agencies. In addition, most major hardware stores and grocery chains take State RPO's. The Bear River MBR normally stocks plastic bags and rubber gloves. Additional supplies can be purchased at Smith and Edwards in North Ogden.

4. Food and Lodging for Temporary Personnel

Food and lodging are available in towns along the east side of the Great Salt Lake including Salt Lake City, Ogden and Brigham City. See Appendix 3 for listing.

5. Work Areas

The Bear River MBR Headquarters in Brigham City is centrally located and can be used for operations north of Willard Bay. The Ogden Bay WMA and/or the Farmington Bay WMA Headquarters as well as the DNR headquarters in Salt Lake City can be used as bases for operations further south.

During an outbreak, the following work areas should be designated:

a. Clean areas

1. Command post
2. Briefing room
3. Press area

b. Decontamination areas

c. Contaminated areas

1. Carcass disposal

The primary goal of carcass pickup and disposal is to prevent spread of the disease agent through environmental contamination. Incineration, burying, and rendering are the three basic approaches available.

While incineration is generally the preferred method of disposal, difficulties obtaining burning permits in the Salt Lake Region may preclude that option. In that event, carcasses can be buried. Burial sites must be selected carefully with consideration given to groundwater circulation and drainage, and any potential for later carcass exposure. It is recommended that carcasses be covered daily with soil.

Areas for carcass disposal:

- 1) Box Elder County Landfill
Little Mountain Road and Highway SR65
- 2) Bear River NWR - burial site located on upland knoll on north end of "D" line dike and near old headquarters sewage lagoon.

Should burning become a necessity or other waste disposal methods used, the following offices should be contacted for permits:

Burning permits:

Utah Department of Health
Bureau of Air Quality
Salt Lake City, Utah
(801) 538-6108

Medical and infectious waste disposal:

Bureau of Solid and Hazardous Waste
Division of Environmental Health
288 North 1460 West
P.O. Box 16700
Salt Lake City, Utah 84140
(801) 538-6170

2. Animal Holding

At present there are no State or Federal animal holding or treatment areas. A botulism hospital may be established on the Bear River MBR in the future. At present, birds found with mild signs of botulism intoxication are transported to other "clean" sites within any given area where they have access to fresh water. These areas are monitored for mortality among these birds to avoid establishing a maggot cycle in the "clean" areas. The birds fly off when they recover.

IV. BIOLOGICAL CONSIDERATIONS

A. Species and population data

1. Migratory birds

Bear River Migratory Bird Refuge and various state areas are used by more than 200 species of birds annually. Millions of birds of various species use the region as a resting area during their migrations. Sixty species of birds nest and raise young on the Refuge. The principle nesting duck species at Bear River MBR are gadwall, cinnamon teal, and redheads with approximately 10,000 young produced annually. The shores of the Great Salt Lake are considered one of the finest redhead production areas in the nation. In addition to the ducks produced, Canada geese, various species of marsh birds, shorebirds, and songbirds nest in the region. (See Appendix 4 for species and population abundance lists.)

2. Endangered species

Federal endangered species include the bald eagle, peregrine falcon, wood stork, brown pelican, and the black-footed ferret. Utah threatened species include the American white pelican; the endangered list includes the wolverine. Utah is involved in a peregrine recovery plan approved by the director of the U.S. Fish and Wildlife Service. Species of special concern include snowy plover, white-faced ibis, and long-billed curlew.

B. Animal Movement Patterns

1. Daily

Daily movements of ducks and geese are not well documented. Trading of birds from open salt water areas to protected fresh marsh is known to occur but the degree of interchange between management areas is unknown. Because the Great Salt Lake acts as a common corridor between management areas with the presence of frequent afternoon winds, it is likely that a fair amount of mixing occurs between areas.

2. Seasonal

There is a steady influx of birds throughout the botulism season (July through September) into the marshes of the Great Salt Lake. Two major patterns of bird movement occur in July. Pintails arrive to molt in July with numbers peaking in August. Large populations of pintail persist into September. Pintails are most abundant on the northern marshes, but increased numbers are observed on all Great Salt Lake Marshes. The other major July movement of waterfowl is the dispersal of Canada geese from their major molting areas along the east shore of

the Promontory and Bear River Refuge as they regain flight capability. Movements are opportunistic and related to grain harvests.

There is an abundance of all duck species in August. Green-winged teal are observed in large numbers throughout the area, with populations peaking in September. Wigeon and shoveler are particularly abundant at Public Shooting Grounds and Salt Creek Waterfowl Management areas in September and into October.

While goose movement is well understood, movement of other waterfowl between marshes during this time period is not well known. Intuitively, birds should arrive at northern marshes and progress southward. However, it is not known whether birds progress from northern Great Salt Lake marshes to those further south, or if newly arrived birds proceed directly to molting and staging marshes in the south.

Major waterfowl movement by season is summarized as follows:

Winter: relatively small numbers of waterfowl are located in isolated pockets of open water.

Spring: migrations begin in late February/early March and reach a peak in March/April. The vast majority of birds migrate north by May. Molting Canada geese aggregate on the Promontory and Bear River Refuge from June to early July.

Summer: locally breeding ducks and geese stake out nesting areas and set up housekeeping. Migrations back into the area begin in June when drake pintails begin to arrive for their molt. Waterfowl numbers continue to increase throughout the late summer. Peak numbers of shorebirds are present from late June through mid-July.

Fall: the fall migration builds rapidly throughout September and peaks in late September/early October. Populations decline rapidly during November and by mid-December the small wintering population is all that remains.

3. Production and Dispersal Patterns

C. Weather Patterns

The climate of the area is strongly influenced by topography. Annual precipitation ranges from 6 inches over and near the lake to about 30 inches on the mountain peaks. The presence of such a large body of water, which rarely freezes due to high salinity, has a strong moderating effect on temperatures in the area. This effect shows up best in the length of the growing season which averages 180 days along the lake shore but only 90 days in some of the higher mountain valleys.

In general, the climate is semiarid with four, well-defined seasons. Summers are hot and dry, but the high temperatures are not oppressive, because relative humidity during the warmer part of the day averages between 20 and 30 percent. Nights are usually cool. Maximum temperatures of 90 degrees or higher occur on 30 to 40 days each summer. Most of the summer precipitation comes from thunderstorms that build up along the mountains. Winters are cold, but usually not severe. The Rocky Mountains to the east and northeast act as a barrier to invasions of cold continental air. Consequently, extended periods of extremely cold weather are rare. On the average, a minimum temperature below zero occurs less than 10-days-per year. (See Table 3 for average monthly temperatures.)

There is a marked variation in seasonal precipitation, most of which falls in winter and spring. The wettest month is usually April or May, and midsummer is usually the driest part of the year. Winds are light to moderate during all seasons, but strong damaging winds occasionally occur either as easterly winds blowing out of the canyons or as westerly winds associated with locally severe thunderstorms or cold fronts.

D. Habitat and Population Manipulation Potential

The most practical means of habitat manipulation consists of the rapid flooding or drainage of various water impoundments. Many of the state and federal management areas have extensive canals, dikes and gate systems enabling flooding or drainage of marshes. Limited water supply can be a major problem due to low priority water rights. When possible, water manipulation may be used to disperse birds in a local area via flooding, divert birds away from a particular area via drainage, and improve water quality via flushing with fresh water.

These same methods can be utilized to manipulate populations of birds; draining some areas and filling adjacent areas will move populations along the shore of the Great Salt Lake. Any management techniques that move populations of birds must be carefully planned, coordinated and monitored via cooperation between all involved agencies to avoid increasing mortality in other locations.

V. COMMUNICATIONS

A. State Agencies

1. Utah Division of Wildlife Resources - (801) 538-4709
2. Utah Department of Environmental Health - (801) 538-6121
3. State Veterinarian - (801) 538-7160

TABLE 3

11a

TEMPERATURES AND PRECIPITATION DATA
BRIGHAM CITY, UTAH

Month	Temperature		Precipitation	
	Average Daily Maximum	Average Daily Minimum	Average Total	Average Snowfall
	oF.	oF.	Inches	Inches
January	35.8	18.0	1.99	16.0
February	41.8	23.0	1.59	10.0
March	50.0	28.6	1.93	6.9
April	61.0	37.2	2.34	2.6
May	72.6	46.1	1.95	(1)
June	80.8	53.2	1.90	0
July	92.5	61.4	.34	0
August	89.8	59.0	.71	0
September	79.4	49.4	1.14	(1)
October	66.2	39.5	1.49	.6
November	49.6	29.6	2.03	3.7
December	46.3	22.5	1.95	12.2
Year	63.8	39.0	19.36	52.2

(1) Trace amounts recorded

B. Federal Agencies

1. National Wildlife Refuges

- a. Bear River Migratory Bird Refuge - (801) 723-5887
- b. Fish Springs NWR - (801) 522-5353
- c. Ouray NWR - (801) 789-0351
- d. Seedskadee NWR - (307) 875-2187

2. National Wildlife Health Research Center - (608) 271-4640

3. U.S. Fish and Wildlife Service Enhancement - (801) 524-5630

4. USFWS - Region 6 Headquarters (Denver) - (303) 236-2668

5. USDA - Animal Damage Control

C. Other Organizations

1. Private clubs

- a. Bear River Club - (801) 744-2420 (Gordon Shafer)
- b. Chesapeake Club - (801) 521-3200 (Ed Richards)
- c. New State Club - (801) 292-0473 (Bill Dodds)

2. Ducks Unlimited - (801) 546-4619 (Phil Wagner)

3. Utah Audubon Society - (801) 272-0526

- a. Logan, Utah - Alice Lindahl (801) 753-7744
- b. Utah Airboats - (801) 466-5114

D. Media

1. Television stations

- a. KTVX - (801) 972-3070
- b. KUTV - (801) 973-3030 (Newsdesk)
- c. KSL - (801) 575-5511

2. Radio stations

- a. KSL - (801) 575-NEWS

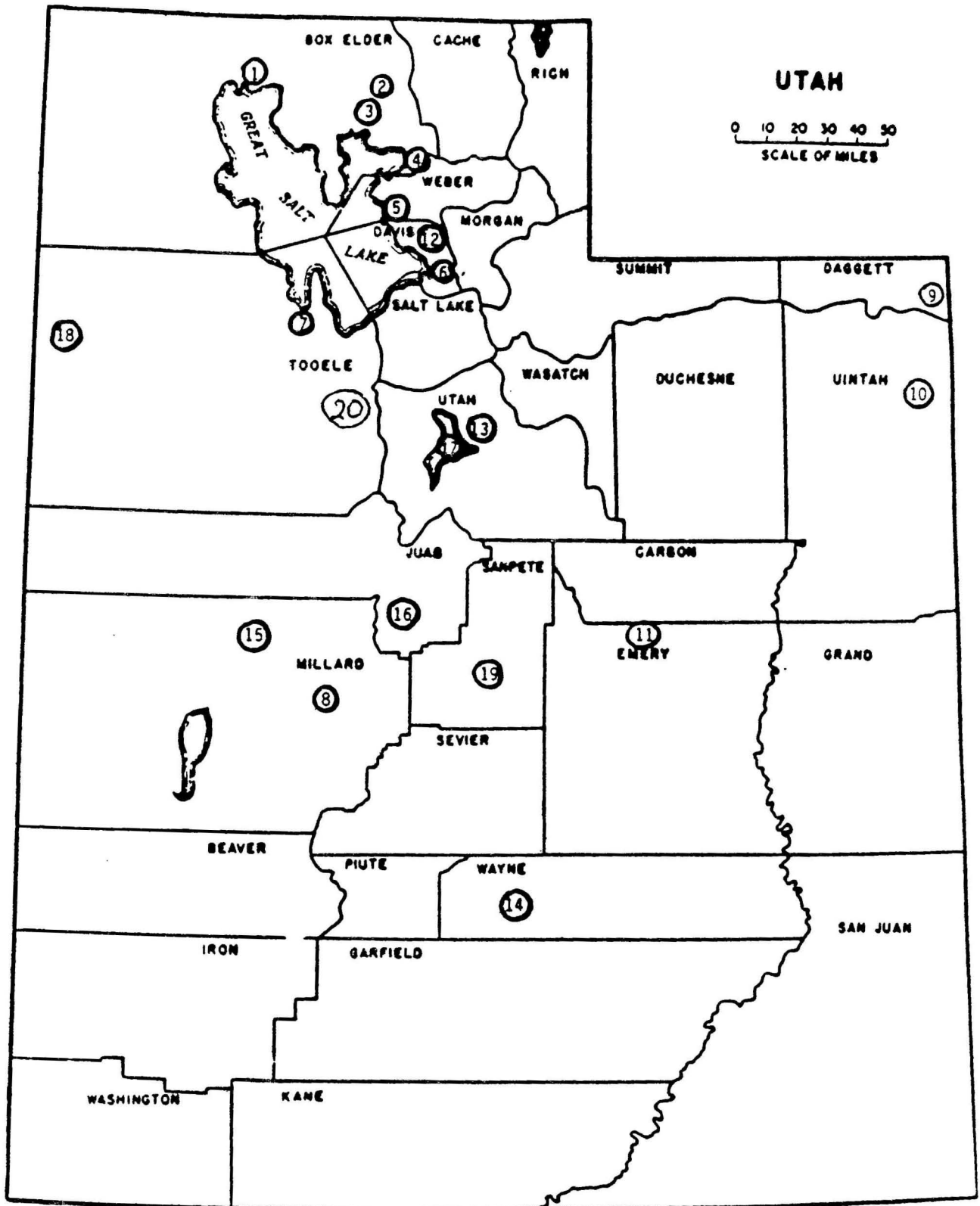
3. Newspapers

- a. Herald Journal (in Logan - John Wise 752-2121)
- b. Standard Examiner (in Ogden - Gordon Weeks 625-4233)
- c. Deseret News - (801) 237-2100
- d. Salt Lake Tribune (801) 237-2045
- e. Ogden Standard (801) 394-7711

APPENDIX 1

UTAH WATERFOWL MANAGEMENT AREAS

13



NOTE--circled reference numbers correspond to the WMA names and numbers on Table 1.

APPENDIX 1 CONT'D

Table 1. Utah waterfowl management areas, July 1990.

		Acreage		CLASSIFIED HABITAT TYPES*				14
Map		Total	Closed	Open		Upland	Mud	
Ref.		Acreage	to	Water	Marsh	Plants	Flat	
No.	Developed Areas		Hunting					
1	Locomotive Springs	12,000	0	1,150	5,500	2,800	2,500	
2	Salt Creek	4,589	65	295	1,843	2,341	110	
3	Public Shooting Grounds	13,063	475	2,250	1,748	3,794	4,489	
4	Harold Crane	8,593**	0	1,210	1,500	720	1,670	
5	Ogden Bay	18,395	900***	3,998	2,780	4,998	4,904	
6	Farmington Bay	10,772	630***	3,961	3,877	240	2,574	
7	Timpie Springs	1,440	0	350	400	300	390	
8	Clear Lake	6,150	75	1,330	1,140	3,680	0	
9	Brown's Park	2,362	40	455	209	1,150	0	
10	Stewart Lake	635	0	145	166	324	0	
11	Desert Lake	2,661	210	559	90	2,012	0	
12	Howard Slough	<u>3,300</u>	<u>0</u>	<u>500</u>	<u>1,141</u>	<u>289</u>	<u>890</u>	
		83,960	2,395	16,203	20,444	22,643	17,527	
<u>PARTIALLY DEVELOPED</u>								
13	Powell Slough	626						
14	Bicknell Bottoms	659						
19	South Sanpete WMA	445						
20	Pony Express WMA	<u>674</u>						
		2,404						
<u>UNDEVELOPED AREAS</u>								
15	Topaz Marsh	700						
16	Meadows	80						
17	Rock Island	2						
18	Salt Springs	<u>216</u>						
		998						
TOTAL STATE AREAS		87,362		2,395				

*With the Great Salt Lake at approximately median water level, some areas are not yet fully classified. The Great Salt Lake has risen more than 10 feet since 1980 and many of these areas have lost habitat due to inundation. Note also that our additions at Ogden Bay, Harold Crane, Howard Slough, and Farmington Bay have not been type mapped. Thus, the total for "Classified Habitat Types" does not equal the total acreage.

**When the Pitzak property was purchased in 1989, the title was encumbered with a private lease on 330 acres until the year 2004. This acreage is included in the total, but is not part of our federal aid project.

***These are areas that have traditionally been closed but under current lake level conditions are now open to hunting. Areas may again be closed during the next 5-year period.

DESCRIPTION AND LOCATION OF WATERFOWL MANAGEMENT AREAS
1990

Name of Area	Acres	County	Location
Ogden Bay	18,395	Weber/Davis	2 mi. W., 1 mi. N., Hooper, UT
Howard Slough	3,300	Davis	1 mi. S., 1.5 mi. W., Hooper, UT
Harold Crane	8,593	Weber/Box Elder	2 mi. N., 2 mi. W., Hooper, UT
Locomotive Springs	12,000	Box Elder	20 mi. S.W., Snowville, UT
Public Shooting Grounds	13,063	Box Elder	14 mi. W., Corinne, UT
Salt Creek	4,589	Box Elder	14 mi. W., Corinne, UT
Farmington Bay	10,772	Davis, Salt Lake	4 mi. S.W., Farmington, UT
Timpie Springs	1,440	Tooele	15 mi. N.W., Grantsville, UT
Clear Lake	6,150	Millard	13 mi. N.W., Flowell, UT
Topaz	700	Millard	10 mi. N.W., Hinckley, UT
Bicknell Bottoms	659	Wayne	8 mi. S., Bicknell, UT
Brown's Park	2,362	Daggett	35 mi. N.E., Vernal, UT
Stewart Lake	635	Uintah	10 mi. S.E., Vernal, UT
Desert Lake	2,661	Emery	2 mi. E., 1 mi. S., Elmo, UT
Powell Slough	626	Utah	4 mi. W., Orem, UT
Salt Springs	216	Tooele	20 mi. S., Wendover, UT
Lake Front	150,000	Box Elder/Weber Davis/Salt Lake	Southern and eastern edge of Great Salt Lake (dependent on lake level)
Meadows	80	Juab	1 mi. W., Mills, UT
S. Sanpete WMA	445	Sanpete	1 mi. W., 1 mi. S., Manti, UT
Pony Express WMA	674	Tooele	6 mi. N., Vernon, UT

Chapter 3.

U. S. Fish and Wildlife Service

Resource Publication #167

Specimen Shipment

16

J. Christian Franson

Procedures for shipping specimens vary with different disease diagnostic laboratories. Therefore, it is important to contact the receiving laboratory and obtain specific instructions. This will facilitate processing of specimens when they reach the laboratory and assure that the quality of specimens is not compromised. Time spent on field investigation, specimen collection, and obtaining an adequate history will be of little value if specimens become contaminated, decomposed, or otherwise spoiled enroute to the diagnostic laboratory.

There are five bases of proper specimen shipment: (1) prevent cross-contamination from specimen to specimen, (2) prevent decomposition of the specimen, (3) prevent leakage of fluids, (4) preserve individual specimen identity, and (5) properly label the package. Basic supplies needed for specimen shipment are shown in Fig. 3.1.

Preventing Breakage and Leakage

Isolate individual specimens from one another by enclosing each one in separate packaging, such as a plastic bag, within the shipment container. Specimens should also be protected from direct contact with any coolant used (e.g., wet ice or dry ice), and all materials within the package must be contained in a manner that prevents leakage to the outside of the shipment container in the event of breakage (e.g., blood tubes) or thawing (wet ice and frozen carcasses) due to delays in transit.

Containing Specimens

Plastic bags should be strong enough to resist being punctured by materials contained within them and from abrasions resulting from contact with other containers within the package.

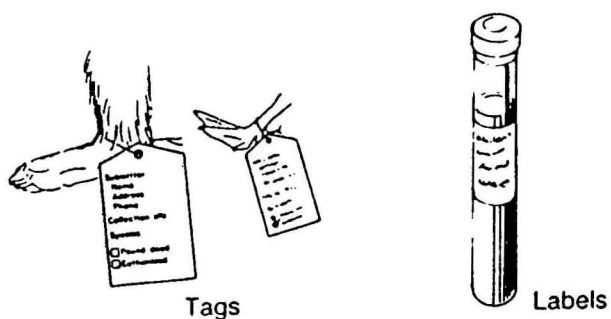
Styrofoam coolers, shipped in cardboard boxes, are desirable for their insulating and shock-absorbing qualities. Styrofoam at least 1 inch thick is preferred over thinner material. When possible, select styrofoam coolers that have straight sides. Those that are wider at the top than bottom are more likely to break during transit. This can be avoided by filling the space between the outside of the styrofoam cooler and the cardboard box with newspaper or other packing material (Fig. 3.2). If coolers are not available, sheets of styrofoam insulation can be cut to fit the inside of cardboard boxes.

The purpose of the cardboard box is to protect the styrofoam cooler from being crushed during transit and to serve as containment for the entire package (Fig. 3.3). The strength of the box should be consistent with the weight of the package. Cardboard boxes are not needed when hard plastic or metal insulated chests are used for specimen shipment, but can be used to protect those containers from damage and provide a useful surface for labels and addresses.

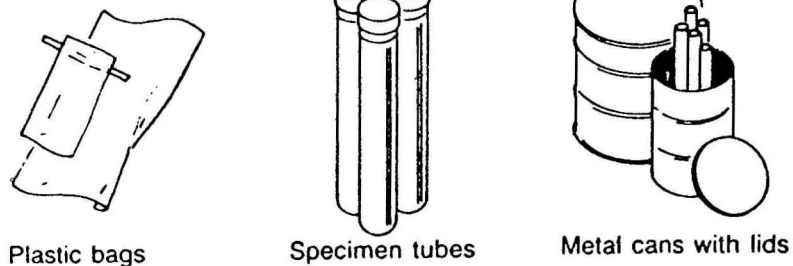
Cooling and Refrigeration

Chemical coolants such as blue ice packs (Fig 3.4) are preferable to wet ice because their packaging prevents leakage should they thaw. Ice cubes or block ice may be used if leakage can be prevented. This can be accomplished most easily by filling plastic jugs (milk, juice, cider, and soda containers) with water and freezing them. Tape the lids of these containers closed to prevent them from being jarred open during transit.

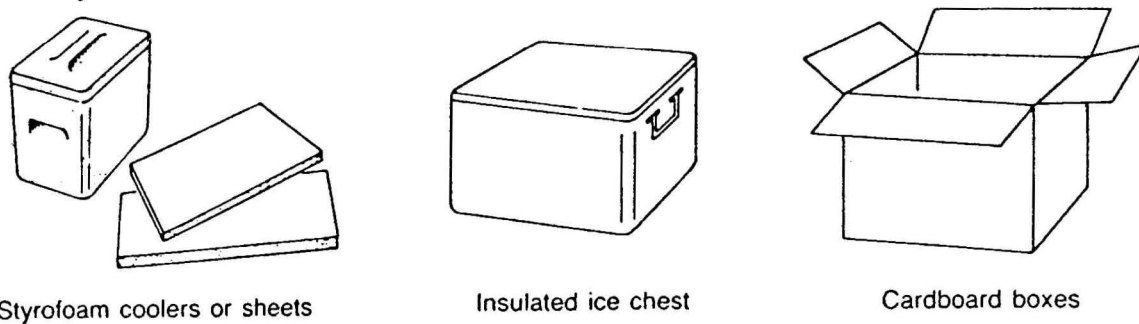
Use dry ice to keep materials frozen, but be aware that dry ice will freeze specimens intended to be shipped chilled. Also, the carbon dioxide given off by dry ice can destroy some disease agents. This is of concern when tissues rather than whole carcasses are being shipped. Use of dry ice in shipment is regulated and should be cleared with the carrier before shipping.



Primary containers



Secondary containers



Miscellaneous

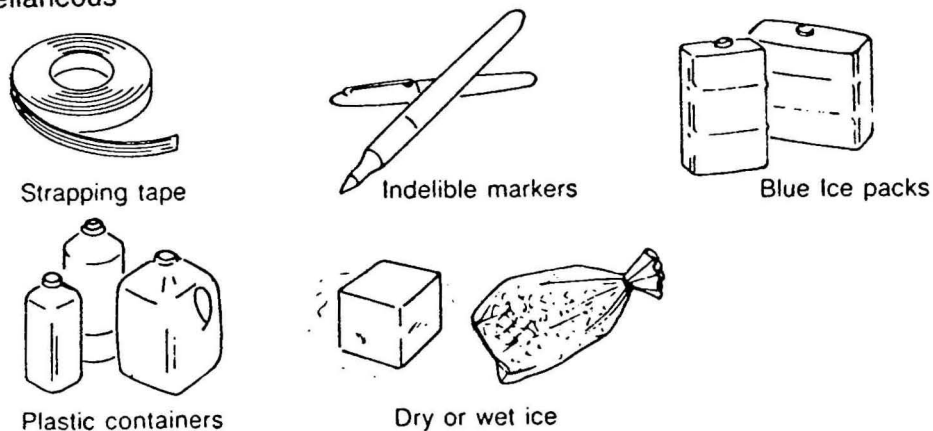


Fig. 3.1. Basic supplies used for specimen shipment.

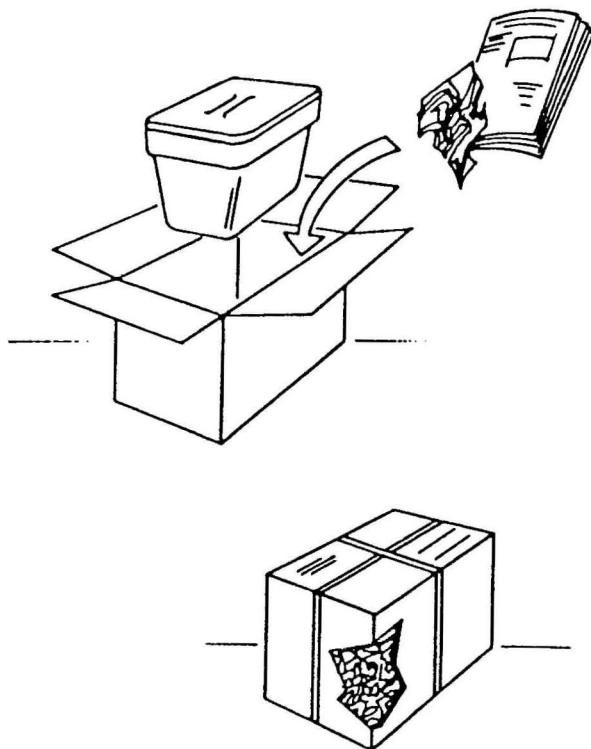


Fig. 3.2. Proper packing to prevent styrofoam coolers from becoming crushed during transit. Place the sealed styrofoam cooler in a sturdy cardboard box. Use crumpled newspaper or other soft packing material to fill all space between the cooler and the box.

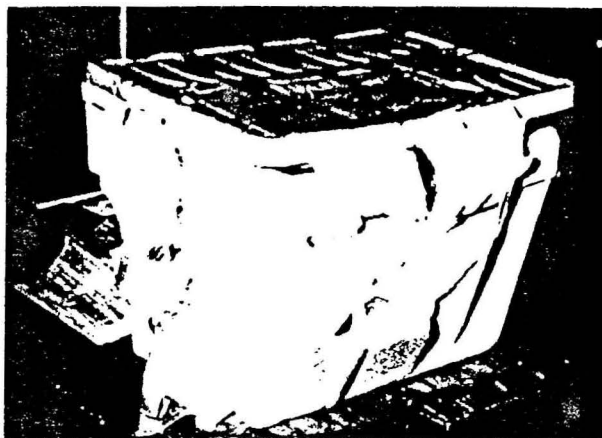


Fig. 3.3. Example of the result of improper packaging. *J.R.*

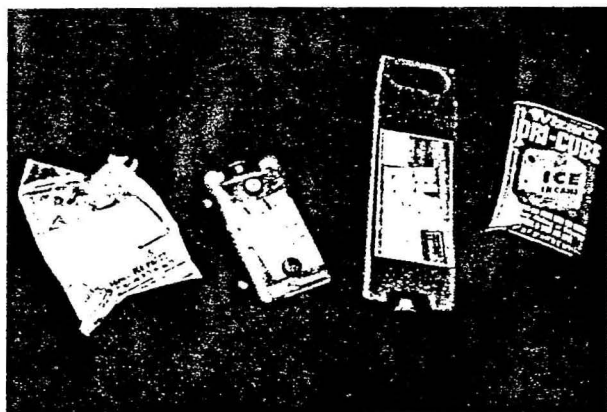


Fig. 3.4. Chemical coolants (blue ice packs) are available in (a) soft plastic, (b) hard plastic, and (c) metal containers. *J.R.*

Preparing Specimens for Shipment to the National Wildlife Health Center (NWHC)

(Other disease diagnostic laboratories may require minor variations in shipping procedures.)

1. Call the NWHC Resource Health Team (608-264-5422, FTS 364-5422) to determine the optimal type and number of specimens for diagnostic procedures, how these specimens are best preserved during transit (e.g., chilled vs. frozen), and when they should be shipped. In most instances, the Resource Health Team asks that specimens be shipped the same day or within 24 hours, but in some instances shipment may be delayed to facilitate specimen receipt and processing.

2. Double-bag carcasses (Fig. 3.5) and place them in a styrofoam cooler lined with a plastic bag. When submitting both frozen and fresh whole carcasses in the same container, you can use the frozen carcasses as a refrigerant to keep the fresh carcasses chilled by interspersing individually bagged frozen carcasses among the individually bagged fresh carcasses or by placing the fresh carcasses between two layers of frozen carcasses (Fig. 3.6).

Blood tubes and other breakable containers of uniform size can be protected by packing them in a common plastic bag that is sealed within a coffee can (Fig. 3.7). Pack any space around the specimen containers within the coffee can (side and top) with paper or some other absorbent material to prevent jarring that could cause breakage, and to collect fluids if breakage does occur. Then, seal the coffee can within a plastic bag before placing it in the styrofoam cooler.

3. When using blue ice packs, intersperse them among specimens; place other types 19 of coolants in locations within the styrofoam container that will provide maximum cooling for all contents or keep everything frozen when dry ice is used (Fig. 3.8). Fill all empty space within the styrofoam cooler with newspaper to prevent materials from being tossed around during transit. The insulating properties of newspaper will also help maintain cool temperatures within the package and its absorbent qualities will help prevent leakage of fluids to the outside of the box or container.

4. Close the plastic bag lining the cooler and seal the lid with strapping tape (Fig. 3.9). Tape the specimen data sheet and history, contained in an envelope within a waterproof plastic bag, to the top of the cooler (Fig. 3.10a).

5. Enclose the styrofoam cooler in a cardboard box and secure the contents with strapping tape (Fig. 3.10b).

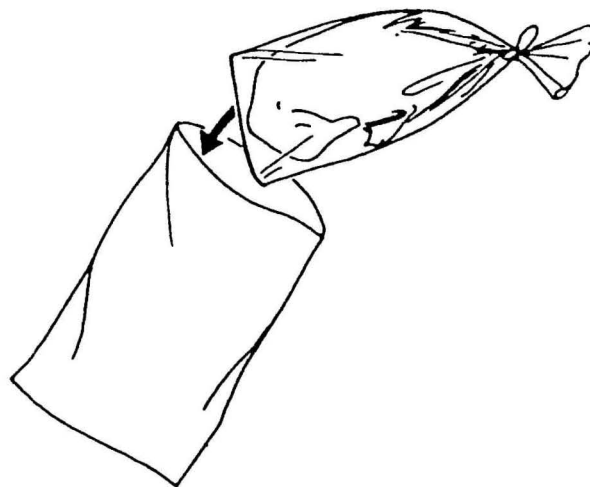


Fig. 3.5. Individual carcasses should be double-bagged to prevent leakage of fluids and cross-contamination of specimens.

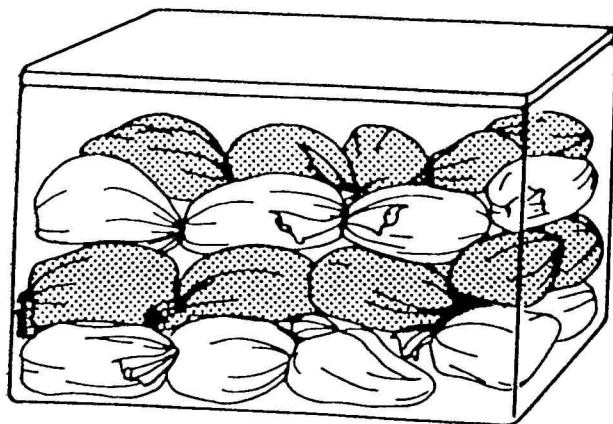


Fig. 3.6. Frozen carcasses (white bags) can be used to keep fresh specimens (dark bags) chilled during short transit times (24 hours or less). Fill the space between the carcasses and the top of the container with newspaper to provide additional insulation to maintain the cold.

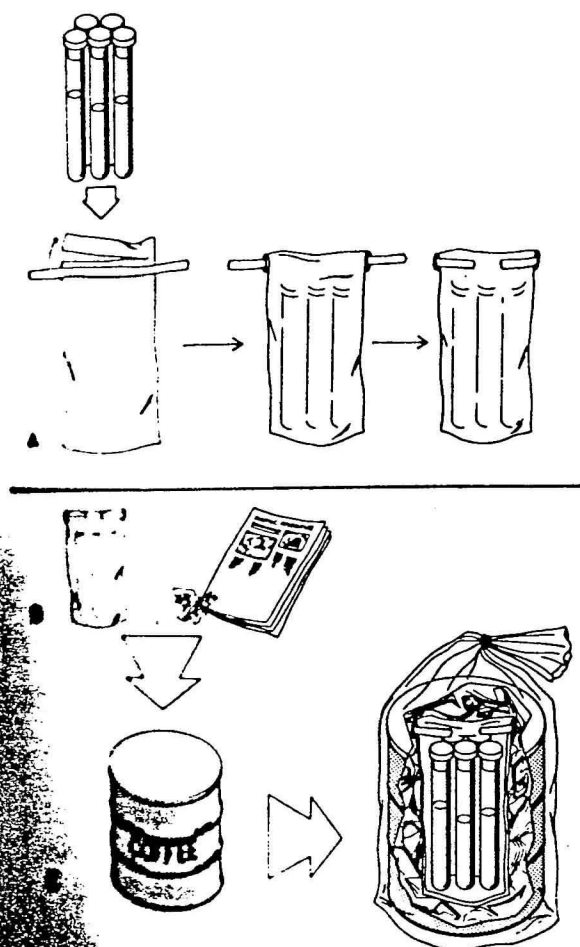
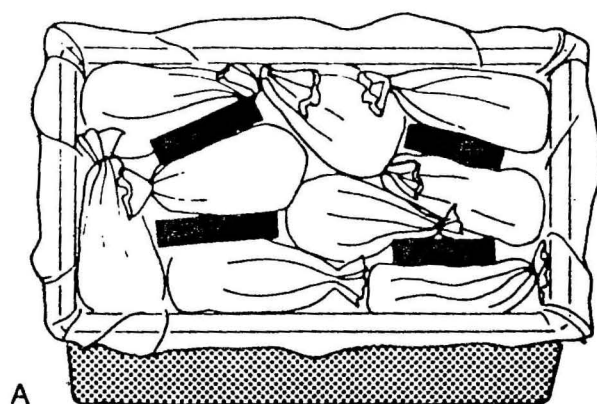
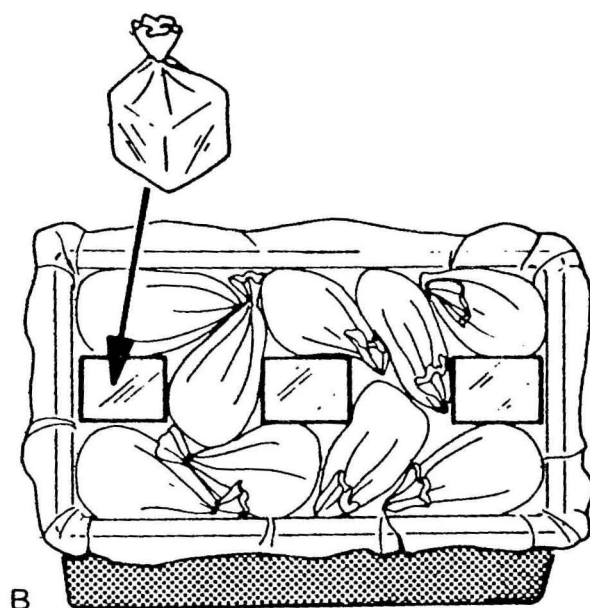


Fig. 3.7. Packing sequence of (a) blood tubes being packaged within Whirl-Pak or other plastic bag; (b) bag then being placed in metal can or hard plastic container and packed with crumpled newspaper or other absorbent, soft, space-filling material; and (c) the can being enclosed in a plastic bag which is then sealed.

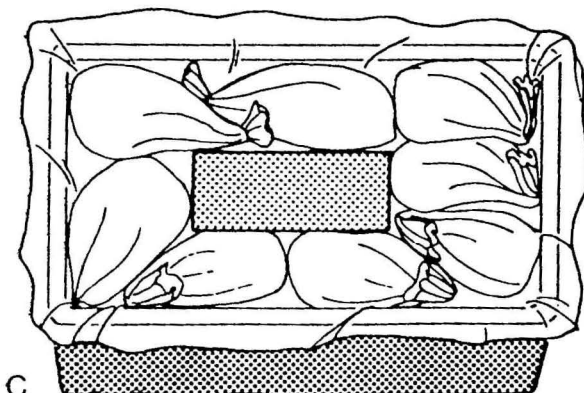
Specimen Shipment



A

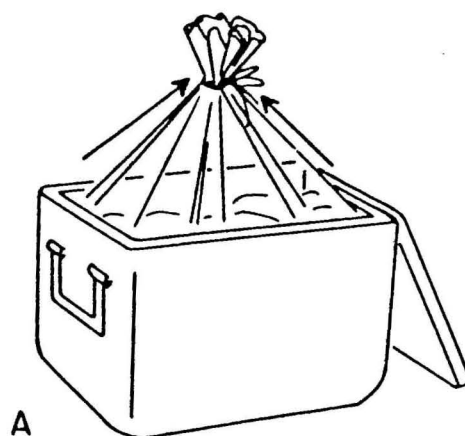


B

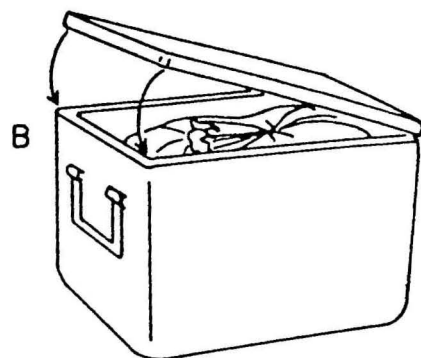


C

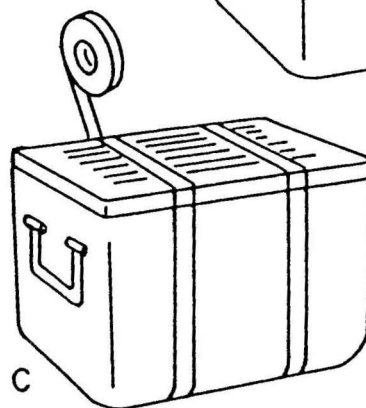
Fig. 3.8. Packing specimens for shipment when (a) blue ice packs, (b) wet ice, and (c) dry ice are used as coolants. Note that in each instance, the shipping container is lined with a large plastic bag.



A



B



C

Fig. 3.9. Closure of specimen container. (a) Secure the large plastic bag containing the specimens by tying the tip; (b) close the cooler lid and (c) secure the container with several bands of strapping tape.

Federal Shipping Regulations for Packaging and Labeling

22

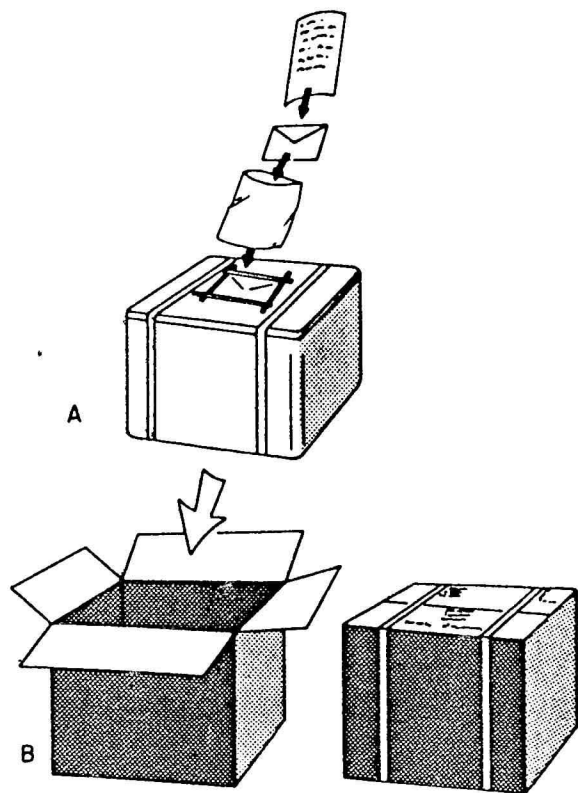


Fig. 3.10. Completion of the packing process. (a) Tape specimen data sheet and history, contained in an envelope within a waterproof plastic bag, to top of cooler. (b) Place cooler in cardboard box and secure box with several bands of strapping tape.

Your packaging and labeling of specimens must conform to the following regulations.

Under Fish and Wildlife Regulations (50 CFR 14), containers with wildlife specimens must bear the name and address of the shipper and consignee, and an accurate statement of the contents (by species and number of each species) must be conspicuously marked on the outside of the container. An alternative to this requirement is to conspicuously mark the outside of each package or container with the word "wildlife" or the common names of the species contained within the package. In addition, an invoice or packing list that includes the name and address of the consignee and shipper, and which accurately states the types and quantities of each species contained in the shipment, should be secured to the outside of one container in the shipment.

In addition to Fish and Wildlife Service regulations, the interstate shipment of diagnostic specimens is subject to applicable packaging, labeling, and shipping requirements for etiologic agents (42 CFR Part 72). These regulations do not require identifying diagnostic specimens as etiologic agents when the disease agent is not known or only suspected. However, all specimen packages sent to the NWHC should be prominently labeled with the words "DIAGNOSTIC SPECIMENS." Packaging requirements under 42 CFR Part 72 are met by following the preceding recommendations 2 through 5 for enclosing specimens within two containers before being enclosed within the package.

Hazardous Material Regulations of the Department of Transportation apply whenever dry ice is contained within the shipping container (49 CFR Part 172-173). Clearly write the amount of dry ice contained within the package in the upper right-hand corner on the outside of the container. The letters "ORM-A" must appear under the amount of dry ice and this information must be written within a rectangular area marked on the outside of the package. The words "DIAGNOSTIC SPECIMENS" must appear under that designation. Properly labeled containers for use with and without dry ice are illustrated in Fig. 3.11. Labeling should be done with permanent markers if possible.

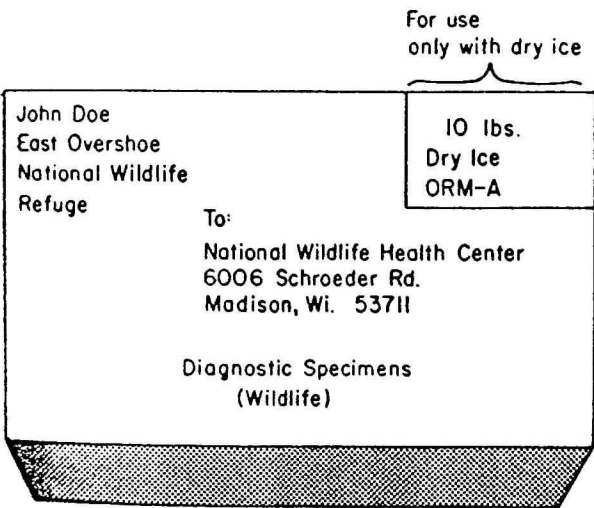


Fig. 3.11. Proper labeling of package.

Commercial Carriers

Specimens should be shipped by carriers that can guarantee 24-hour delivery to the location of the diagnostic laboratory (for the NWHC, this is Madison, Wisconsin). Air freight is preferred over other types of carriers. Federal Express, Purolator, Emery, DHL, and U.S. Postal Service Express Mail have all proved to be satisfactory in meeting this requirement. For many locations, these commercial delivery services will pick up packages at the point of origin. When you have completed shipping arrangements, recontact the NWHC Resource Health Team to provide the airbill number and estimated time of arrival. This information is needed to allow prompt tracing of shipments that may not arrive on schedule and to schedule work at the laboratory.

EQUIPMENT SOURCES

Federal:

1) Bear River MBR

- 2 4WD pickup trucks
- 1 2WD pickup truck
- 2 4WD ATV's
- 1 slip-on pumper unit
- 4 walkie-talkie radios (on refuge frequency)
- 2 airboats
- 1 14' aluminum John boat
- 1 crawler dozer

2) Fish and Wildlife Enhancement

- 2 4WD ATV's

3) Fish Springs and Ouray NWRs

No equipment listing - consider only as emergency sources due to their long distance from the area.

State:

1) Utah Division of Wildlife Resources

- 4 pickup trucks
- 4 airboats
- 3 Cessna 185 airplanes
- 3 4WD ATV's
- 1 backhoe
- 2 dump trucks
- 1 large military trailer (for hauling carcasses)
- 2 propane cannons

BRIGHAM CITY

84302 Pop. 20,000 Elev. 4,315 C-4

First called Box Elder when settled in 1851 because of the many Box Elder trees, it was later named after Brigham Young.

Most Famous For: Golden Spike National Historic Site of transcontinental railroad era; Peach Days harvest celebration each September since 1904; and home of Morton Thiokol space shuttle rocket booster plant.

Visitor Center: Chamber of Commerce, 6 N. Main, 723-3931.

City Parks: 9 parks.

Churches: Most major denominations.

Medical Services: Brigham City Community Hospital, 950 S. 500 W., 734-9471.

Auto Services: 16 gas stations, 20 auto repair.

State Liquor Store: 43 S. 100 W., 723-3701.

Bus Station: Greyhound Bus Service, Hardy Enterprises, 704 N. Main, 723-8519.

Airport: Municipal Airport, Seagull Aviation, 1780 N. 2000 W., 723-8519.

Local Tours: Box Elder Tabernacle, 251 S. Main, 723-5376.

Restaurants: 12 restaurants, 16 fast food.

Accommodations:

BEST WESTERN MOTEL, 505 N. Main, 723-8584, 17 Rooms, P, TV, DD, D, AX, DI, DS, MC, VI, AAA, \$30-\$45.

**Box Elder Tabernacle**

BURBANKS MOTEL, 759 N. Main, 723-7011, 5 Rooms, P, TV, K, \$16-\$23.

BUSHNELL LODGE, 115 E. 6700 S., 723-8575, 24 Rooms, S, M, K, DD, MC, VI, Rates not available.

DRIFTWOOD MOTEL, 605 S. Main, 723-2218, 13 Rooms, TV, M, K, MC, VI, \$22-\$33.

GALAXIE MOTEL, 740 S. Main, 723-3439, 25 Rooms, P, TV, K, DD, NS, D, AX, DS, MC, VI, AAA, \$31-\$44.

RED BARON MOTEL, 1167 S. Main, 723-8511, 44 Rooms, R, S, HT, P, TV, M, DD, D, AX, DI, DS, MC, VI, AAA, MOBIL, \$28-\$46.

STARLITE MOTEL, 443 N. Main, 723-5291, 15 Rooms, P, TV, K, DD, D, A, DI, DS, MC, VI, AAA, \$22-\$46.

NORTH OGDEN

84404 Pop. 10,057 Elev. 4,500 C-4

Settled in 1851, it is known for fruit growing.

City Parks: Oaklawn Park, 1200 E. 2500 N.; North Ogden Park, 500 E. 2700 N.; Lomond View Park, 220 E. Elberta Dr.

Medical Services: McKay Dee Medical Clinic, 2500 N. 400 E., 782-5323; N. Ogden Medical Center, 2252 N. 400 E., 782-3400.

Auto Services: 3 gas stations (1 24-hour), 2 auto repair.

Restaurants: 2 fast food.

NORTH SALT LAKE

84054 Pop. 6,400 Elev. 4,700 D-4

When stock yards were built amidst fruit orchards in 1912, Salt Lake built a railroad to North Salt Lake.

Most Famous For: Oil refineries.

Visitor Information: City Hall, 20 S. Hwy 89, 298-3877.

City Parks: Main Park, Center & Main; Palmquist Park, 350 E. Center St.; Mathis Park, 400 E. 800 N.

Churches: Assembly of God, LDS.

Auto Services: 7 gas stations (3 24-hour), 1 auto repair.

Restaurants: 4 restaurants, 4 fast food.

Accommodations:

BEST WESTERN COTTONTREE INN, 1030 N. 400 E., 292-7666, 800-528-1234, FAX: (801)292-9664, 80 Rooms, S, HT, P, TV, M, DD, NS, H, D, AX, DI, DS, MC, VI, AAA, MOBIL, \$44-\$100.

OGDEN

Pop. 69,000 Elev. 4,500 C-4

A major rendezvous site for mountain men in the 1820's, Ogden was named after fur trapper Peter Skene Ogden when pioneers settled here in 1850.

Most Famous For: Railroad center of inter-mountain area; Mt. Ben Lomond inspired logo for Paramount Pictures.

Visitor Information: Golden Spike Empire, Union Station, 2501 Wall Ave., 399-8289.

City Parks: 39 parks.

Churches: Most major denominations.

Medical Services: McKay-Dee Hospital, 3939 Harrison Blvd., 627-2800; St. Benedict's Hospital, 5475 S. 500 E., 479-2111.

Auto Services: (24-hour).

State Liquor Stores: 1160 Patterson, 394-1898.

3212 Wall Ave., 392-3091; 573 2nd, 393-2592.

Bus Stations: Greyhound, 394-5573; Trailways Bus System, 2501 Grant Ave., 393-6868.

Airport: Ogden City Airport-Ogden Municipal, 3909 Airport Rd., 399-8251.

Restaurants: 122 restaurants, 69 fast food.

Accommodations:

BEST WESTERN FLYING J MOTEL, 1206 W. 2100 S., 393-8644, 102 Rooms, R, S, P, TV, M, K, DD, NS, D, AX, DI, DS, MC, VI, AAA, \$35-\$59.

BIG Z MOTEL, 1123 W. 2100 S., 394-6632, 32 Rooms, R, P, TV, M, K, DD, AX, DI, DS, MC, VI, AAA, \$25-\$38.

BUDGET HOST MILLSTREAM MOTEL, 1450 Washington Blvd., 394-9425, 800-456-5025, 46 Rooms, HT, TV, M, K, DD, D, AX, DI, MC, VI, AAA, MOBIL, \$26-\$52.

COLONIAL MOTEL, 1269 Washington Blvd., 399-5851, 32 Rooms, S, P, TV, K, NS, D, AE, MC, VI, \$20-\$26.

HIGH COUNTRY BEST WESTERN INN, 1335 W. 1200 S., 394-9474, 800-528-1234, 111 Rooms, R, L, S, HT, P, TV, M, DD, NS, H, EX, D, AX, DI, DS, MC, VI, AAA, \$39-\$49.

HOLIDAY INN OGDEN, 3306 Washington Blvd., 399-5671, FAX: 801-621-0321, 109 Rooms, R, L, S, HT, P, TV, M, DD, NS, H, D, AX, DI, DS, MC, VI, AAA, \$38-\$59.

MOTEL ORLEANS, 1825 Washington Blvd., 621-8350, 92 Rooms, R, S, HT, P, TV, K, DD, D, AX, DI, MC, VI, AAA, MOBIL, \$28-\$44.

MOTEL 6, 1455 Washington Blvd., 627-4560, 72 Rooms, S, P, TV, M, DD, NS, AX, DI, DS, MC, VI, \$22-\$40.

MT. LOMOND MOTEL, 755 N. Hamsville, 782-7477, 25 Rooms, R, P, TV, K, NS, MC, VI, \$22-\$26.

OGDEN HOTEL, 247 24th Street, 627-1190, 800-421-7599, FAX: (801)627-1190, 287 Rooms, R, L, S, HT, P, TV, M, DD, NS, H, D, AX, DI, DS, MC, VI, \$64-\$253.

OGDEN IMPERIAL MOTEL, 1956 Washington Blvd., 393-8667, 35 Rooms, S, P, TV, M, K, DD, D, AX, DI, MC, VI, \$25-\$38.

QUALITY INN, 1500 W. Riverdale Road, 627-2880, 800-258-2847, FAX: (801)627-2880, R, L, S, TV, M, NS, H, SA, D, AX, DI, DS, MC, VI, \$43-\$70.

RADISSON SUITE HOTEL, 2510 Washington Blvd., 627-1900, 800-333-3333, 627-1900, FAX: (801)394-5342, 124 Rooms, R, L, TV, M, DD, NS, H, EX, D, AX, DI, DS, MC, VI, \$55-\$145.

ROGERS REST BED AND BREAKFAST, 914 29th Street, 393-5824, 1 Room, NS, \$25-\$30.

SUN CHASE, 424 Park Blvd., 621-5574, FAX: (801)621-5744, 30 Rooms, S, HT, TV, K, DD, H, SA, EX, D, AX, MC, VI, \$35-\$55.

SUPER 8 MOTEL OF OGDEN, 1508 W. 2100 S., 731-7100, 800-843-1991, 60 Rooms, P, TV, M, DD, NS, H, D, AX, DI, DS, MC, VI, AAA, \$28-\$42.

TRAVELODGE OGDEN, 2110 Washington Blvd., 394-4563, 800-255-3050, 76 Rooms, S, P, TV, M, DD, NS, D, AX, DI, DS, MC, VI, AAA, \$32-\$48.

WESTERN COLONY INN, 234 24th Street, 627-1332, 16 Rooms, P, TV, K, DD, NS, SA, AX, DI, DS, MC, VI, AAA, \$33-\$55.

WOLF CREEK VILLAGE, 3900 N. Wolf Creek Drive, Eden, 745-0222, HT, TV, K, DD, EX, AX, MC, VI, \$88-\$164.

WOLF LODGE CONDOMINIUMS, 3615 North Wolf Creek Drive, Eden, 745-0222, 13 Rooms, HT, TV, K, DD, EX, AX, MC, VI, \$88-\$164.

SALT LAKE CITY

Pop. 168,000* Elev. 4,330 D-4

(*Salt Lake City proper is a fairly small area when compared with the entire Salt Lake Valley population of 696,000).

On July 23, 1847, the same afternoon the first company of Mormon pioneers arrived in Salt Lake Valley, plows were set to the earth and a dam for irrigating was built. Delayed one day due to sickness was Brigham Young, who had been looking for "a place on this earth that nobody else wants."

Most Famous For: Wide streets (132 feet in width laid out by pioneers "so a team of oxen could turn around without backing up"); Temple Square, where the Mormon Tabernacle Choir is accompanied by the massive pipe organ in the Tabernacle; world headquarters for the Church of Jesus Christ of Latter-day Saints (Mormon); State Capitol; University of Utah Health Sciences Center; Trolley Square.

Visitor Information: Salt Lake Convention & Visitors Bureau, 180 S. W. Temple, 521-2868, or Salt Lake International Airport, Terminal #2, 539-8000; Salt Lake Area Chamber of Commerce, 175 E. 400 S., 528-5056; Utah Travel Council, Council Hall/Capitol Hill, 538-1030.

City Parks: 54 parks.

Churches: Most denominations.

Hospitals: Holy Cross Hospital, 1045 E. 100 S., 350-4111; LDS Hospital, 325 E. 8th Ave., 321-1100; Primary Childrens Medical Center, 320 E. 12th Ave., 521-1221; St. Marks Hospital, 1200 E. 3900 S., 268-7074; Shriners Hospital For Crippled Children, Fairfax Rd. at Virginia St., 532-5307; University of Utah Health Sciences Center, 50 N. Medical Drive, 581-2121; Veterans Administration Hospital, 500 Foothill Drive, 582-1565.

Auto Services: (24-hour service).

State Liquor Stores: 205 W. 400 S., 533-5901; 416 5th Ave., 533-5905; 54 N. 800 W., 533-5904; 1457 S. Main, 483-1272; 1177 Ashton, 533-5907; Salt Lake International Airport Terminal 1 & Terminal 2, 539-2600; 1615 Foothill Blvd., 533-5902; 2408 Kentucky Ave., 278-3572; 2284 S. Redwood Rd., 972-5735; 63 E. Miller Ave., 484-9721; 3255 E. 3300 S., 533-5904; 1863 E. 700 S., 942-6234.

Bus Stations: Trailways, 77 W. S. Temple, 532-2441; Greyhound, 160 W. S. Temple, 355-9589.

Airport: Salt Lake International Airport, 776 N. Terminal Drive, 539-2400.

Bus or Walking Tours: Contact Salt Lake Convention & Visitors Bureau, 521-2868.

Restaurants: Over 200.

Accommodations:

AIRPORT HILTON, 5151 Wiley Post Way, 539-1515, 800-999-3736, FAX: (801)539-1113, 293 Rooms, R, L, S, HT, P, TV, M, DD, NS, H, EX, D, AX, DI, DS, MC, VI, \$69-\$196.

AIRPORT INN, 2333 W. N. Temple, 539-0438, 15 Rooms, R, L, S, HT, TV, M, DD, AX, DI, MC, VI, \$35-\$40.

ALTA MOTOR LODGE, 1899 S. State, 486-7417, 30 Rooms, S, TV, K, \$22-\$40.

ANTON BOXRUD B&B, 57 S. 600 E., 363-8035, 4 Rooms, TV, NS, D, MC, VI, AAA, \$44-\$60.

AQUARIUS MOTEL, 325 N. 300 W., 521-9525, 33 Rooms, P, TV, K, MC, VI, \$19-\$30.

BIG COTTONWOOD FAMILY LODGING, 3116 E. Danish Ridge Way, 943-2097, 1 House, TV, M, K, DD, D, \$135.

ACCOMMODATIONS SYMBOL KEY

Restaurant(R), Liquor License(L), Swimming Pool(S), Hot Tub(HT), Allow Pets(P), TV(TV), In Room Movies(M), Kitchens Available(K), Direct Dial Phones(DD), No Smoking Rooms(NS), Handicapped Rooms Facilities(H), Sauna(SA), Exercise Equipment(EX), Discounts Offered(D), American Express(AX), Diners Club(DI), Discover Card(DS), MasterCard(MC), Visa(VI), Accreditations(AAA etc)

BRIGHAM STREET INN B&B, 1135 E. S. Temple, 364-4461, 9 Rooms, TV, K, DD, AX, MC, VI, AAA, \$65-\$154.

BUDGET BOB'S, 534 N. 300 W., 532-9071, 40 Rooms, P, TV, K, NS, \$11-\$22.

CAPITOL MOTEL, 1749 S. State, 485-5551, 40 Rooms, P, TV, K, DD, NS, D, AX, MC, VI, \$25-\$28.

CARLTON HOTEL, 140 E. S. Temple, 355-3418, 800-633-3500, 55 Rooms, R, HT, TV, M, K, DD, NS, EX, D, AX, DI, DS, MC, VI, \$34-\$69.

CHATEAU MOTEL, 1999 W. N. Temple, 596-7240, 800-596-7240, 20 Rooms, P, TV, D, MC, VI, \$21-\$28.

COLONIAL VILLAGE MOTEL, 1530 S. Main, 486-8171, 24 Rooms, P, TV, K, DD, NS, AX, DI, DS, MC, VI, \$19-\$28.

COMFORT INN - AIRPORT, 200 N. Admiral Byrd Road, 537-7444, 800-532-4721, FAX: (801)532-4721, 156 Rooms, R, L, S, HT, P, TV, M, DD, NS, H, D, AX, DI, DS, MC, VI, \$49-\$62.

CONTINENTAL MOTEL, 819 W. N. Temple, 363-4546, 38 Rooms, S, P, TV, DD, NS, D, AX, DI, MC, VI, \$22-\$34.

COUNTRY CLUB MOTOR INN, 2665 Parley's Way, 486-1034, 43 Rooms, S, HT, P, TV, M, K, DD, NS, D, AX, DI, DS, MC, VI, \$30-\$76.

COVERED WAGON MOTEL, 230 W. N. Temple, 533-9100, 37 Rooms, P, TV, K, DD, NS, D, AX, DI, DS, MC, VI, \$22-\$28.

DAVE'S COZY CABIN INN, B&B, 2293 E. 6200 S., 278-6136, 3 Rooms, NS, \$30-\$45.

DAYS INN, 1900 W. N. Temple, 539-8538, 800-325-2525, FAX: (801)539-8538, 111 Rooms, P, TV, M, K, DD, NS, H, D, AX, DI, DS, MC, VI, AAA, \$34-\$57.

DEAN'S MOTOR LODGE, 1821 S. Main, 486-7495, 36 Rooms, P, TV, K, DD, NS, AX, MC, VI, \$29.

DESERET INN, 50 W. 500 S., 532-2900, 88 Rooms, R, S, TV, M, DD, AX, DI, MC, VI, AAA, \$32-\$65.

DOUBLETREE HOTEL - SALT LAKE, 215 W. S. Temple, 531-7500, 800-528-0444, FAX: (801)328-1289, 381 Rooms, R, L, S, HT, TV, M, DD, NS, H, EX, D, AX, DI, DS, MC, VI, AAA, \$63-\$120.

ECONO LODGE, 715 W. N. Temple, 363-0062, 800-446-6900, FAX: (801)363-0062, R, S, P, TV, M, DD, NS, H, D, AX, DI, DS, MC, VI, AAA, MOBIL, \$27-\$45.

EMBASSY SUITES, 600 S. W. Temple, 359-7800, 800-325-7643, FAX: (801)359-3753, 241 Rooms, R, L, S, H, P, TV, DD, NS, H, EX, D, AX, DI, DS, MC, VI, AAA, \$69-\$99.

FLYING J MOTEL, 715 W. N. Temple, 363-0062, 800-446-6900, FAX: (801)359-3926, 121 Rooms, R, S, \$27-\$45.

HOLIDAY INN - AIRPORT, 1659 W. N. Temple, 533-9000, 800-HOLIDAY, FAX: (801)364-0614, 191 Rooms, R, L, S, P, TV, M, DD, NS, D, AX, DI, DS, MC, VI, \$54-\$84.

HOLIDAY INN DOWNTOWN, 230 W. 600 S., 532-7000, 800-465-4329, FAX: (801)364-0974, 160 Rooms, R, L, S, HT, P, TV, M, DD, EX, D, AX, DI, DS, MC, VI, AAA, \$55-\$74.

HOLIDAY MOTEL, 3035 S. State, 466-8773, 42 Rooms,

S, TV, M, K, DD, AX, DI, DS, MC, VI, \$26-\$60.

HOWARD JOHNSON'S HOTEL, 122 W. S. Temple, 521-0130, 800-336-3684, FAX: (801)322-5057, 226 Rooms, R, L, S, HT, P, TV, DD, NS, EX, D, AX, DI, DS, MC, VI, AAA, \$45-\$75.

IMPERIAL 400 MOTOR INNS, 476 S. State Street, 533-9300, FAX: (801)532-1746, 49 Rooms, S, P, TV, M, K, DD, NS, D, AX, DI, DS, MC, VI, AAA, MOBIL, \$30-\$41.

KEN DELL MOTEL, 667 N. 300 W., 355-0293, 15 Rooms, P, TV, K, NS, MC, VI, \$25-\$75.

LAKE CITY MOTEL, 925 E. 400 S., 359-5200, 12 Rooms, TV, M, AX, MC, VI, \$21-\$34.

LITTLE AMERICA HOTEL, 500 S. Main, 363-6781, 800-453-9450, FAX: (801)322-1610, 850 Rooms, R, L, S, HT, TV, M, DD, NS, EX, D, AX, DI, DS, MC, VI, AAA, \$45-\$65.

MARRIOTT HOTEL 75 S. W. Temple, 531-0800, FAX: (801)532-4127, 511 Rooms, R, L, S, HT, P, TV, M, NS, H, EX, D, AX, DI, DS, MC, VI, AAA, MOBIL, \$59-\$89.

MOTEL 6 - AIRPORT, 1990 W. N. Temple, 364-1053, 104 Rooms, S, P, TV, M, DD, NS, AX, DI, DS, MC, VI, \$28-\$47.

MOTEL 6 - DOWNTOWN, 176 W. 600 S., 531-1252, 109 Rooms, S, P, TV, M, DD, NS, AX, DI, DS, MC, VI, \$28-\$47.

NATIONAL HISTORIC B&B, 936 E. 1700 S., 485-3535, 5 Rooms, K, DD, NS, D, MC, VI, AAA, \$47-\$97.

NENDELS MOTOR INN, 2080 W. N. Temple, 355-0088, 800-547-0106, FAX: (801)355-0099, 96 Rooms, R, S, HT, TV, M, DD, NS, H, D, AX, DI, DS, MC, VI, AAA, \$45-\$51.

OQUIRH MOTOR INN, 8740 North State Hwy, Lakepoint, 250-0118, 20 Rooms, P, TV, M, DD, D, AX, DI, DS, MC, VI, \$20-\$40.

ORLEANS INN HOTEL, 352 S. 300 E., 521-3790, 44 Rooms, R, S, P, TV, M, K, DD, NS, D, AX, DI, DS, MC, VI, \$54-\$87.

OVERNITER MOTOR INN, 1500 W. N. Temple, 533-8300, 51 Rooms, S, TV, DD, H, D, AX, DI, MC, VI, \$22-\$38.

PEERY HOTEL, 110 W. 300 S., 521-4300, 800-331-0073, FAX: (801)575-5014, 78 Rooms, R, L, HT, TV, M, DD, NS, EX, D, AX, DI, MC, VI, \$65-\$100.

PINECREST B&B, 6211 Emigration Canyon, 583-6663, 800-359-6663, 6 Rooms, HT, K, DD, AX, MC, VI, AAA, \$60-\$140.

QUALITY INN - AIRPORT, International Center, 5575 W. Amelia Earhart Drive, 537-7020, 800-522-5575, 195 Rooms, R, L, S, HT, P, TV, M, DD, NS, H, D, AX, DI, DS, MC, VI, AAA, Rates not available.

QUALITY INN CITY CENTER, 154 W. 600 S., 521-2930, 800-228-5151, FAX: (801)355-0733, 247 Rooms, R, L, S, P, TV, M, DD, NS, H, AX, DI, DS, MC, VI, AAA, \$43-\$160.

QUALITY INN SOUTH, 465 Century Drive, 268-2533, 800-228-5151, 131 Rooms, R, L, S, HT, P, TV, M, K, DD, NS, H, D, AX, DI, DS, MC, VI, AAA, MOBIL, \$46-\$86.

RADISSON AIRPORT HOTEL, 2177 W. N. Temple, 364-5800, 800-333-3333, FAX: (801)364-5823, 127 Rooms, R, S, HT, M, K, DD, NS, AX, DI, DS, MC, VI, \$69-\$119.

RED LION, 255 S. W. Temple, 328-2000, 800-426-1982, FAX: (801)532-1953, 494 Rooms, R, L, S, HT, P, TV, M, DD, NS, H, EX, D, AX, DI, DS, MC, VI, AAA, \$89-\$200.

REGAL INN, 1025 N. 900 W., 364-6591, 31 Rooms, P, TV, M, K, DD, NS, H, D, AX, MC, VI, AAA, \$22-\$32.

ROADWAY INN, 315 W. 3300 S., 486-8780, 24 Rooms,

MT. P. TV, M. NS, H. EX, D. AX, DI, DS, MC, VI, \$36.
ROYAL EXECUTIVE INN, 121 N. 300 W., 521-3450.
 94 Rooms, S. TV, M. DD, NS, AX, DI, MC, VI, AAA,
 \$31-\$46.
SALT LAKE HILTON, 150 W. 500 S., 532-3344.
 800-445-8667, FAX: (801)532-3344. 352 Rooms, R.
 L. S. HT, P. TV, M. NS, EX, AX, DI, DS, MC, VI, \$69-
 \$110.
SALTAIR B&B, 164 S. 900 E., 533-8184. 5 Rooms.
 DD, NS, D. MC, VI, \$38-\$87.
SCENIC MOTEL, 1345 Foothill Drive, 582-1527.
 23 Rooms, TV, DD, NS, H, AX, DS, MC, VI, \$29-\$38.
SCOTTY'S TRAVEL MOTOR HOTELS, 754 W. N.
 Temple, 531-7300. 67 Rooms, S. P. TV, M, K, DD, NS,
 AX, DI, MC, VI, \$19-\$35.
SE RANCHO MOTOR HOTEL, 640 W. N. Temple.
 100 Rooms, \$12-\$32.
SHILO INN, 206 S. W. Temple, 521-9500, 800-222-
 2244, FAX: (801)359-6527. 200 Rooms, R. S. HT, P.
 TV, M, K, DD, NS, EX, D, AX, DI, DS, MC, VI, AAA,
 \$57-\$72.
SIESTA MOTEL, 3109 S. State Street, 487-6202.
 12 Rooms, P. TV, M, K, DD, D, MC, VI, \$25-\$34.
SKYLINE FRIENDSHIP INN, 2475 E. 1700 S.,
 582-5350. 25 Rooms, S. HT, P. TV, M, DD, D, AX, DI,
 DS, MC, VI, AAA, \$33-\$50.
SPIKING TOURIST LODGE, 2866 S. State Street,
 466-0858. 20 Rooms, P. TV, K, DD, D, MC, VI, \$20-\$27.
SPRUCES B&B, 6151 S. 900 E., 268-8762. 4 Rooms,
 HT, TV, K, DD, NS, D, AX, MC, VI, \$50-\$135.
STRATFORD HOTEL, 169 E. 200 S., 328-4089.
 54 Rooms, \$10-\$14.
SUN ARBOR, 1876 W. N. Temple, 539-8002.
 FAX: (801)539-8003. 100 Rooms, S. HT, TV, K, DD, H.
 SA, EX, D, AX, MC, VI, \$35-\$55.
SUN BURST, 4000 S. Redwood Rd., 972-0124.
 FAX: (801)972-0145. 100 Rooms, S. HT, TV, K, DD,
 H, SA, EX, D, AX, MC, VI, \$35-\$40.
SUN RIVER, 1080 W. 3300 S., 973-4464. FAX: (801)
 973-4493. 75 Rooms, S. HT, TV, K, DD, H, SA, EX, D,
 AX, MC, VI, \$35-\$55.
SUPER 8 MOTEL, 616 S. 200 W., 534-0808, 800-843-
 1991. 123 Rooms, TV, M, DD, NS, H, D, AX, DI, DS,
 MC, VI, AAA, \$40-\$60.
THE AVENUES, 107 F Street, 363-8137. 14 Rooms, K
 NS, AYH, \$10-\$13.
THE INN AT TEMPLE SQUARE, 75 W. S. Temple,
 531-1000. R. TV, M, DD, NS, H, EX, D, MC, VI, \$69-
 \$145.
THE RESIDENCE INN, 765 E. 400 S., 532-5511, 800-
 331-3131, FAX: (801)531-0416. 128 Rooms, S. HT, P.
 TV, M, K, DD, NS, H, EX, D, AX, DI, DS, MC, VI, \$84-
 \$137.
TRAVELODGE AT TEMPLE SQUARE, 144 W. N.
 Temple, 533-8200, 800-255-3050. 55 Rooms, TV,
 DD, NS, D, AX, DI, DS, MC, VI, AAA, \$32-\$54.
TRAVELODGE DOWNTOWN, 524 S. W. Temple,
 531-7100, FAX: (801)359-3814. 60 Rooms, S. P. TV,
 M, DD, NS, D, AX, DI, DS, MC, VI, \$45-\$54.
TRAVELODGE SALT PALACE, 215 W. N. Temple,
 532-1000, 800-255-3050. 130 Rooms, R, L, S, HT,
 TV, M, DD, NS, H, D, AX, DI, DS, MC, VI, \$34-\$60.
TRI ARC HOTEL, 161 W. 600 S., 521-7373, FAX:
 (801)521-7373. 386 Rooms, R, L, S, HT, TV, M, DD,
 NS, H, D, AX, DI, DS, MC, VI, \$39-\$56.
UPTOWN MOTEL, 1185 S. State Street, 521-4150,
 7 Rooms, P. TV, M, K, \$25-\$40.
WINDSOR HOTEL, 241 S. State Street, 322-5309,
 41 Rooms, \$19.

SALT LAKE AREA ACCOMMODATIONS:**MIDVALE**

BEST WESTERN EXECUTIVE INN, 280 W. 7200
 South, 566-4141, 800-528-1234, FAX: (801)566-
 5142. 92 Rooms, S. HT, TV, DD, NS, D, AX, DI, DS,
 MC, VI, AAA, \$38-\$69.
COPPER-VU MOTEL, 7353 South State, 255-7976,
 10 Rooms, P. TV, M, K, NS, D, MC, VI, \$20-\$25.
LA QUINTA MOTEL INNS, 530 Catalpa Road,
 566-5943. 122 Rooms, R, S, P, TV, M, DD, NS, H, D,
 AX, DI, DS, MC, VI, AAA, \$34-\$59.
MOTEL 6, 496 N. Catalpa, 561-0058, 128 Rooms, P,
 TV, M, DD, NS, H, D, AX, DI, DS, MC, VI, \$26-\$45.
SANDMAN INN, 380 W. 7200 South, 561-2256,
 800-444-6969. 89 Rooms, S. HT, TV, M, DD, NS, H,
 D, AX, DI, DS, MC, VI, \$31-\$50.

MURRAY

EL RANCHO MURRAY MOTOR LODGE, 5203 S. State
 Street, 266-3551. 13 Rooms, P. TV, M, DD, D, AX, MC,
 VI, \$27-\$42.
QUALITY INN, 4465 Century Drive, 268-2533,
 130 Rooms, S, HT, P, TV, M, K, DD, D, NS, H, D, AX,
 DI, DS, MC, VI, AAA, MOBIL, \$49-\$74.
RESTON HOTEL, 5335 College Drive, 264-1054,
 800-231-9710, FAX: (801)264-1054. 99 Rooms, R, L,
 S, HT, P, TV, NS, D, AX, DI, MC, VI, \$54-\$120.
SANDMAN MOTEL, 5754 South State Street,
 266-5963. 8 Rooms, TV, NS, \$25-\$30.

SANDY

BRIGHTON CHALETs, 2750 E. 9800 S., 942-8824,
 FAX: (801)942-4480. 5 Rooms, HT, TV, K, D, MC, VI,
 \$55-\$250.
COMFORT INN, 8955 S. 255 W., 255-4919, 800-255-
 4919, FAX: (801)255-4998. 98 Rooms, S, HT, TV, M,
 DD, NS, H, D, AX, DI, DS, MC, VI, AAA, \$41-\$51.
MAJESTIC ROCKIES MOTEL, 8901 S. State,
 255-2313. 17 Rooms, S, P, TV, M, K, DD, NS, AX, MC,
 VI, \$22-\$37.
MOUNTAIN HOLLOW B&B, P.O. Box 1841,
 942-3428. 9 Rooms, HT, TV, M, NS, EX, MC, VI, AAA,
 \$52-\$68.
SKI-IN MOTEL, 9640 S. State Street, 255-9889, 8
 Rooms, P, TV, K, SC, MC, VI, \$19-\$28.

SANDY

Pop. 71,500 Elev. 4,500 D-4
 Of the many versions how Sandy was named, most
 common is that it had sandy soil, or was named after
 the first railroad engineer to drive a train to town.
Most Famous For: Most married and youngest
 population in U.S. (1980 Census).
Visitor Information: Sandy City Hall, 8680 S.
 440 E., 566-1561.
City Parks: 16 parks.
Churches: Most major denominations.
Medical Services: Alta View Hospital, 9660 S. 1300
 E., 572-2600.
Auto Services: 30 gas stations (some 24-hour),
 36 auto repair.
State Liquor Store: 9075 Monroe Street,
 255-8721.
Walking Tour: Historic District, contact City Hall.
Restaurants: 27 restaurants and fast food.
Accommodations:
 SEE SALT LAKE AREA ACCOMMODATIONS

SOUTH OGDEN

84403 Pop. 11,500 Elev. 4,600 C-4
 Ownership of the area was first granted to Miles
 Goodyear by the Mexican government, and later sold
 to James Brown of the Mormon Battalion.
Visitor Information: City offices, 560 39th St.,
 399-4414.
City Parks: 5 parks.
Churches: Catholic, Greek Orthodox, LDS.
Auto Services: 4 gas stations, 3 auto repair.
Restaurants: 11 restaurants, 4 fast food.

SOUTH SALT LAKE

84115 Pop. 12,500 Elev. 4,266 D-4
 It was incorporated in 1938 for areas between 2100
 South and 3300 South and between 700 East and the
 Jordan River (about 1000 West).
Visitor Information: Chamber of Commerce, 2500
 S. State St., 466-3377.
City Parks: Community Park, 3040 S. 500 E.; Fitts
 Park, 2500 S. State; Lions Park, 2420 S. 400 E.
Churches: Most major denominations.
Auto Services: 18 gas stations, 9 auto repair.
State Liquor Store: 63 E. Miller Ave., 484-9721.
Restaurants: 23 restaurants, 7 fast-food.

Table 6. State of Utah Division of Wildlife Resources Waterfowl Populations on Management Areas in Utah for Period July 1989 to June 1990.

SPECIES	JULY	AUG	SEPT	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUNE	SPE
Mallard	1,386	4,992	4,081	4,208	10,013	6,677	3,758	6,933	10,195	4,347	2,013	5,543	63.
Pintail	1,278	103,286	48,396	15,090	13,005	4,575	1,179	9,056	79,255	4,599	1,112	11,313	292.
G.W. Teal	470	13,298	27,282	11,321	13,343	6,291	1,283	10,111	61,367	6,617	1,209	677	153.
Shoveler	128	5,065	4,966	2,356	6,999	1,435	91	964	17,836	4,868	583	610	45.
Baldpate	718	3,540	31,555	16,951	27,457	5,139	782	1,332	28,687	1,726	73	386	118.
Gadwall	1,193	8,592	9,754	5,675	4,145	815	526	758	5,152	1,275	1,553	3,131	42.
Cin. Teal	1,580	8,572	6,105	859	344	130	6	585	10,890	11,866	3,769	6,218	51.
Redhead	1,256	1,103	1,707	914	270	12	4	87	2,870	5,344	3,307	5,471	22.
Canvasback	42	51	426	38	109	0	0	30	204	148	74	28	1.
Ruddy	706	357	624	236	151	16	0	1	30	1,157	321	559	4.
Others & Unc.	2,718	3,035	7,720	4,729	4,065	1,535	1,011	1,283	6,750	2,964	563	464	36.
TOTAL DUCKS	11,255	151,891	142,616	62,386	79,901	26,625	8,640	31,140	223,236	44,911	14,577	34,400	831.
White Geese	0	0	0	0	13	3	0	0	7	—	0	0	
Canada Geese	2,427	1,708	2,703	3,397	4,068	3,627	3,516	4,524	2,290	1,197	779	1,437	31.
TOTAL GEESE	2,427	1,708	2,703	3,397	4,081	3,630	3,516	4,524	2,297	1,197	779	1,437	31.
Swan	0	0	—	7	306	587	87	365	2,093	1	0	0	3.
Coot	12,246	18,235	30,819	22,244	14,490	3,251	1,983	2,995	33,552	22,588	2,300	6,990	171.
TOTAL WATERFOWL	25,528	171,834	176,138	88,034	98,778	34,093	14,226	39,024	261,178	68,697	17,656	42,827	1,038.
TOTAL DUCKS Corresponding Period 1988-89	12,505	40,053	131,237	89,238	46,042	13,956	6,096	8,882	100,123	77,313	37,068	16,484	578.

Weather Conditions: Hot summer; mild fall; cold winter; dry warm spring.Hunting Conditions & Success 1.09 ducks per manday.

APPENDIX 4

Table 6. Mammal bird census on Utah Division of Wildlife Resources waterfowl management areas, expressed as monthly average, 1960-61.

SPECIES	JULY	AUGUST	SEPT.	OCTOBER	NOV.	DEC.
Grebe nered	6,000	800	100	20		10
Western	2,100	600	80	40		
Pelican	600	1,400	2,100	400	10	
Cormorant	100	50	400	50		
G. B. heron	120	170	50	80	10	10
Egret	350	300	150	10		
Night heron	200	120	80	50		
Ibis	4,300	1,200	50	20		
Hawk sparrow	10	20	10	20	10	10
Marsh	40	80	10	60	20	30
Other		10	10	20	10	10
Engles		1	1	10	1	10
Pheasant	50	60	50	90	60	20
Killdeer	100	300	20	20		
Snipe	40	150	25	80	10	20
Villet	40	70	600			
Dowitcher	350	11,700	5,400	3,200		
Avocet	22,300	38,000	6,200	7,000	600	
Stilt	4,500	12,000	1,400	750		
Phalarope	400,000	100,000	800	20,000		70
Gull Calif.	30,000	20,000	100	80	30	
Franklin	1,100	500	80			
Other	10	80		10		
Tern foraster	400	400	20			
Black	100	170				
Dove	100	200	150	10		
Owl	10	30	10	10	10	
Swallows	15,000	20,000	1,400	600		
Magpie	150	80	80	150	50	40
Raven	20	20	20	20	10	10
Wren	200	700	200	60		
Meadowlark	30	50	70	220	10	
Blackbird red	10,000	800	150	780		
Yellow-headed	4,500	900	100	400		
Other	100	20	30	200	600	300
Sparrows	200	700	200	360	100	20
Other: shrike, plover, kingbird, sandpiper, crane	700	180	100	2,400	5,100	100
Total monthly avg. (all birds)	505,620	211,860	20,236	37,220	6,640	660
Total use days	15,674,220	6,355,800	607,080	1,153,820	199,200	20,460
Annual bird use days	50,830,980					

JAN.	FEB.	MARCH	APRIL	MAY	JUNE
20	10	7,000	7,000	6,000	9,000
		60	100	700	1,600
	10	300	300	500	800
		10	50	100	100
40	20	200	200	100	100
		40	300	400	400
		100	200	200	200
		180	600	800	2,200
10	10	20	10	10	10
50	20	30	20	30	40
30	70	10	20		
95	60	10			
390	20	300	600	500	200
10	10	1,800	1,500	1,700	1,600
10	30	200	200	50	40
		300	800	700	50
		100	17,000	10,000	8,000
		15,000	12,000	15,000	18,000
		3,200	3,100	7,000	9,000
		100	35,000	100,000	300,000
400	1,550	31,000	21,000	20,000	22,000
		400	900	1,000	1,000
		10	10	20	50
		10	200	300	400
		10	50	200	500
			100	100	80
10	10	10	10	5	10
		1,000	17,000	18,000	12,000
200	250	200	200	200	400
10		50	20	70	50
60	80	10,000	10,000	80,000	10,000
40	10	600	600	500	600
10	10	700	800	700	700
10	10	700	1,200	600	1,900
10	900	8,000	1,900	2,000	2,000
100	60	1,000	1,000	800	900
300	400	800	500	600	700
1,805	3,540	81,450	134,690	254,685	404,630
55,955	102,660	2,586,950	4,040,700	7,895,235	12,138,900

Table 7. Nongame bird census on Utah Division of Wildlife Resources waterfowl management areas, expressed as a quarterly average, 1989-90.

SPECIES	JULY	SEPT.	JAN	APRIL
Grebe eared	30	52	1	1,511
Western	155	10	—	32
Pelican	656	295	—	461
Cormorant	82	68	—	314
G.B. heron	114	58	16	279
Egret	699	190	—	1,006
Night heron	107	29	—	530
Ibis	1,476	98	—	5,826
Hawk sparrow	2	1	20	12
Marsh	21	16	6	25
Other	8	7	13	11
Eagles	—	—	128	7
Killdeer	55	35	25	92
Snipe	6	5	—	17
Willet	152	13	—	155
Dowitcher	605	292	—	981
Avocet	11,469	5,784	5	3,852
Stilt	6,506	4,335	—	2,045
Phalarope	1,201	95	—	2,623
Gull Calif.	3,388	1,867	125	12,845
Franklin	45	55	97	275
Other	6	—	—	48
Tern Forster	605	10	—	111
Black	—	—	—	76
Dove	26	14	—	49
Owl	3	—	—	11
Swallows	1,057	1,153	5	491
Magpie	30	30	35	44
Raven	33	21	70	25
Wren	155	16	—	320
Meadowlark	22	13	3	68
Blackbird red	114	98	82	1,191
Yellow-headed	13	10	—	422
Other	33	700	—	35
Sparrows	100	100	62	257
Others: shrike, plover, kingbird, sandpiper, crane	1,432	288	10	1,060
Total monthly avg. (all birds)	30,406	15,758	703	37,107
Total use days	2,766,946	1,433,978	63,973	3,376,737
Annual bird use days	7,641,634			

Table 5.

State of Utah Division of Wildlife Resources
WATERFOWL POPULATIONS ON MANAGEMENT AREAS IN UTAH for Period July 1980 to June 1981

SPECIES	July	Aug	Sept	Oct	Nov	Dec		Jan	Feb	Mar	Apr	May	June	TOTAL BY Species
Mallard	5850	28454	31027	27042	17349	18081		16929	21844	19045	5448	3152	6509	200690
Pintail	29600	158088	197038	122488	49493	26491		29711	107574	139861	12048	4728	36281	913401
G.W. Teal	4685	119993	139062	68328	23778	26352		38314	52018	73268	26486	1652	3979	577915
Shoveler	932	30436	48680	50961	8271	4625		4545	15494	29658	21992	5175	9891	230660
Baldpate	978	42003	76302	57831	20634	5372		3117	8410	20673	1442	304	956	238002
Gadwall	2462	43265	54939	33270	9159	986		1182	4096	9366	8750	4475	7365	179315
Clm. Teal	5631	36446	37182	6789	501	558		550	7341	15846	5922	5026	15892	137684
Redhead	3874	9729	56595	56333	3392	346		132	2977	9589	7856	5387	6578	162788
Canvasback	58	205	4172	31724	3758	227		50	439	9169	1887	112	36	51877
Ruddy	6664	5701	8590	23302	4402	425		330	356	26521	24955	11185	20070	132501
Others & Inc.	1407	6281	7049	47625	10142	4416		4152	5118	11194	5766	1677	2001	106828
TOTAL DUCKS	62141	480601	660636	525693	150879	87879		99012	225667	364190	122552	42873	109558	2931681
White Geese	2	2	2	158	239	19		1	1	1100	5	-	-	1529
Canada Geese	3526	3194	8367	7911	6356	4447		3405	4339	2634	2946	3015	4154	59294
TOTAL GESE	3528	8196	8369	8069	6595	4466		3406	4340	3734	2951	3015	4154	60823
Swan	-	-	1	3109	21044	14059		5713	4643	25021	12	2	3	73607
GOIT	62299	163853	206270	123426	34887	15284		5798	17752	54445	53936	42091	56613	836654
TOTAL WATERFOWL	127968	652650	875276	660297	213405	121688		113929	252402	447390	179451	87981	170328	3904295
TOTAL DUCKS Corresponding Period 1979-80	82005	512543	529361	396019	268939	60164		75814	131593	322159	194563	25007	112209	2710376

Weather Conditions Hot summer, mild winter, wet springHunting Conditions & Success 2.69 ducks per man.day

APPENDIX 4 CONT'D

SEASONAL ABUNDANCE OF BIRDS

32

ON THE BEAR RIVER REFUGE



When is the best time of year to see whistling swan? Are there any ducks that stay through the winter? When do the long-billed curlews arrive at Bear River and how long do they stay? How many pheasants are found on the refuge?

These and hundreds of similar questions can best be answered by referring to a series of charts showing the seasonal occurrence of many birds frequenting the Bear River Refuge. These charts also indicate the average peak numbers each species has attained over many years of record keeping at the refuge.



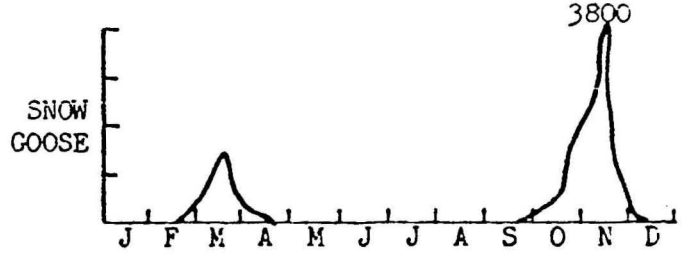
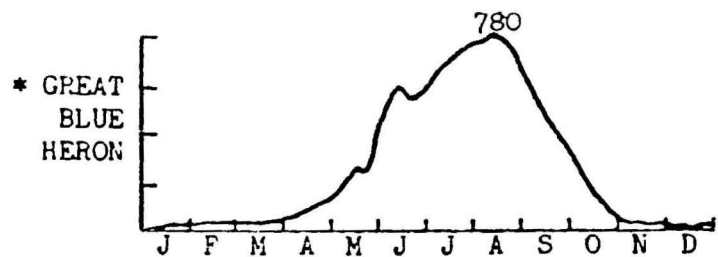
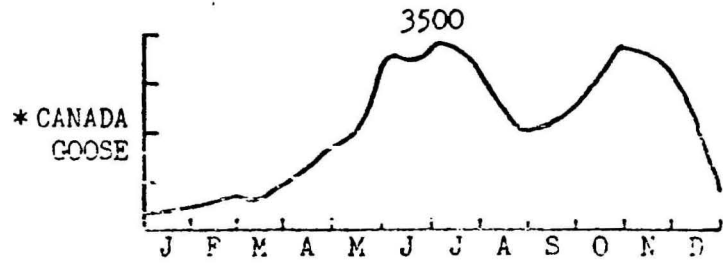
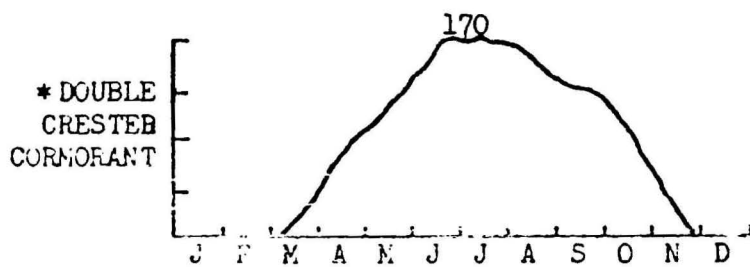
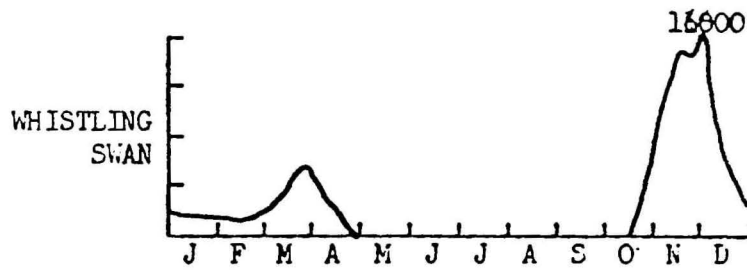
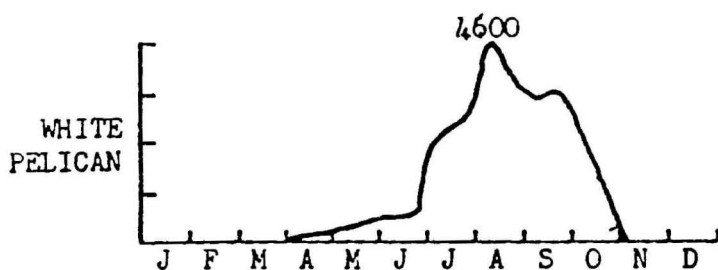
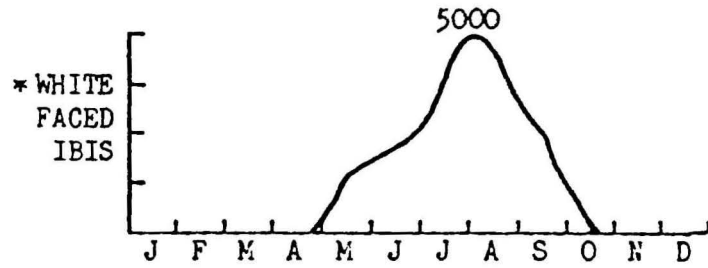
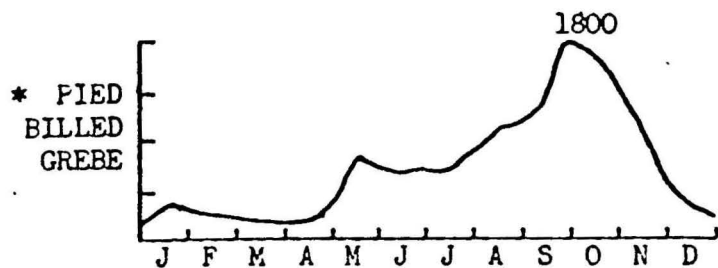
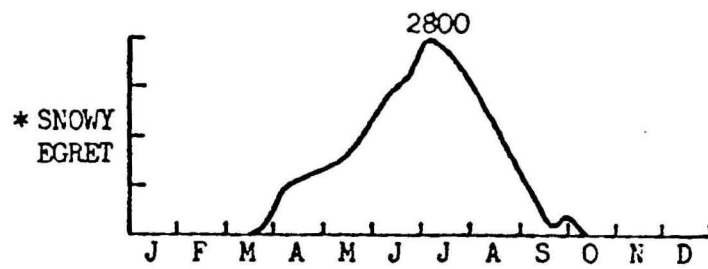
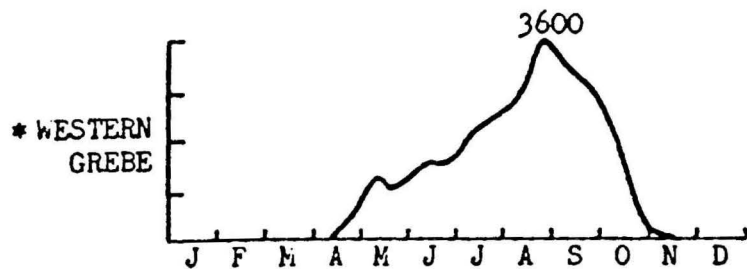
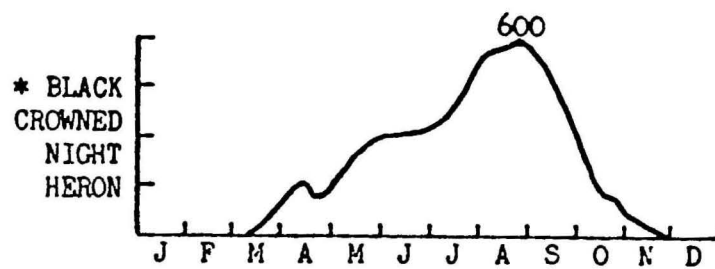
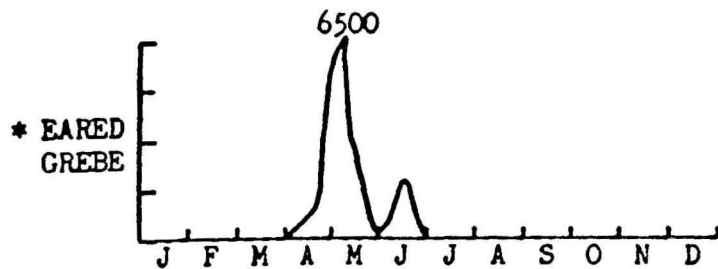
UNITED STATES DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE
BUREAU OF SPORT FISHERIES AND WILDLIFE



APPENDIX 4 CONT'D
**AVERAGE MONTHLY ABUNDANCE BY SPECIES
 OF BIRDS ON THE BEAR RIVER REFUGE**

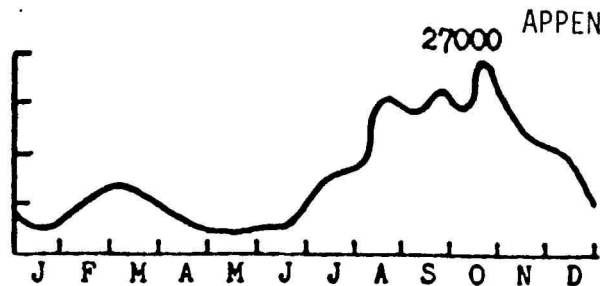
* INDICATES THOSE SPECIES THAT NEST ON REFUGE.

33

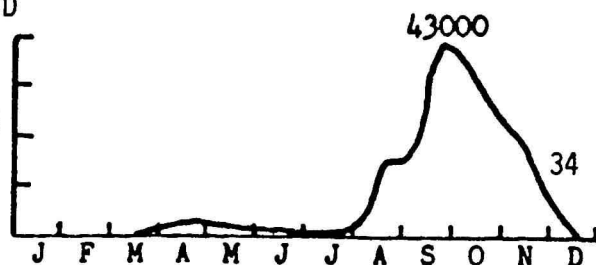


APPENDIX 4 CONT'D

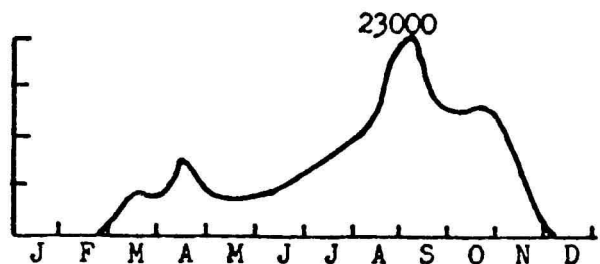
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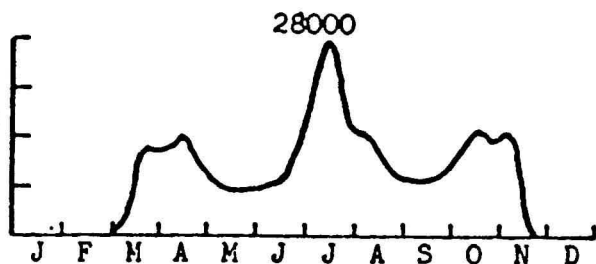
* SHOVELER



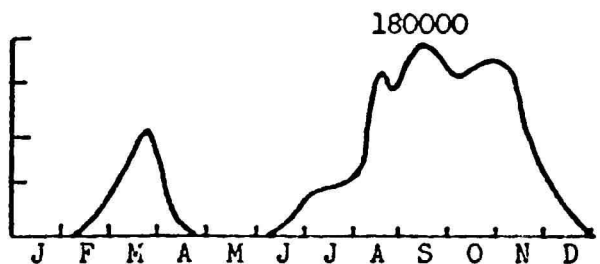
* GADWALL



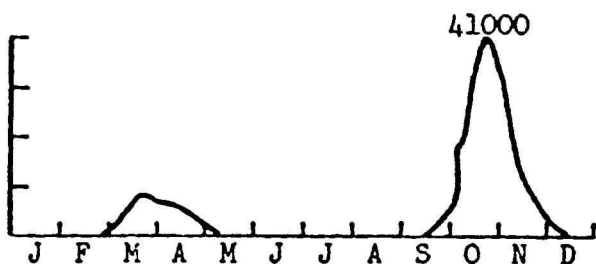
* REDHEAD



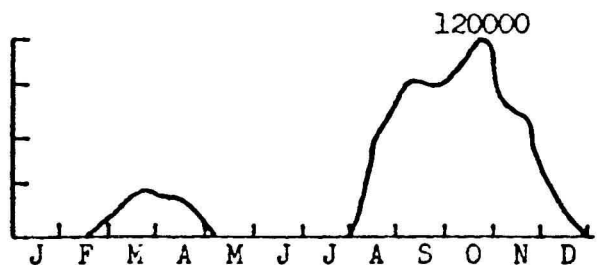
* PINTAIL



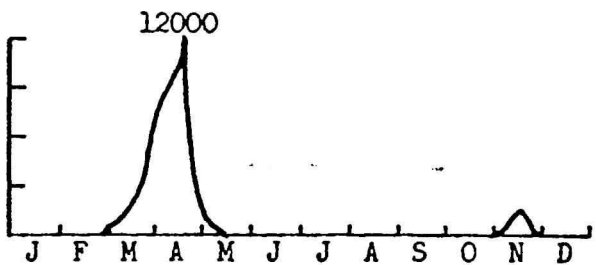
CANVASBACK



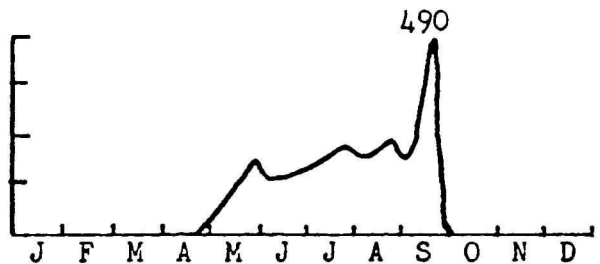
* GREEN
WINGED
TEAL



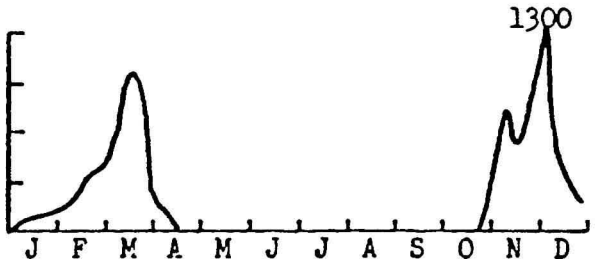
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SCAUP



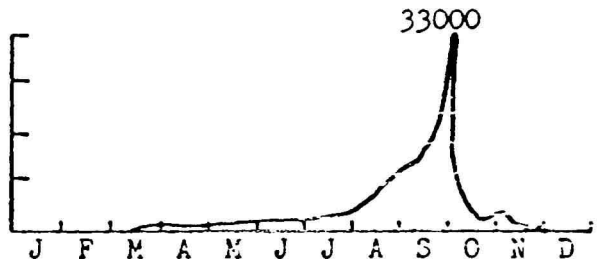
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WINGED
TEAL



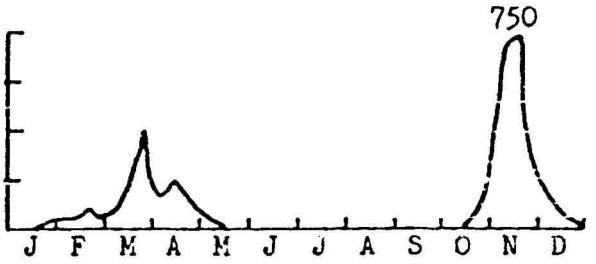
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GOLDENEYE



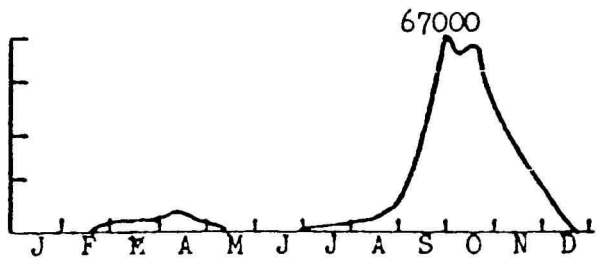
* CINNAMON
TEAL



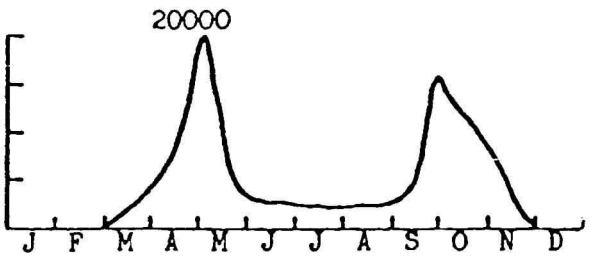
BUFFLEHEAD



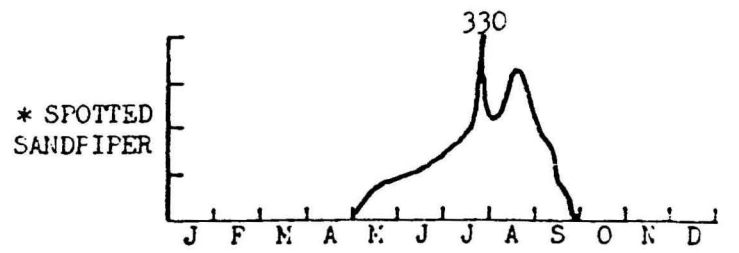
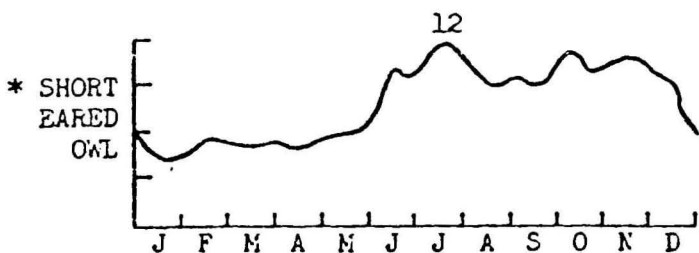
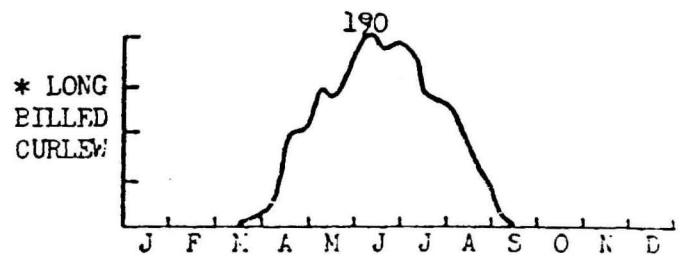
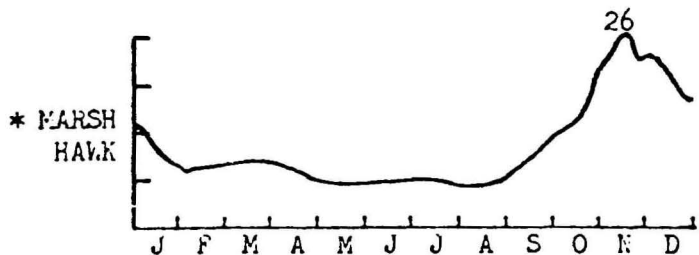
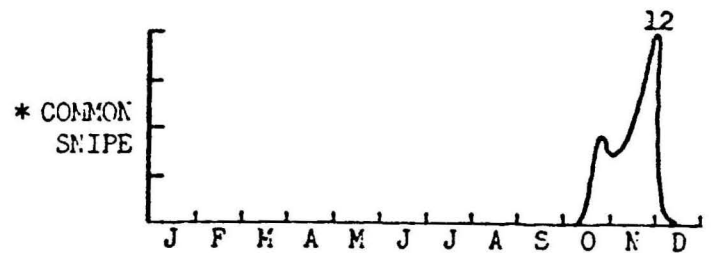
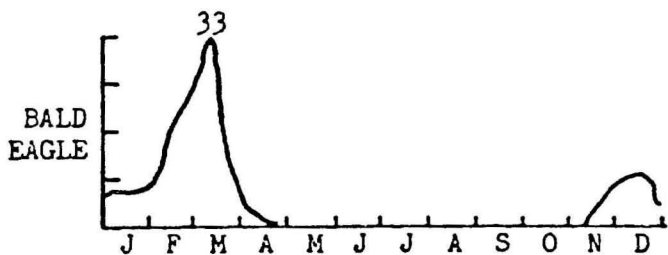
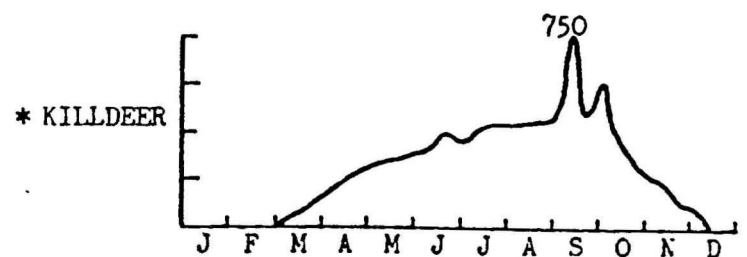
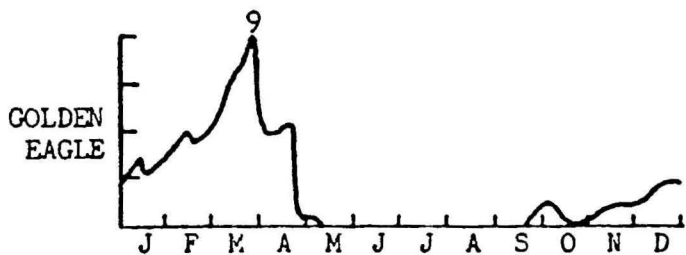
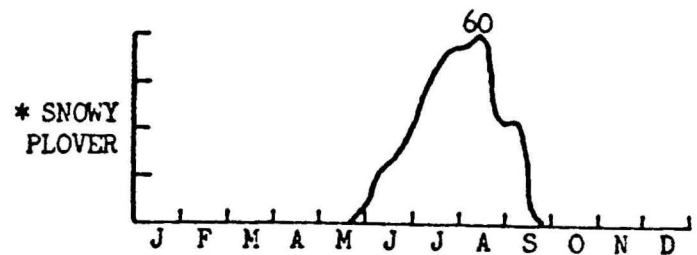
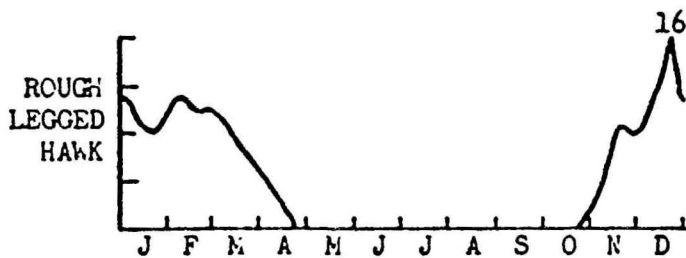
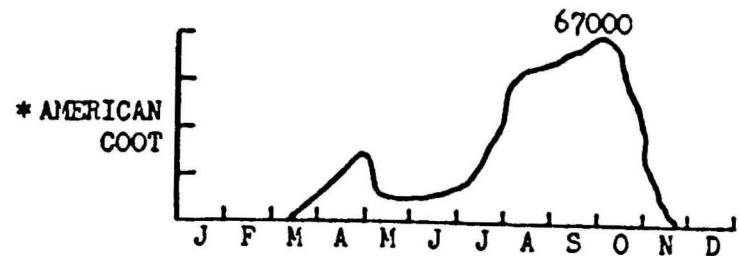
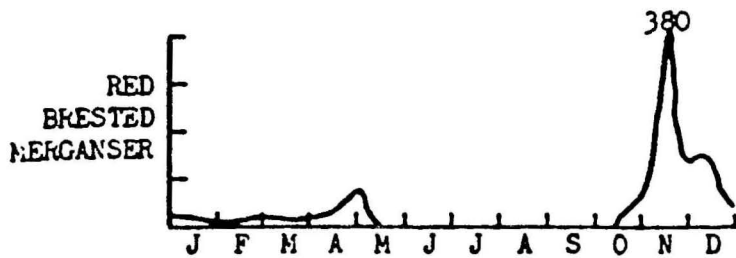
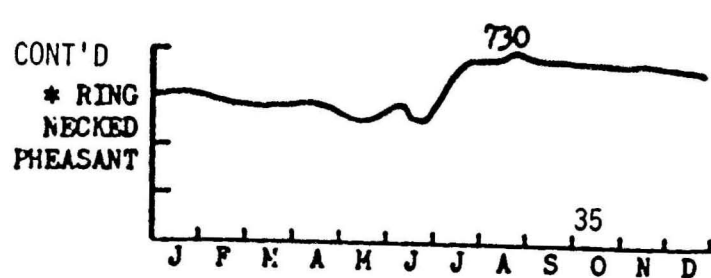
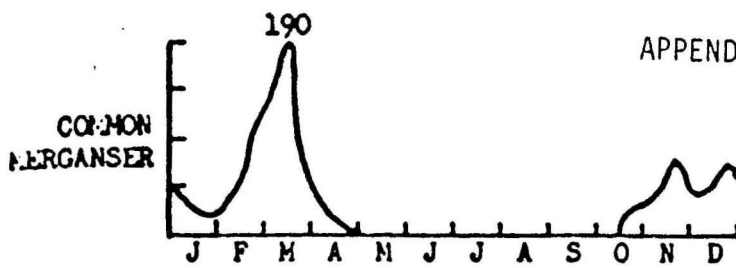
AMERICAN
WIDGEON



* RUDDY
DUCK

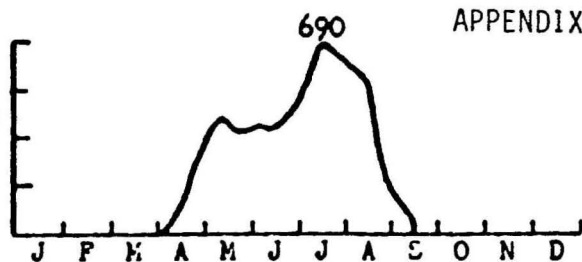


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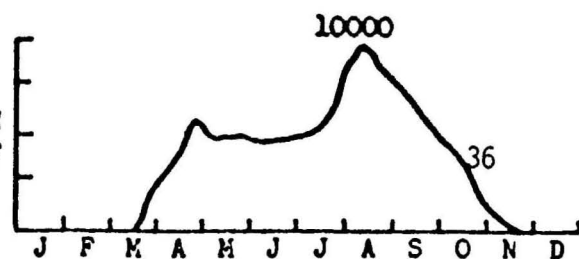


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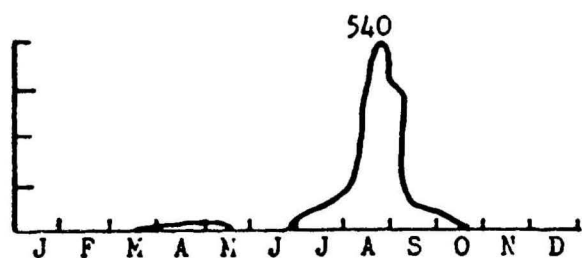
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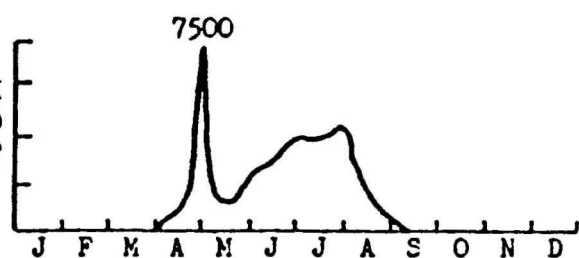
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AVOCET



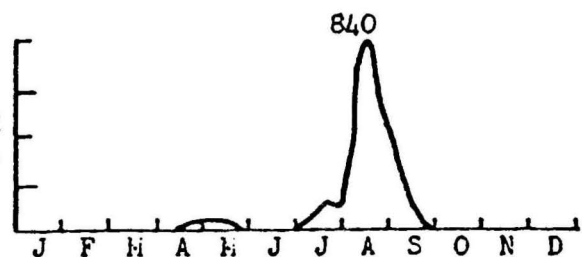
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YELLOW LEGS



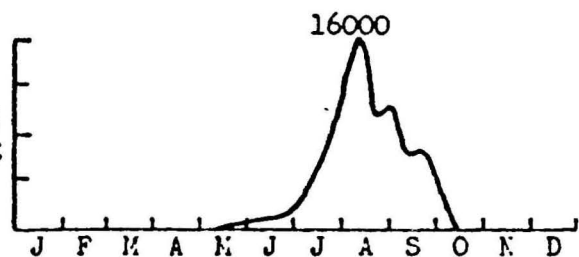
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NECKED
STILT



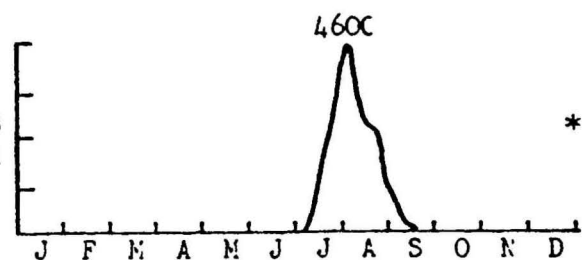
LESSER
YELLOW LEGS



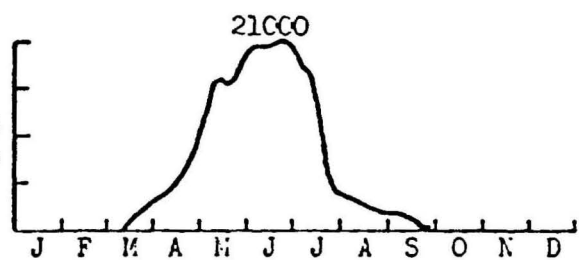
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PHALAROPE



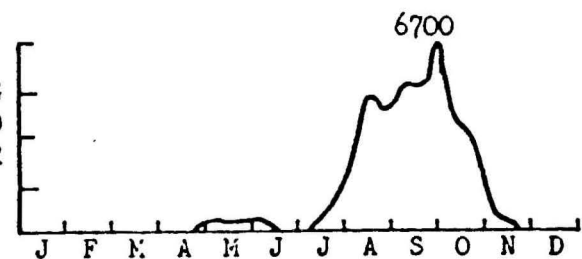
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SANDPIPER



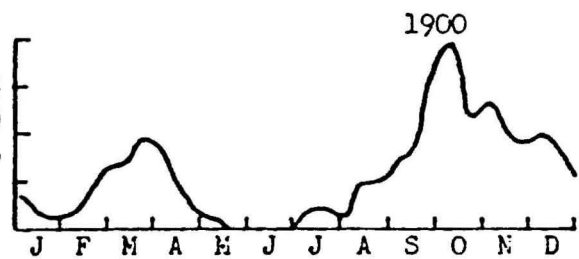
* CALIFORNIA
GULL



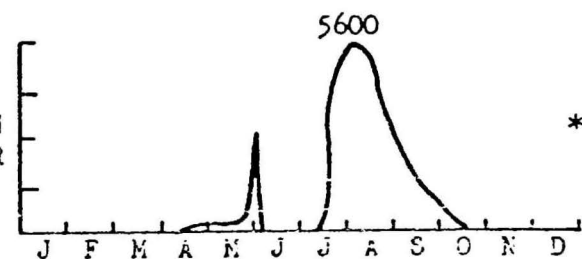
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BILLED
DOWITCHER



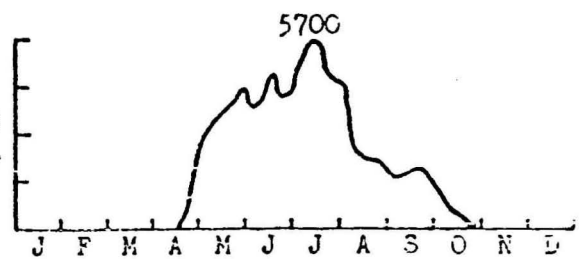
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BILLED
GULL



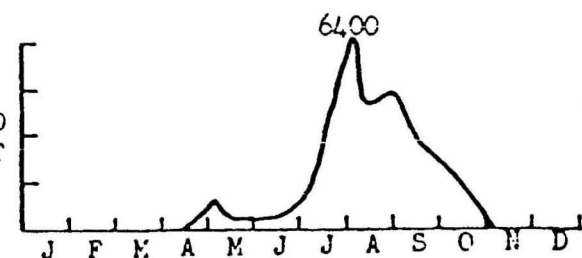
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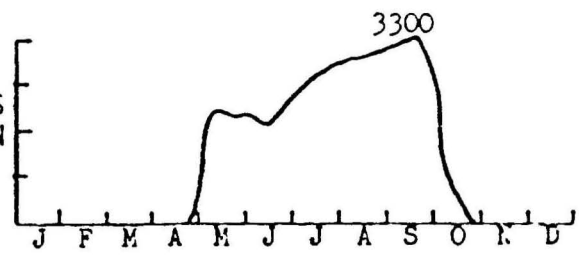
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GULL



MARELED
GODWIT

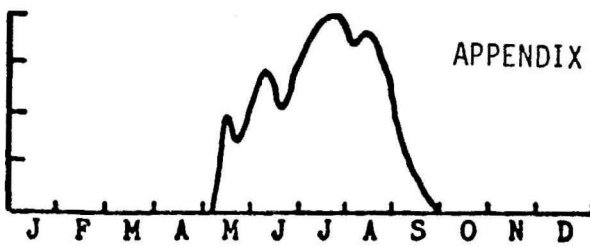


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TERN

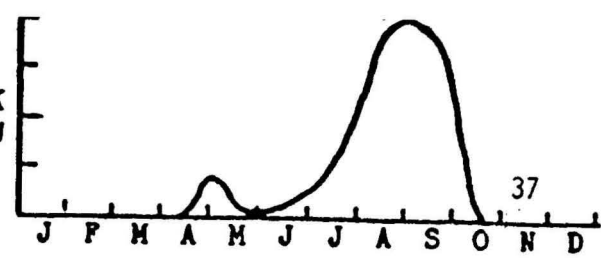


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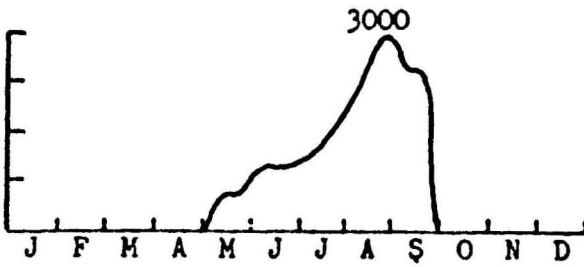
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TERN



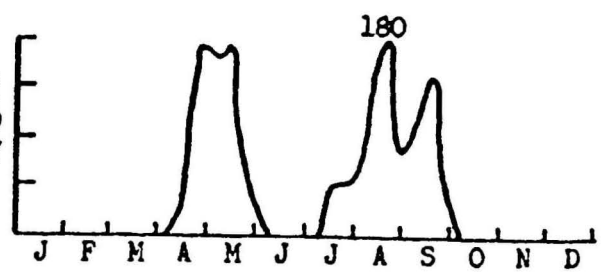
BANK
SWALLOW



* BLACK
TERN



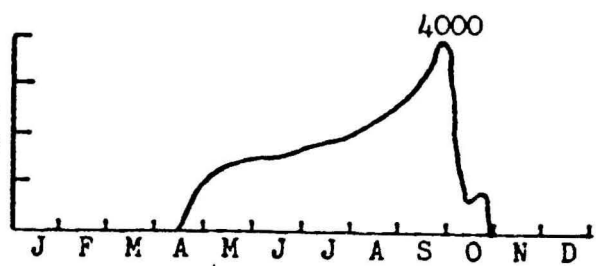
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SWALLOW



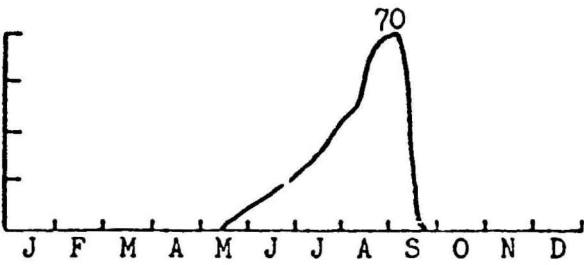
* MOURNING
DOVE



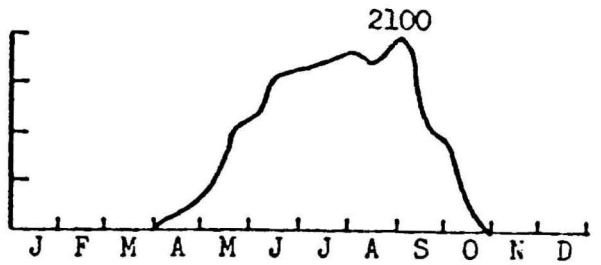
* BARN
SWALLOW



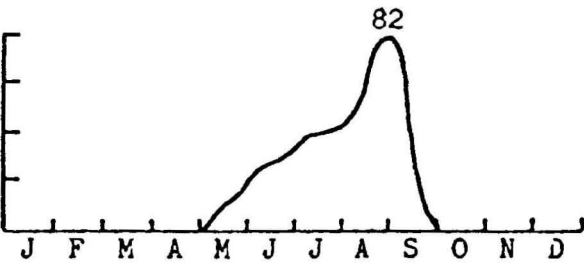
* EASTERN
KINGBIRD



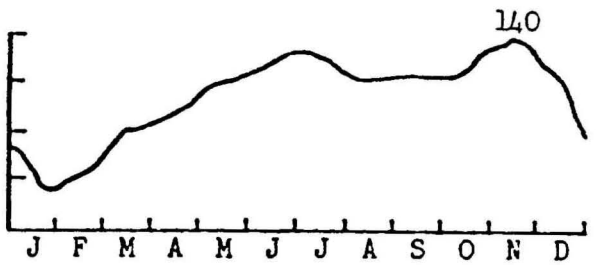
* CLIFF
SWALLOW



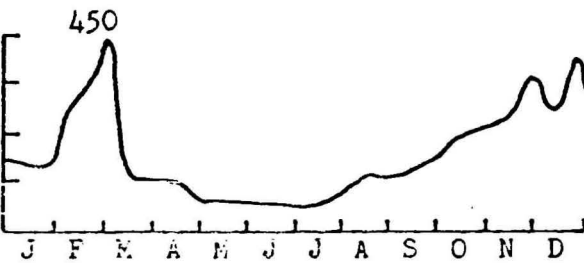
* WESTERN
KINGBIRD



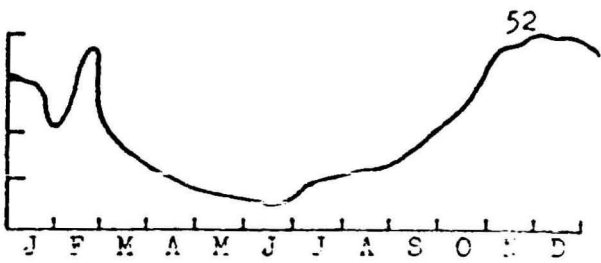
* BLACK
BILLED
MAGPIE



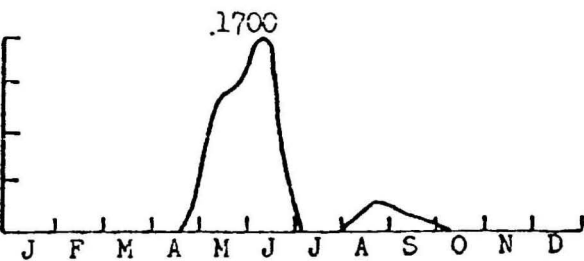
* HORNE
LARK



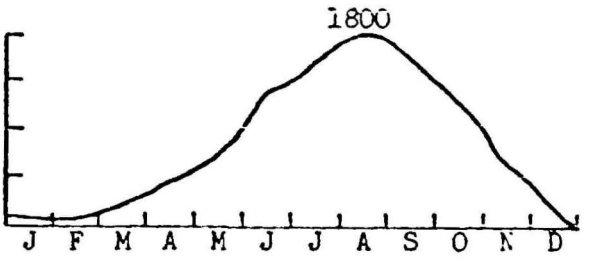
* COMMON
RAVEN



TREE
SWALLOW

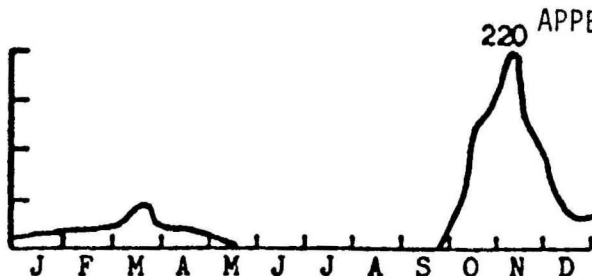


* LONG
BILLED
MARSH
WREN

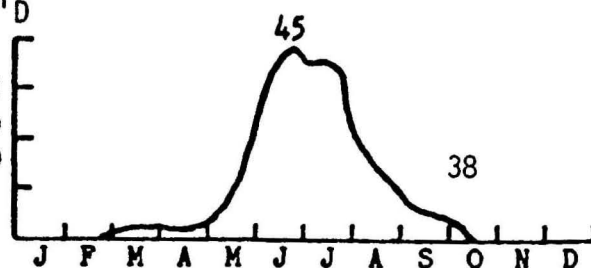


APPENDIX 4 CONT'D

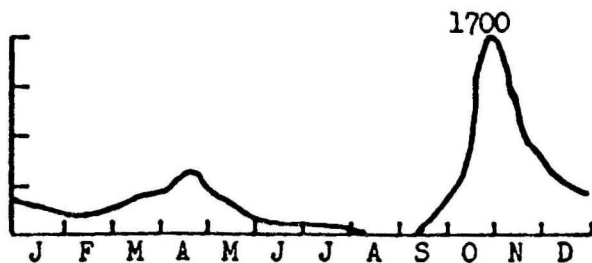
WATER
PIPIT



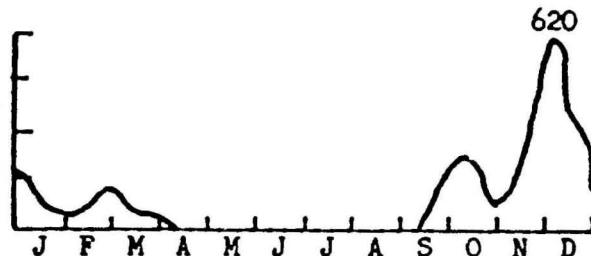
* BROWN
HEADED
COWBIRD



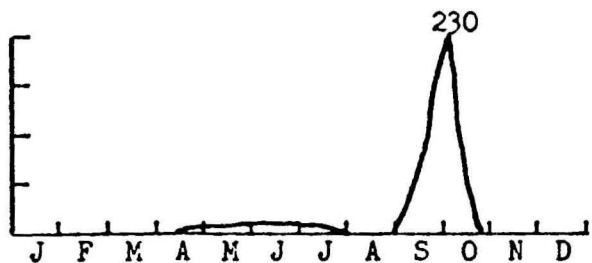
STARLING



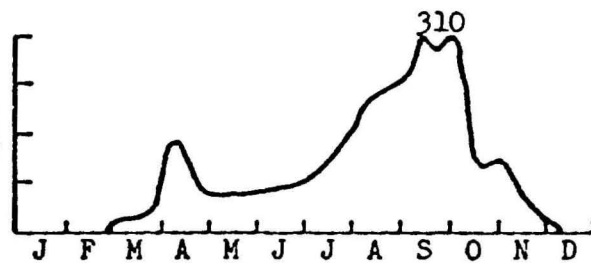
AMERICAN
GOLDFINCH



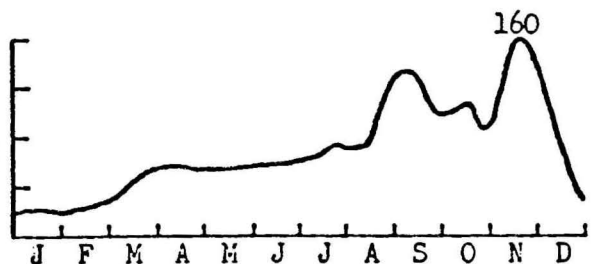
* AUDUBON'S
WARBLER



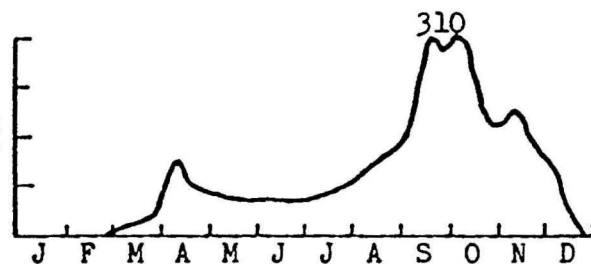
* SAVANNAH
SPARROW



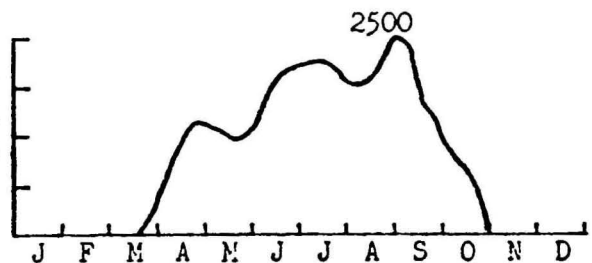
* WESTERN
MEADOWLARK



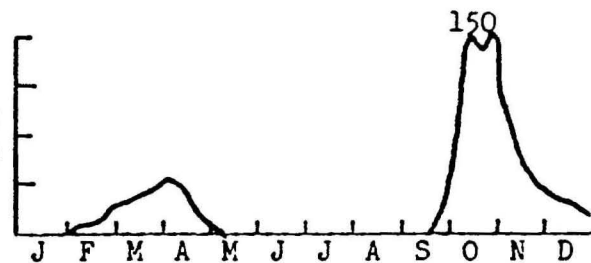
* VESPER
SPARROW



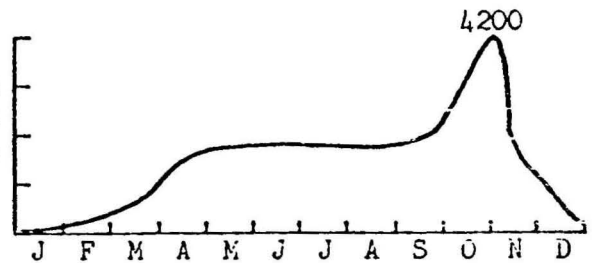
* YELLOW
HEADED
BLACKBIRD



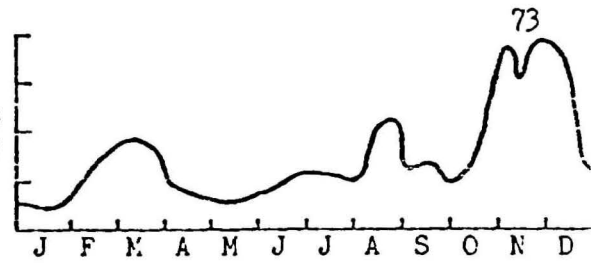
OREGON
JUNCO



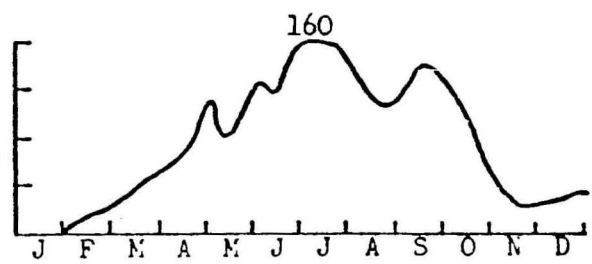
* RED
WINGED
BLACKBIRD



* SONG
SPARROW



* BREWER'S
BLACKBIRD



APPENDIX 4CONT'D

POTENTIAL BIRD AND MAMMAL SPECIES FOR DWR NORTHERN REGION
NAME STATUS

AVOCET, AMERICAN	Federal Migratory Nongame-Protected Migrant	39
BARN-OWL, COMMON	Nongame-Protected Migrant	
BITTERN, AMERICAN	Federal Migratory Nongame-Protected Migrant	
BITTERN, LEAST	Federal Migratory Nongame-Protected Migrant	
BLACKBIRD, BREWER'S	Nongame-Protected	
BLACKBIRD, RED-WINGED	Federal Migratory Nongame-Protected Migrant	
BLACKBIRD, RUSTY	Federal Migratory Nongame-Protected Migrant	
BLACKBIRD, YELLOW-HEADED	Federal Migratory Nongame-Protected Migrant	
BLUEBIRD, MOUNTAIN	Nongame-Protected Migrant	
BLUEBIRD, WESTERN	Nongame-Protected Migrant	
BOBOLINK	Nongame-Protected Pest/Crops Migrant	
BRANT	Federal Migratory Federal Migratory	
	State Sensitive Game (Consumptive Recreational) Accidental Migrant	
BUFFLEHEAD	Federal Migratory Game (Consumptive Recreational) Migrant	
BUSHTIT	Nongame-Protected	
CANVASBACK	Federal Migratory Game (Consumptive Recreational) Migrant	
CARDINAL, NORTHERN	Nongame-Protected Accidental	
CATBIRD, GRAY	Nongame-Protected Migrant	
CHAT, YELLOW-BREASTED	Nongame-Protected Migrant	
CHICKADEE, BLACK-CAPPED	Nongame-Protected	
CHICKADEE, MOUNTAIN	Nongame-Protected Migrant	
CHUKAR	Game (Consumptive Recreational) See Comments	
COOT, AMERICAN	Federal Migratory Game (Consumptive Recreational) Migrant	
DORMORANT, DOUBLE-CRESTED	Federal Migratory Nongame-Protected	

POTENTIAL BIRD AND MAMMAL SPECIES FOR DWR NORTHERN REGION
NAME STATUS

	Migrant	
COWBIRD, BROWN-HEADED	Nongame-Protected	40
CRANE, SANDHILL	Game (Consumptive Recreational)	
	Migrant	
CREEPER, BROWN	Nongame-Protected	
	Migrant	
CROSSBILL, RED	Nongame-Protected	
	Migrant	
CROSSBILL, WHITE-WINGED	Nongame-Protected	
	Migrant	
CROW, AMERICAN	Migrant	
CUCKOO, BLACK-BILLED	Nongame-Protected	
CUCKOO, YELLOW-BILLED	Nongame-Protected	
CURLEW, LONG BILLED	Federal Migratory	
	Nongame-Protected	
	Migrant	
	USFS Indicator	
DICKCISSEL	Nongame-Protected	
	Migrant	
DIPPER, AMERICAN	Nongame-Protected	
DOVE, GROUND, COMMON	Accidental	
DOVE, MOURNING	Game (Consumptive Recreational)	
	Migrant	
DOVE, ROCK	Pest/Nuisance	
	See Comments	
DOWITCHER, LONG-BILLED	Federal Migratory	
	Nongame-Protected	
DOWITCHER, SHORT-BILLED	Federal Migratory	
	Nongame-Protected	
	Accidental	
DUCK, RING-NECKED	Federal Migratory	
	Game (Consumptive Recreational)	
	Migrant	
DUCK, RUDDY	Federal Migratory	
	Game (Consumptive Recreational)	
	Migrant	
DUCK, WHISTLING, FULVOUS	Federal Migratory	
	Game (Consumptive Recreational)	
DUCK, WOOD	Federal Migratory	
	Game (Consumptive Recreational)	
	State Sensitive	
	Migrant	
DUNLIN	Federal Migratory	
	Nongame-Protected	
	Migrant	
EAGLE, BALD	Federal Endangered	
	Federal Migratory	
	Nongame-Protected	
EAGLE, GOLDEN	Nongame-Protected	
	Sensitive	
EGRET, CATTLE	Federal Migratory	
	Nongame-Protected	
	Migrant	
EGRET, GREAT	Nongame-Protected	
	Federal Migratory	
	Migrant	
	Accidental	
EGRET, SNOWY	Federal Migratory	

POTENTIAL BIRD AND MAMMAL SPECIES FOR DWR NORTHERN REGION
NAME STATUS

41

FALCON, PEREGRINE	Nongame-Protected Migrant Federal Endangered Recovery plan approved by Director, FWS State Endangered Nongame-Protected Sensitive Biological Indicator Migrant Federal Migratory
FALCON, PRAIRIE	Nongame-Protected Migrant
FINCH, CASSIN'S	Federal Migratory Nongame-Protected
FINCH, HOUSE	Nongame-Protected
FINCH, ROSY, BLACK	Nongame-Protected
FLICKER, NORTHERN	Nongame-Protected
FLYCATCHER, ASH-THROATED	Nongame-Protected Migrant
FLYCATCHER, DUSKY	Nongame-Protected Migrant
FLYCATCHER, GRAY	Nongame-Protected Migrant
FLYCATCHER, HAMMOND'S	Nongame-Protected Migrant
FLYCATCHER, OLIVE-SIDED	Nongame-Protected Migrant
FLYCATCHER, SCISSOR-TAILED	Nongame-Protected Migrant
FLYCATCHER, WESTERN	Nongame-Protected Migrant
FLYCATCHER, WILLOW	Nongame-Protected Migrant
GADWALL	Federal Migratory Game (Consumptive Recreational) Migrant
GALLINULE, PURPLE	Federal Migratory State Sensitive Game (Consumptive Recreational) Migrant
GNATCATCHER, BLUE-GRAY	Nongame-Protected Migrant
GODWIT, HUDSONIAN	Federal Migratory Nongame-Protected Migrant Accidental
GODWIT, MARBLED	Federal Migratory Nongame-Protected Migrant
GOLDENEYE, BARROW'S	Federal Migratory Game (Consumptive Recreational) Migrant
GOLDENEYE, COMMON	See Comments Federal Migratory Game (Consumptive Recreational) Migrant
GOLDFINCH, AMERICAN	Nongame-Protected

POTENTIAL BIRD AND MAMMAL SPECIES FOR DWR NORTHERN REGION
NAME STATUS

GOLDFINCH, LESSER	Migrant Nongame-Protected
GOOSE, CANADA	Migrant Federal Migratory Game (Consumptive Recreational) Migrant
GOOSE, ROSS'	State Sensitive Game (Consumptive Recreational) Accidental Migrant Federal Migratory
GOOSE, SNOW	Federal Migratory Game (Consumptive Recreational) Migrant
GOOSE, WHITE-FRONTED, GREATER	Federal Migratory Game (Consumptive Recreational) Migrant
GOSHAWK, NORTHERN	Nongame-Protected Biological Indicator
GRACKLE, COMMON	
GRACKLE, GREAT-TAILED	
GREBE, EARED	Federal Migratory Nongame-Protected Migrant
GREBE, HORNED	
GREBE, PIED-BILLED	Federal Migratory Nongame-Protected Migrant
GREBE, WESTERN	Federal Migratory Nongame-Protected Migrant
GROSBEAK, BLUE	Nongame-Protected Migrant
GROSBEAK, EVENING	Nongame-Protected
GROSBEAK, PINE	Nongame-Protected
GROUSE, BLUE	USFS Indicator Game (Consumptive Recreational)
GROUSE, RUFFED	Game (Consumptive Recreational)
GROUSE, SAGE	USFS Indicator Game (Consumptive Recreational) Biological Indicator
GROUSE, SHARP-TAILED	USFS Indicator Game (Consumptive Recreational)
GULL, BONAPARTE'S	Federal Migratory Furbearer Migrant
GULL, CALIFORNIA	Federal Migratory Nongame-Protected Migrant
GULL, FRANKLIN'S	Federal Migratory Nongame-Protected Migrant
GULL, GLAUCOUS	Federal Migratory Nongame-Protected Migrant
GULL, GLAUCOUS-WINGED	Federal Migratory Nongame-Protected Accidental

POTENTIAL BIRD AND MAMMAL SPECIES FOR DWR NORTHERN REGION

NAME	STATUS
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43

GULL, HERRING	Federal Migratory Nongame-Protected Migrant
GULL, MEW	Federal Migratory Nongame-Protected Accidental
GULL, RING-BILLED	Federal Migratory Nongame-Protected Migrant
GULL, SABINE'S	Federal Migratory Nongame-Protected Migrant
GULL, THAYER'S	Federal Migratory Nongame-Protected Migrant
GYRFALCON	Nongame-Protected Migrant Accidental
HARRIER, NORTHERN	Nongame-Protected Migrant Sensitive
HAWK, BROAD-WINGED	Nongame-Protected Migrant
HAWK, COOPER'S	Nongame-Protected Migrant Sensitive
HAWK, FERRUGINOUS	Nongame-Protected Sensitive Biological Indicator Migrant
HAWK, RED-SHOULDERED	Nongame-Protected Migrant
HAWK, RED-TAILED	Nongame-Protected
HAWK, ROUGH-LEGGED	Nongame-Protected Migrant
HAWK, SHARP-SHINNED	Nongame-Protected Migrant
HAWK, SWAINSON'S	Nongame-Protected Migrant
HERON, BLUE, GREAT	Federal Migratory Nongame-Protected Migrant
HERON, BLUE, LITTLE	Federal Migratory Nongame-Protected Migrant
HERON, GREEN-BACKED	Federal Migratory Nongame-Protected Migrant
HERON, TRICOLORED	Federal Migratory Nongame-Protected Migrant Accidental
HUMMINGBIRD, BLACK-CHINNED	Nongame-Protected Migrant
HUMMINGBIRD, BROAD-TAILED	Nongame-Protected Migrant

POTENTIAL BIRD AND MAMMAL SPECIES FOR DWR NORTHERN REGION

NAME	STATUS
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HUMMINGBIRD, CALLIOPE	Nongame-Protected Migrant
HUMMINGBIRD, MAGNIFICENT	State Sensitive Nongame-Protected Migrant Accidental
HUMMINGBIRD, RUFOUS	Nongame-Protected Migrant
IBIS, WHITE-FACED	Federal Migratory Nongame-Protected Migrant
JAEGER, LONG-TAILED	Federal Migratory Nongame-Protected Accidental
JAEGER, PARASITIC	Federal Migratory Nongame-Protected Migrant
JAY, BLUE	Nongame-Protected Migrant
JAY, GRAY	Nongame-Protected
JAY, PINYON	Nongame-Protected Migrant
JAY, SCRUB	Nongame-Protected Migrant
JAY, STELLER'S	Nongame-Protected Migrant
KESTREL, AMERICAN	Nongame-Protected Migrant
KILLDEER	Federal Migratory Nongame-Protected Migrant
KINGBIRD, CASSIN'S	Federal Migratory Nongame-Protected Migrant
KINGBIRD, EASTERN	Nongame-Protected Migrant
KINGBIRD, WESTERN	Nongame-Protected Migrant
KINGFISHER, BELTED	Nongame-Protected Pest/Livestock Migrant
KINGLET, GOLDEN-CROWNED	Nongame-Protected Migrant
KINGLET, RUBY-CROWNED	Nongame-Protected Migrant
KNOT, RED	Federal Migratory Nongame-Protected Migrant
LARK, HORNED	Federal Migratory Nongame-Protected Migrant
LONGSPUR, CHESTNUT-COLLARED	Nongame-Protected
LONGSPUR, LAPLAND	Nongame-Protected Migrant
LOON, ARCTIC	Nongame-Protected Federal Migratory Migrant
LOON, COMMON	Federal Migratory Nongame-Protected

POTENTIAL BIRD AND MAMMAL SPECIES FOR DWR NORTHERN REGION
NAME STATUS

45

	Migrant	
	See Comments	
LOON, RED-THROATED	Federal Migratory	
	Nongame-Protected	
	See Comments	
MAGPIE, BLACK-BILLED	Pest/Nuisance	
	Pest/Livestock	
	Migrant	
	See Comments	
MALLARD	Federal Migratory	
	Game (Consumptive Recreational)	
	Migrant	
MARTIN, PURPLE	Nongame-Protected	
	Migrant	
MEADOWLARK, WESTERN	Federal Migratory	
	Nongame-Protected	
	Migrant	
MERGANSER, COMMON	Federal Migratory	
	Game (Consumptive Recreational)	
	Migrant	
MERGANSER, HOODED	Federal Migratory	
	Game (Consumptive Recreational)	
	Migrant	
MERGANSER, RED-BREASTED	Federal Migratory	
	Game (Consumptive Recreational)	
	Migrant	
MERLIN	Nongame-Protected	
	Migrant	
MOCKINGBIRD, NORTHERN	Nongame-Protected	
	Migrant	
MOORHEN, COMMON	Federal Migratory	
	State Sensitive	
	Game (Consumptive Recreational)	
	Migrant	
MURRELET, ANCIENT	Federal Migratory	
	Nongame-Protected	
	Accidental	
NIGHT-HERON, BLACK-CROWNED	Federal Migratory	
	Nongame-Protected	
	Migrant	
NIGHTHAWK, COMMON	Federal Migratory	
	Nongame-Protected	
NUTCRACKER, CLARK'S	Nongame-Protected	
NUTHATCH, PYGMY	Nongame-Protected	
	Migrant	
NUTHATCH, RED-BREASTED	Nongame-Protected	
	Migrant	
NUTHATCH, WHITE-BREASTED	Nongame-Protected	
	Migrant	
OLDSQUAW	Federal Migratory	
	State Sensitive	
	Game (Consumptive Recreational)	
	Accidental	
	Migrant	
ORIOLE, NORTHERN	Federal Migratory	
	Nongame-Protected	
	Migrant	
ORIOLE, SCOTT'S	Federal Migratory	

POTENTIAL BIRD AND MAMMAL SPECIES FOR DWR NORTHERN REGION

NAME	STATUS
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46

OSPREY	Nongame-Protected Migrant Nongame-Protected Sensitive Biological Indicator Migrant
OVENBIRD	USFS Indicator Nongame-Protected Migrant Accidental
OWL, BURROWING	Federal Migratory USFS Indicator Nongame-Protected Sensitive Migrant
OWL, FLAMMULATED	Federal Migratory Nongame-Protected Sensitive Biological Indicator Migrant
OWL, GREAT GRAY	Nongame-Protected
OWL, HORNED, GREAT	Federal Migratory USFS Indicator Nongame-Protected
OWL, LONG-EARED	Nongame-Protected Migrant
OWL, SAW-WHET, NORTHERN	Federal Migratory Nongame-Protected Sensitive Biological Indicator Migrant
OWL, SHORT-EARED	Nongame-Protected Migrant
OWL, SNOWY	State Sensitive Nongame-Protected Migrant See Comments
PARTRIDGE, GRAY	Game (Consumptive Recreational)
PELICAN, BROWN	Federal Endangered Federal Migratory Nongame-Protected
PELICAN, WHITE, AMERICAN	Federal Migratory State Threatened Nongame-Protected Migrant
PHALAROPE, RED	Federal Migratory Nongame-Protected Migrant
PHALAROPE, RED-NECKED	Federal Migratory Nongame-Protected
PHALAROPE, WILSON'S	Federal Migratory Nongame-Protected Migrant
PHEASANT, RING-NECKED	Game (Consumptive Recreational)
PHOEBE, BLACK	Nongame-Protected Migrant
PHOEBE, EASTERN	Nongame-Protected Migrant

POTENTIAL BIRD AND MAMMAL SPECIES FOR DWR NORTHERN REGION

NAME	STATUS
PHOEBE, SAY'S	Nongame-Protected Migrant
PIGEON, BAND-TAILED	Game (Consumptive Recreational) Migrant
PINTAIL, NORTHERN	Federal Migratory Game (Consumptive Recreational) Migrant
PIPIT, WATER	Federal Migratory USFS Indicator Nongame-Protected
PLOVER, BLACK-BELLIED	Federal Migratory Nongame-Protected
PLOVER, GOLDEN, LESSER	Federal Migratory State Sensitive Nongame-Protected
PLOVER, MOUNTAIN	Federal Migratory Nongame-Protected Migrant USFS Indicator
PLOVER, SEMIPALMATED	Federal Migratory Game (Consumptive Recreational)
PLOVER, SNOWY	State Sensitive Nongame-Protected
POORWILL, COMMON	Federal Migratory Nongame-Protected
PTARMIGAN, WHITE-TAILED	Game (Consumptive Recreational)
PYGMY-OWL, NORTHERN	Federal Migratory Nongame-Protected Sensitive Biological Indicator
QUAIL, CALIFORNIA	Game (Consumptive Recreational)
RAIL, SORA	Federal Migratory Game (Consumptive Recreational) Migrant
RAIL, VIRGINIA	Federal Migratory Game (Consumptive Recreational) Migrant
RAVEN, COMMON	Nongame-Protected
REDHEAD	Federal Migratory Game (Consumptive Recreational) Migrant
REDPOLL, COMMON	Nongame-Protected Migrant
REDSTART, AMERICAN	Nongame-Protected Migrant
ROBIN, AMERICAN	Nongame-Protected Migrant
SANDERLING	Federal Migratory Nongame-Protected Migrant
SANDPIPER, BAIRD'S	Federal Migratory Nongame-Protected
SANDPIPER, LEAST	Federal Migratory Nongame-Protected
SANDPIPER, PECTORAL	Federal Migratory Nongame-Protected
SANDPIPER, SEMIPALMATED	Federal Migratory Nongame-Protected
SANDPIPER, SOLITARY	Federal Migratory

POTENTIAL BIRD AND MAMMAL SPECIES FOR DWR NORTHERN REGION

NAME	STATUS
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48

	Nongame-Protected
	Migrant
SANDPIPER, SPOTTED	Federal Migratory
	Nongame-Protected
	Migrant
SANDPIPER, STILT	Federal Migratory
	Nongame-Protected
SANDPIPER, UPLAND	Federal Migratory
	State Sensitive
	Nongame-Protected
SANDPIPER, WESTERN	Federal Migratory
	Nongame-Protected
SAPSUCKER, RED-NAPED	Nongame-Protected
	Migrant
SAPSUCKER, WILLIAMSON'S	Nongame-Protected
	Migrant
SAPSUCKER, YELLOW-BELLIED	Nongame-Protected
	Migrant
SCAUP, GREATER	Federal Migratory
	Game (Consumptive Recreational)
	State Sensitive
	Migrant
SCAUP, LESSER	Federal Migratory
	Game (Consumptive Recreational)
	Migrant
SCOTER, BLACK	Federal Migratory
	State Sensitive
	Game (Consumptive Recreational)
	Accidental
	Migrant
SCOTER, SURF	Federal Migratory
	Game (Consumptive Recreational)
	Accidental
	Migrant
SCOTER, WHITE-WINGED	Federal Migratory
	State Sensitive
	Game (Consumptive Recreational)
	Accidental
	Migrant
SCREECH-OWL, WESTERN	Nongame-Protected
SHOVELER, NORTHERN	Federal Migratory
	Game (Consumptive Recreational)
	Migrant
SHRIKE, LOGGERHEAD	Nongame-Protected
	Migrant
SHRIKE, NORTHERN	Nongame-Protected
	Migrant
	Federal Migratory
SISKIN, PINE	Nongame-Protected
	Migrant
SNIFE, COMMON	Federal Migratory
	Game (Consumptive Recreational)
	Migrant
SOLITAIRE, TOWNSEND'S	Nongame-Protected
	Migrant
SPARROW, BLACK-THROATED	

POTENTIAL BIRD AND MAMMAL SPECIES FOR DWR NORTHERN REGION

NAME	STATUS
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49

SPARROW, CHIPPING	Federal Migratory Nongame-Protected Migrant
SPARROW, CLAY-COLORED	Federal Migratory Nongame-Protected Migrant
SPARROW, FOX	Nongame-Protected Migrant
SPARROW, GOLDEN-CROWNED	Nongame-Protected Migrant
SPARROW, GRASSHOPPER	Nongame-Protected Migrant
SPARROW, HARRIS'	Nongame-Protected
SPARROW, HOUSE	Pest/Nuisance
SPARROW, LARK	Nongame-Protected Migrant
SPARROW, LECONTE'S	Nongame-Protected Accidental Migrant
SPARROW, LINCOLN'S	Nongame-Protected Migrant
SPARROW, SAGE	Federal Migratory Nongame-Protected Migrant
SPARROW, SAVANNAH	Nongame-Protected Migrant
SPARROW, SONG	Nongame-Protected Migrant
SPARROW, SWAMP	Federal Migratory Nongame-Protected Pest/Nuisance
SPARROW, TREE, AMERICAN	Federal Migratory Nongame-Protected Migrant
SPARROW, VESPER	Nongame-Protected Migrant
SPARROW, WHITE-CROWNED	Nongame-Protected Migrant
SPARROW, WHITE-THROATED	See Comments Nongame-Protected Migrant
SPOONBILL, ROSEATE	Federal Migratory Nongame-Protected
STARLING, EUROPEAN	
STILT, BLACK-NECKED	Federal Migratory Nongame-Protected Migrant
STORK, WOOD	Federal Endangered Recovery plan in preparation Federal Migratory Nongame-Protected Accidental
SWALLOW, BANK	Nongame-Protected Migrant
SWALLOW, BARN	Nongame-Protected Migrant
SWALLOW, CLIFF	Nongame-Protected Migrant
SWALLOW, ROUGH-WINGED, NORTHER	Nongame-Protected

POTENTIAL BIRD AND MAMMAL SPECIES FOR DWR NORTHERN REGION
NAME STATUS

SWALLOW, TREE	Migrant Nongame-Protected	50
SWALLOW, VIOLET-GREEN	Migrant Nongame-Protected	
SWAN, TRUMPETER	Migrant State Sensitive Nongame-Protected Accidental	
SWAN, TUNDRA	Migrant Federal Migratory Nongame-Protected	
SWIFT, BLACK	Migrant State Sensitive Nongame-Protected	
SWIFT, CHIMNEY	Migrant Nongame-Protected	
SWIFT, VAUX'S	Migrant	
SWIFT, WHITE-THROATED	Nongame-Protected	
TANAGER, WESTERN	Migrant Nongame-Protected	
TATTLER, WANDERING	Migrant	
TEAL, BLUE-WINGED	Federal Migratory Game (Consumptive Recreational)	
TEAL, CINNAMON	Migrant Federal Migratory Game (Consumptive Recreational)	
TEAL, GREEN-WINGED	Migrant Federal Migratory Game (Consumptive Recreational)	
TERN, BLACK	Migrant Federal Migratory Nongame-Protected	
TERN, CASPIAN	Migrant Federal Migratory Nongame-Protected	
TERN, COMMON	Migrant Federal Migratory Nongame-Protected	
TERN, FORSTER'S	Migrant Federal Migratory Nongame-Protected	
THRASHER, BENDIRE'S	Migrant State Sensitive Nongame-Protected	
THRASHER, BROWN	Migrant Nongame-Protected	
THRASHER, SAGE	Migrant Nongame-Protected	
THRUSH, HERMIT	Migrant Nongame-Protected	
THRUSH, SWAINSON'S	Migrant Nongame-Protected	
THRUSH, VARIED	Migrant Nongame-Protected	
THRUSH, WOOD	Migrant State Sensitive Nongame-Protected	

POTENTIAL BIRD AND MAMMAL SPECIES FOR DWR NORTHERN REGION
NAME STATUS

51

	Migrant
	State Sensitive
	Accidental
TITMOUSE, PLAIN	Nongame-Protected
	Migrant
TOWHEE, GREEN-TAILED	Nongame-Protected
	Migrant
TOWHEE, RUFOUS-SIDED	Nongame-Protected
	Migrant
TURNSTONE, RUDDY	Federal Migratory
	Nongame-Protected
	Accidental
VEERY	Nongame-Protected
	Migrant
VIREO, RED-EYED	Federal Migratory
	Nongame-Protected
	Migrant
VIREO, SOLITARY	Federal Migratory
	Nongame-Protected
	Migrant
VIREO, WARBLING	Federal Migratory
	Nongame-Protected
	Migrant
VULTURE, TURKEY	Nongame-Protected
	Migrant
	See Comments
WARBLER, BLACK-AND-WHITE	Nongame-Protected
	Migrant
WARBLER, BLACKPOLL	Nongame-Protected
	Migrant
WARBLER, BLUE, BLACK-THROATED	Migrant
WARBLER, CONNECTICUT	Nongame-Protected
	Migrant
WARBLER, GRACE'S	Nongame-Protected
	Migrant
WARBLER, GRAY, BLACK-THROATED	Nongame-Protected
	Migrant
WARBLER, MACGILLIVRAY'S	Nongame-Protected
	Migrant
WARBLER, MAGNOLIA	Nongame-Protected
	Migrant
WARBLER, NASHVILLE	Nongame-Protected
	Migrant
WARBLER, ORANGE-CROWNED	Nongame-Protected
	Migrant
WARBLER, PALM	Nongame-Protected
	Migrant
	Accidental
WARBLER, TENNESSEE	Nongame-Protected
	Migrant
WARBLER, TOWNSEND'S	Nongame-Protected
	Migrant
WARBLER, VIRGINIA'S	Nongame-Protected
	Migrant
WARBLER, WILSON'S	Nongame-Protected
	Migrant
WARBLER, YELLOW	Nongame-Protected
	Migrant
WARBLER, YELLOW-RUMPED	Nongame-Protected

POTENTIAL BIRD AND MAMMAL SPECIES FOR DWR NORTHERN REGION
NAME STATUS

WATERTHRUSH, NORTHERN	Migrant Nongame-Protected
WAXWING, BOHEMIAN	Migrant Federal Migratory
WAXWING, CEDAR	Nongame-Protected Federal Migratory
WHIMBREL	USFS Indicator Nongame-Protected Federal Migratory
WIGEON, AMERICAN	Nongame-Protected Migrant Federal Migratory
WIGEON, EURASIAN	Game (Consumptive Recreational) Migrant State Sensitive
WILLET	Accidental Migrant See Comments Federal Migratory
WOOD-PEWEE, WESTERN	Nongame-Protected Nongame-Protected
WOODPECKER, DOWNY	Migrant Nongame-Protected
WOODPECKER, HAIRY	Migrant USFS Indicator Nongame-Protected
WOODPECKER, LEWIS'	Migrant Nongame-Protected
WOODPECKER, RED-HEADED	USFS Indicator Nongame-Protected
WOODPECKER, THREE-TOED	Migrant Nongame-Protected
WREN, BEWICK'S	Sensitive Biological Indicator USFS Indicator Nongame-Protected
WREN, CACTUS	Migrant
WREN, CANYON	Nongame-Protected
WREN, HOUSE	Nongame-Protected
WREN, MARSH	Migrant
WREN, ROCK	Nongame-Protected
WREN, WINTER	Migrant State Sensitive Nongame-Protected
YELLOWLEGS, GREATER	Migrant Federal Migratory Nongame-Protected
YELLOWLEGS, LESSER	Federal Migratory Nongame-Protected
YELLOWTHROAT, COMMON	Nongame-Protected
BADGER	Nongame-Protected Furbearer
BAT, BIG EARED, RAFINESQUE'S	Nongame-Protected
BAT, BIG-EARED, TOWNSEND'S	Nongame-Protected
BAT, BROWN, BIG	Nongame-Protected

POTENTIAL BIRD AND MAMMAL SPECIES FOR DWR NORTHERN REGION

NAME	STATUS
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53

BAT, FREE-TAILED, BRAZILIAN	Nongame-Protected Sensitive Migrant
BAT, HOARY	Nongame-Protected Migrant
BAT, RED	State Sensitive Nongame-Protected Migrant
BAT, SILVER-HAIRED	Nongame-Protected Migrant
BAT, SPOTTED	Nongame-Protected
BEAR, BLACK	Nongame-Protected
BEAVER	Furbearer Recovery plan approved by Director, FWS
BISON	Game (Consumptive Recreational)
BOBCAT	Furbearer Game (Consumptive Recreational)
CAT, RINGTAIL	Furbearer
CHIPMUNK, CLIFF	Nongame-Protected
CHIPMUNK, LEAST	Nongame-Protected
CHIPMUNK, UINTA	Nongame-Protected
CHIPMUNK, YELLOW-PINE	State Sensitive Nongame-Protected
COTTONTAIL, DESERT	Game (Consumptive Recreational)
COTTONTAIL, NUTTALL'S	Game (Consumptive Recreational)
COYOTE	Pest/Livestock
DEER, MULE	Game (Consumptive Recreational)
ELK (WAPITI)	USFS Indicator Game (Consumptive Recreational) Biological Indicator Pest/Crops
ERMINE	See Comments Furbearer
FERRET, BLACK-FOOTED	State Endangered Furbearer Federal Endangered
FISHER	Furbearer Extirpated See Comments State Sensitive
FOX, GRAY	Furbearer
FOX, KIT	Furbearer
FOX, RED	
GOAT, MOUNTAIN	Game (Consumptive Recreational) Sensitive See Comments
GOPHER, POCKET, BOTTA'S	Pest/Crops
GOPHER, POCKET, NORTHERN	Nongame-Protected Pest/Nuisance Pest/Crops See Comments
HARE, SNOWSHOE	Game (Consumptive Recreational)
JACKRABBIT, BLACK-TAILED	Pest/Nuisance See Comments
JACKRABBIT, WHITE-TAILED	See Comments Pest/Nuisance
LION, MOUNTAIN	
LYNX, CANADA	State Sensitive

POTENTIAL BIRD AND MAMMAL SPECIES FOR DWR NORTHERN REGION
NAME STATUS

54

	Nongame-Protected
	Furbearer
MARMOT, YELLOW-BELLIED	Nongame-Protected
MARTEN, PINE	Furbearer
MINK	Furbearer
	Commercial
	See Comments
MOOSE	Game (Consumptive Recreational)
MOUSE, BRUSH	Nongame-Protected
	See Comments
MOUSE, CANYON	Nongame-Protected
MOUSE, DEER	Nongame-Protected
	Biological Indicator
	Pest/Nuisance
MOUSE, GRASSHOPPER, NORTHERN	Nongame-Protected
MOUSE, HARVEST, WESTERN	Nongame-Protected
MOUSE, HOUSE	Pest/Crops
MOUSE, JUMPING, WESTERN	Nongame-Protected
MOUSE, KANGAROO, DARK	
MOUSE, POCKET, DESERT	Nongame-Protected
MOUSE, POCKET, GREAT BASIN	
MOUSE, POCKET, LITTLE	
MUSKRAT	Furbearer
MYOTIS, BROWN, LITTLE	Nongame-Protected
	Migrant
MYOTIS, FRINGED	Nongame-Protected
	Migrant
MYOTIS, LONG-EARED	Nongame-Protected
	Migrant
MYOTIS, LONG-LEGGED	Nongame-Protected
	Migrant
MYOTIS, SMALL-FOOTED	Sensitive
OTTER, RIVER	State Sensitive
	Nongame-Protected
	Furbearer
PIKA	Nongame-Protected
PIPISTRELLE, WESTERN	Nongame-Protected
PORCUPINE	Nongame-Protected
PRAIRIE DOG, WHITE-TAILED	Nongame-Protected
	See Comments
PRONGHORN	Game (Consumptive Recreational)
RABBIT, PYGMY	Nongame-Protected
RACCOON	Furbearer
RAT, BLACK	Pest/Nuisance
	Pest/Crops
RAT, KANGAROO, CHISEL-TOOTHED,	See Comments
RAT, KANGAROO, ORD'S	Nongame-Protected
RAT, NORWAY	Pest/Livestock
	Pest/Crops
SHEEP, BIGHORN, ROCKY MOUNTAIN	Game (Consumptive Recreational)
	Biological Indicator
SHREW, MERRIAM'S	Nongame-Protected
SHREW, MONTANE (DUSKY)	Nongame-Protected
SHREW, PREBLE'S	Nongame-Protected
SHREW, VAGRANT	Nongame-Protected
SHREW, WATER (NORTHERN)	Nongame-Protected
SKUNK, SPOTTED	Furbearer
SKUNK, STRIPED	Furbearer
SQUIRREL, ANTELOPE, WHITE-TAIL	Nongame-Protected

POTENTIAL BIRD AND MAMMAL SPECIES FOR DWR NORTHERN REGION
NAME STATUS

55

SQUIRREL, FLYING, NORTHERN	State Sensitive
SQUIRREL, GROUND, BELDINGS	See Comments
SQUIRREL, GROUND, GOLDEN-MANTL	See Comments
SQUIRREL, GROUND, THIRTEEN-LIN	Nongame-Protected
	See Comments
	State Sensitive
	Game (Consumptive Recreational)
SQUIRREL, GROUND, TOWNSEND'S	
SQUIRREL, GROUND, UINTA	See Comments
SQUIRREL, GROUND, WYOMING	See Comments
	State Sensitive
	Nongame-Protected
	See Comments
SQUIRREL, RED	Nongame-Protected
SQUIRREL, ROCK	Nongame-Protected
	Game (Consumptive Recreational)
VOLE, HEATHER	Nongame-Protected
VOLE, LONG-TAILED	Nongame-Protected
VOLE, MEADOW	Nongame-Protected
VOLE, MONTANE	Nongame-Protected
VOLE, RED-BACKED, SOUTHERN	Nongame-Protected
VOLE, SAGEBRUSH	Nongame-Protected
VOLE, WATER	Nongame-Protected
WEASEL, LONG-TAILED	Furbearer
WOLVERINE	State Endangered
	State Sensitive
	Furbearer
	Nongame-Protected
WOODRAT, BUSHY-TAILED	Nongame-Protected
WOODRAT, DESERT	Nongame-Protected

THE IMPACT OF FLOODING ON UTAH'S MANAGED MARSHES

56

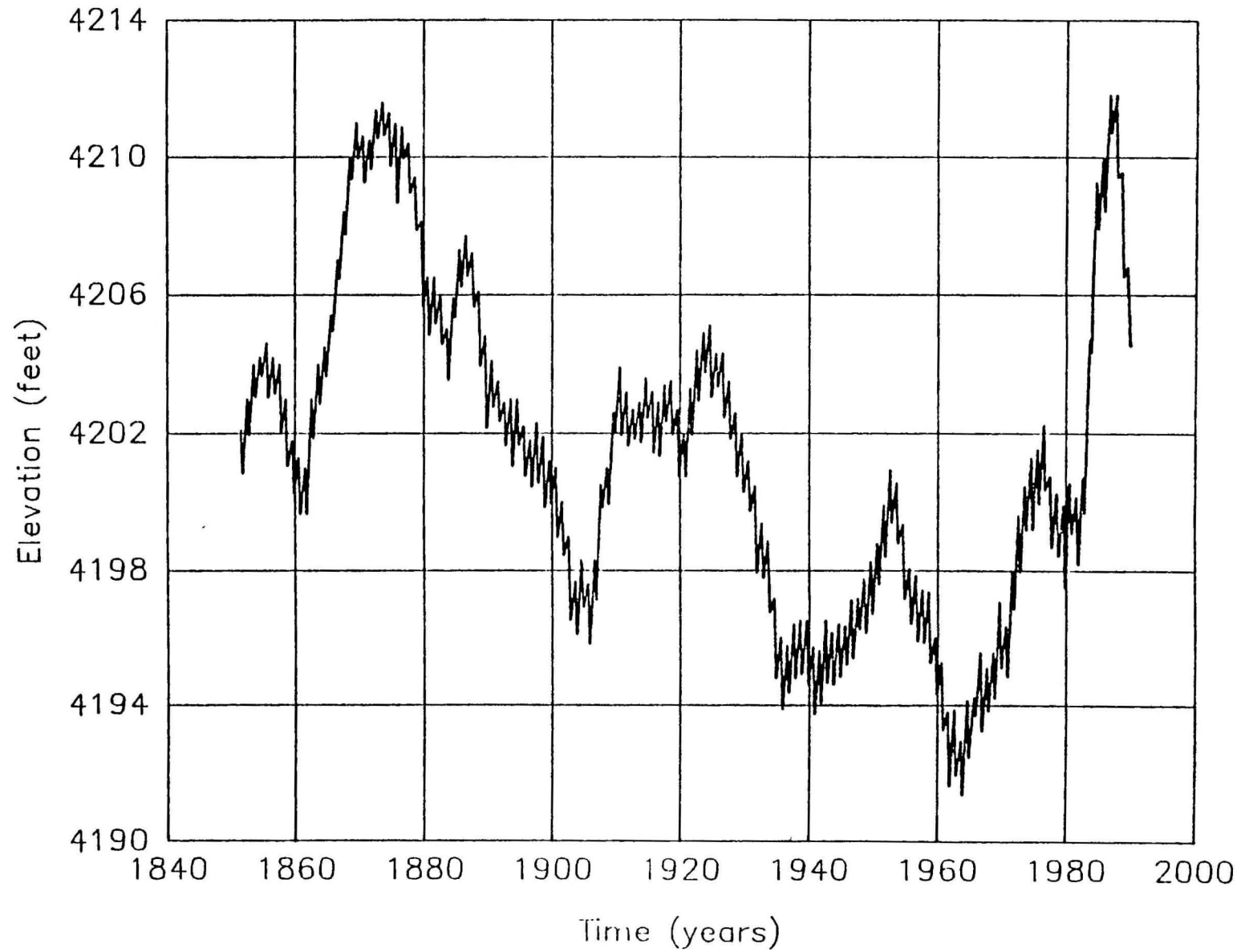
The Utah Division of Wildlife Resources owns and manages 18 waterfowl management areas (WMAs) through out the state. The focus of the waterfowl program in Utah has been on the marshes surrounding the Great Salt Lake. Over 400,000 acres of state, federal and private marsh exists along the shore of the lake and represents almost 80% of all the wetlands in the state. Great Salt Lake marshes include some of the earliest marshes developed under several federal programs. Public Shooting Grounds WMA was the first marsh acquired and developed under the Migratory Bird Conservation Act of 1929, while Ogden Bay WMA was the first marsh acquired and developed under the Federal Aid in Wildlife Restoration Act of 1937. Most of the refuges around the lake were constructed in the 1930s and early 1940s, when the lake level was relatively stable at 4,196 feet above mean sea level.

Prior to the spring floods of 1983, we were experiencing relatively stable lake levels. Annual production of waterfowl approached three-quarters of a million birds, with nongame production numbering in the multi-millions. Waterfowl harvest was relatively stable at 400,000 ducks and 35,000 geese annually. Bird-use on the Great Salt Lake marshes was over 100 million bird-use days annually, and recreationists would expend one-half million days per year. At this point, Division marshes were managed for a mean depth of 18 to 24 inches.

Starting in October 1982, the beginning of the 1983 water year, and to July 1984, the lake rose 9.25 feet (an approximate two-year period). By 1988, the lake level reached a record high and over 300,000 acres of the 400,000 acres of marsh associated with the Great Salt Lake were destroyed or rendered sterile due to deep water and salt intrusion. Over \$30 million worth of marsh, dikes, water control structures, parking facilities, fences, signs, and gates have been destroyed on state-owned marshes. Production of ducks dropped 70 percent in 1984 over the previous 5-year average. Production of geese decreased 60% percent and fall swan use dropped over 90%. Bird-use decreased from 100 million plus to 12 million plus (88 percent).

The destruction of this much habitat has had major impacts on the resource, on the waterfowl management program in the State of Utah, and public involvement with the resource (both through hunting and nonconsumptive uses). In response to the flooding situation, the State of Utah initiated a duck stamp program in 1986 to provide a funding source for the protection, restoration and development of marshes. To date, over \$1,200,000 has been raised by the sale of duck stamps and associated art work. With lake levels now receding, restoration has begun on many of our state waterfowl areas.

HISTORICAL GREAT SALT LAKE HYDROGRAPH



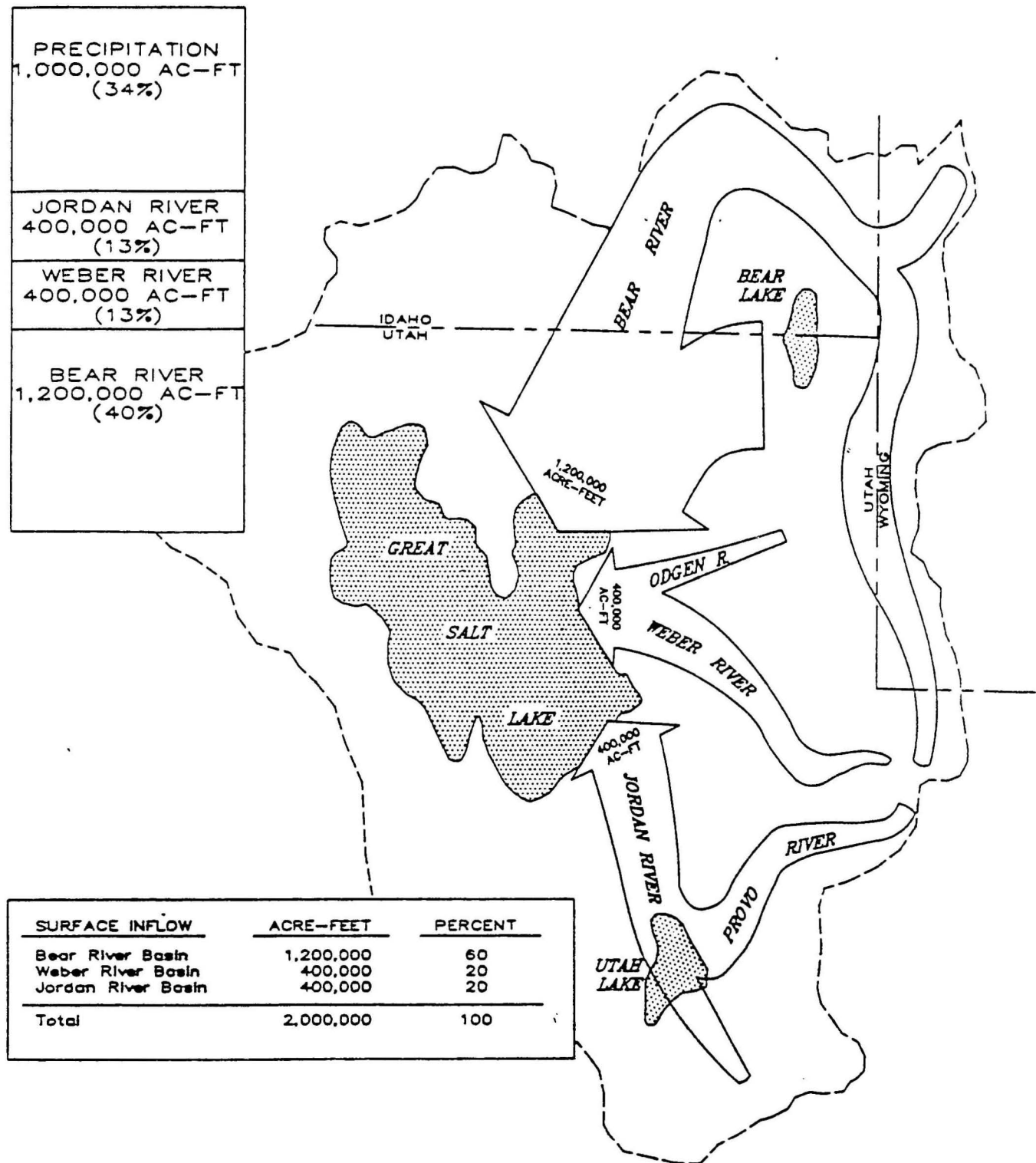
TOTAL SUPPLY
GREAT SALT LAKE

PRECIPITATION
1,000,000 AC-FT
(34%)

JORDAN RIVER
400,000 AC-FT
(13%)

WEBER RIVER
400,000 AC-FT
(13%)

BEAR RIVER
1,200,000 AC-FT
(40%)



SURFACE INFLOW	ACRE-Feet	PERCENT
Bear River Basin	1,200,000	60
Weber River Basin	400,000	20
Jordan River Basin	400,000	20
Total	2,000,000	100