Upper Miss

UPPER MISSISSIPPI RIVER WILD LIFE AND FISH REFUGE

DVE CONTINGENCY PLAN

TABLE OF CONTENTS

BACKGROUND INFORMATION

Introduction 1

Basic Refuge Data 1-2-3

Maps 4-5

Waterfowl Population Data 6-9

Water Chemistry 10

Water Resources 11

Inventory

Personnel 11

Telephone Directory 12-13-14

Equipment 15-16

Source and Availability of Chemicals 16

Technical Liaison 16

Aerial Transportation 16

Accommodations 17

Disposal Facilities 17

Safety Equipment 17-18

PREVENTATIVE MANAGEMENT

Systems Objectives and Interim Waterfowl Management Guidelines 19-20

Waterfowl Population Manipulation Techniques 21-22

EPIDEMIC CONTROL

Detection and Initial Reporting 25
Checklist 26-27
On-site Actions Preparatory to Arrival of Attack Force 27-29
Attack Force (Created and Described) 29-32
Alternative Courses of Action 32-33
Total Reporting System 33-35

DVE CONTINGENCY PLAN

UPPER MISSISSIPPI RIVER WILD LIFE AND FISH REFUGE

Introduction

This document is intended to serve as a ready reference for background information, an inventory of refuge personnel, equipment and resources and the outline of a general plan for resolving a potentially hazardous situation.

Basic Refuge Data

The Upper Mississippi River Wild Life and Fish Refuge is located on the floodplain of the Upper Mississippi River between Wabasha, Minnesota and Rock Island, Illinois. The navigation channel of the river is marked according to miles above the mouth of the Ohio River. The Upper Mississippi Refuge (hereafter referred to as UMR) extends from mile 493 to 763, approximately. Refuge headquarters is located at Winona, Minnesota, about 30 miles downstream from the northern limit of the refuge and about 125 miles from Minneapolis-St. Paul, Minnesota. It is easily reached from the Twin Cities via U.S. Highway 61. The office is located at 405 Exchange Building, Fourth and Center Streets in downtown Winona. The mailing address is Box 226, Winona, Minnesota 55987.

Six district offices are located along the river:

Wisconsin	District Manager Upper Mississippi Refuge P. O. Box 51 Cassville, Wi. 53806 (Office: upstairs Badger State Bank Bldg.)	608/725-5198
	District Manager P. O. Box 619 La Crosse, Wi 54601 (Office: in Post Office)	608/782-6039 FTS: 608/782-4210

	District Manager Route 1 Trempealeau, Wi. 54661 (Office: off Hwy. 35 about 10 mi. east of Winona)	608/539-3190
Iowa	District Manager Upper Mississippi Refuge P. O. Box 128 Lansing, Ia. 52151 (Office: Medical Offices, Inc. Bldg.)	319/533-4580
	District Manager P. O. Box 250 Guttenberg, Ia. 52052 (Office: downtown at L/D 10)	319/252-1156
Illinois	District Manager P. O. Box 250 Savanna, Il. 60174 (Office: basement of Post Office)	815/272-2732

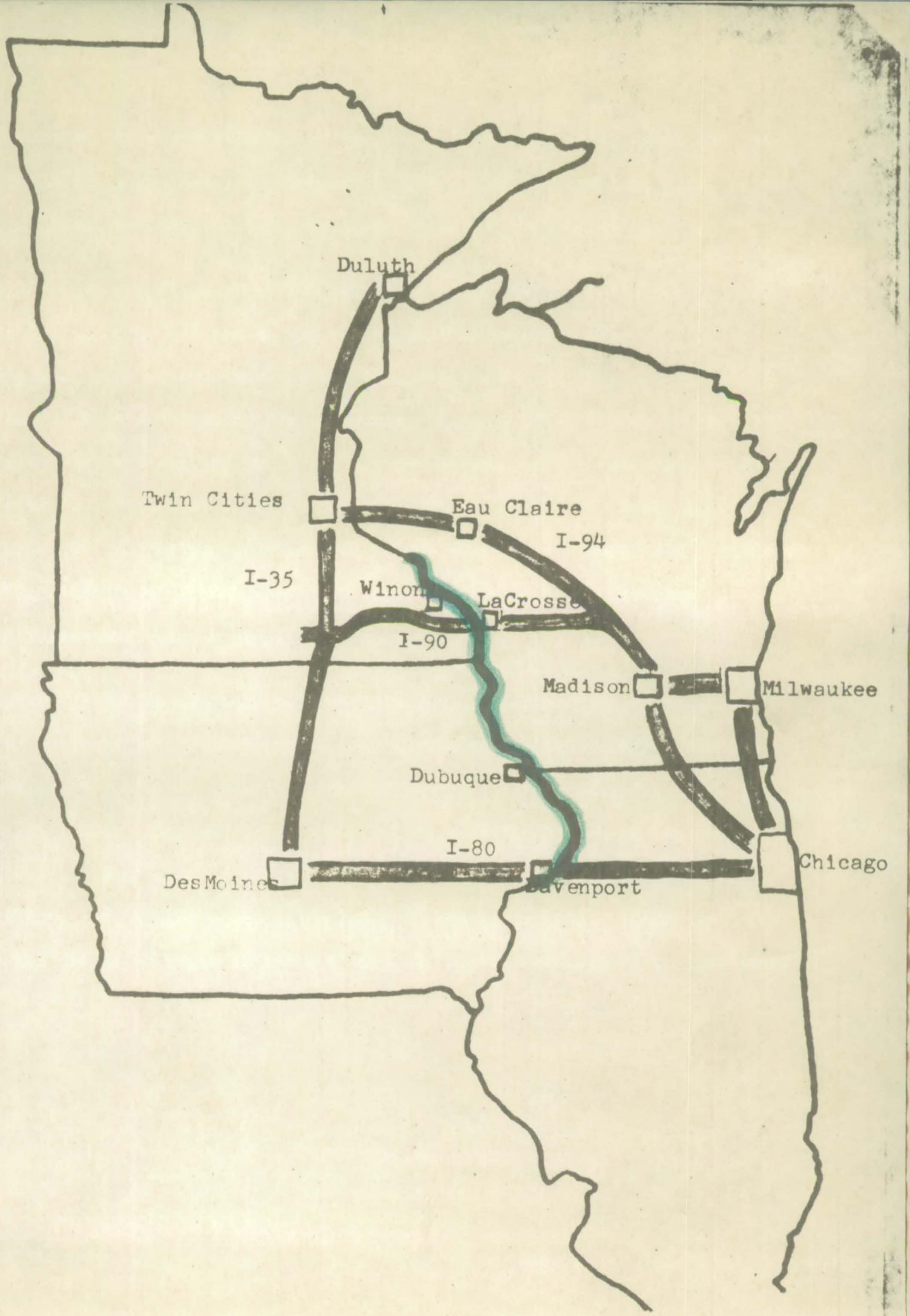
The valley of the Upper Mississippi River is a deep trench varying in the latitude of the refuge from two to five miles in width and flanked by wooded bluffs of sedimentary rocks up to 600 feet above the floodplain. The valley was carved by the drainage of a vast glacial river that drained glacial lake Agassiz until it switched its drainage to Hudson Bay. About 200 feet of sediments have already accumulated in the valley. The tributaries carry heavy silt loads over steep gradients into the relatively level Mississippi (Winona is only about 600 feet above New Orleans).

Since the 1930s, a series of low-level dams have impounded the river for purposes of commercial navigation. The dams have created a series of stair-step-like slack water pools, all or part of which of twelve are within the reach of the UMR. Each pool has three general zones--in the upstream end, water was not impounded to a great degree, and there remains extensive wooded bottoms disected by fairly deep sloughs; in the center of each pool water is deeper, extensive marsh has developed on former pasture and farm lands that were inundated or where timber was cleared prior to flooding the

pools; in the downstream end of the pools, water is rather deep, and there are large, open lake-like expanses of water with few emergent marsh plants and almost no timbered land yet above water.

The refuge comprises about 195,000 acres total, of which the Bureau owns in fee about 89,000 acres, and the balance is owned by the Corps of Engineers and administered by the refuge for wildlife purposes under a General Plan and Cooperative Agreement. Roughly 66,000 acres of the refuge is in marsh, 85,000 acres in open water, and the remaining 44,000 acres in bottomlands of which about 41,000 are timbered. Water depths range up to a minimum of nine feet in the navigation channel and a maximum channel depth of probably over 20 feet. Most backwaters are much shallower and seldome exceed five feet in depth.

Marsh vegetation consists of a variety of types, depending on water depth and bottom type. Sagittaria is very extensive; cattails, bulrushes and sedges are common. Extensive beds of aquatics like pondweeds, wild celery, water lily and lotus occur widely over the length of the refuge. There are few areas of grassland, most of the bottoms are timbered with willow, elm, silver maple and a few oaks and cottonwood. There are a few small fields of crops in Pools 11 and 13, but the acreage is insignificant.

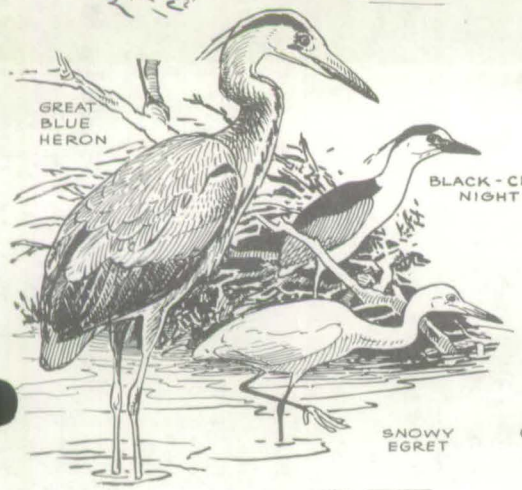

Duluth
Twin Cities
Eau Claire
I-94
I-35
Winona
LaCrosse
I-90
Madison
Milwaukee
Dubuque
I-80
Chicago
DesMoines
Davenport

UPPER MISSISSIPPI RIVER WILDLIFE AND FISH REFUGE


MUSKRAT

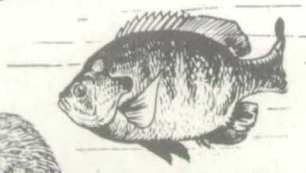

WOOD DUCK


SORA RAIL


GREAT BLUE HERON

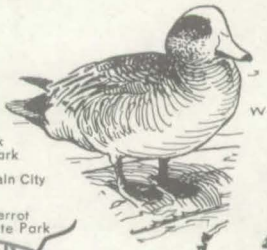
BLACK-CROWNED NIGHT HERON

SNOWY EGRET


BLUEGILL


BEAVER

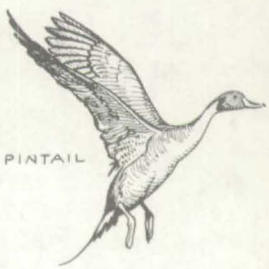

WHITE-TAILED DEER


WIDGEON


MINK


RACCOON


BALD EAGLE


PINTAIL


SCAUP


MALLARD


COOT


OTTER

Chippewa River

Wabasha

Merrick State Park

Island No. 148A

Fountain City

John A. Latsch State Park

Perrot State Park

Winona

Trempealeau

La Crescent

La Crosse

MINNESOTA - IOWA

Battle of Bad Axe

Victory

Lansing

Island No. 161

Effigy Mounds National Monument

McGregor

Prairie du Chien

Wisconsin River

Villa Louis

Peak State Park

Wyalusing State Park

Aquarium; German Architecture

Nelson Dewey State Park

Guttenburg

Cassville

Grave of Julien Dubuque; Shot tower

Dubuque

E. Dubuque

WISCONSIN - ILLINOIS

Galena

Home of General Grant

Bellevue

Bellevue State Park

Mississippi Palisades State Park

Sabula

Savanna

Clinton

Fulton

Refuge Headquarters

Refuge District Office

Sanctuary Area

Great River Road

Dam and Lock

Point of Interest

Boat Launching Site

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

UPPER MISSISSIPPI RIVER WILDLIFE AND FISH REFUGE

This refuge is an important resting area during spring and fall migrations. Several hundred thousand waterfowl stop to feed and rest—some for many weeks—before proceeding to the nesting or wintering grounds. Over 25 species are normally represented. This is a major nesting area for the classic wood duck, one of our most beautiful ducks. Hundreds of pairs of great blue herons and common egrets nest in the tall river-bottom trees. Our national bird—the bald eagle—finds a favored wintering ground here, numbering as high as 250 during some winters. A refuge birdlist, containing over 250 species, is available at refuge headquarters and the district offices.

Muskrats, minks, beavers, otters, and raccoons are the principal fur animals present. White-tailed deer are common in many sections and can be hunted in conformance with State laws.

Refuge headquarters are in the city of Winona, Minnesota. District headquarters are at Trempealeau, La Crosse, Prairie du Chien, and Cassville, Wisconsin; Lansing, Iowa; and Savanna, Illinois. Hard-surfaced highways border the refuge, among them being the "Great River Road." A major railroad parallels the refuge on each side of the river, offering an opportunity to view many parts of the area.

Hundreds of thousands of visitors are drawn to the area for fishing, boating, picnicking, camping, hunting, and bird-watching. Public use is permitted subject to the following simple regulations:

Fishing and boating are permitted in accordance with State and Federal laws. Fishermen and boaters are asked not to use backwaters of closed areas during the waterfowl hunting season.

Camping for short stays is permitted on the refuge without restriction, although there are no facilities for this activity. Extended periods of occupancy should be reported to a refuge official in the event that the visitor needs to be contacted for any reason. Camp-fires are permitted, provided precautions are taken to prevent wildfires. Developed campgrounds are available in the numerous State parks on either side of the River.

Part of the refuge area is open to public hunting in conformance with State seasons. The remaining portion is composed of sanctuaries—14 separate areas scattered the length of the refuge. Possession of firearms is prohibited except during open hunting seasons. Waterfowl hunting is the most popular. Specific hunting information is available from any of the refuge offices.

Refuge Leaflet 90. June 1961.

For sale by the Superintendent of Documents, U.S. Government Printing Office, Washington 25, D.C. – Price 5 cents

U.S. GOVERNMENT PRINTING OFFICE : 1961 OF—595991

For 284 miles along the Upper Mississippi River from above the Chippewa River near Wabasha, Minnesota, almost to Rock Island, Illinois, there stretches one of the most notable wildlife areas on the North American continent. The Upper Mississippi River Wildlife and Fish Refuge was established by an act of Congress approved June 7, 1924, and is managed by the Bureau of Sport Fisheries and Wildlife, U.S. Fish and Wildlife Service.

The river bottomlands making up the refuge vary from 1 to 5 miles in width and are hemmed in for most of the length by precipitous wooded hills and stark limestone bluffs dotted with junipers. The 195,000 acres included within the boundaries are in four States: Wisconsin 87,987, Iowa 50,707, Minnesota 32,985, and Illinois 23,261.

Eleven of the 26 locks and dams which maintain a 9-foot deep navigation channel on the Upper Mississippi River are within the refuge. Lands purchased for this project by the Corps of Engineers, U.S. Army, have been turned over to the Bureau for wildlife management along with lands purchased under the refuge act.

The refuge accommodates over 3 million visitors annually, more than any other in the United States. Many private and public access points are provided.

Waterfowl Population Data

Peak Numbers of Ducks for Last 10 Years

Year	Spring Peak No.	Date*	Fall Peak No.	Date*
1963	165,745	4/6	222,600	11/9
1964	208,401	4/11	186,978	11/7
1965	178,680	4/17	196,695	10/30
1966	172,710	4/9	198,055	11/5
1967	166,375	4/1	160,445	10/28
1968	132,030	3/23	117,912	11/2
1969	216,211	4/5	180,935	11/1
1970	210,891	4/4	185,832	10/31
1971	200,525	4/10	228,585	10/30
1972	260,534	3/31	216,265	10/28

*All dates are "week ending..."

Chronology of duck numbers during the migration periods of the past years is shown on the following two charts.

UM-6

WEEKLY DUCK POPULATIONS AND PEAK NUMBERS

Refuge: Upper Mississippi Refuge
Period: January-April, [illegible]

Week of Period:	1968	1969	1970	1971	1972
1	716	1,004	1,557	3,820	4,881
2	612	918	1,427	3,823	4,406
3	597	859	1,459	3,755	4,338
4	837	1,023	1,557	2,592	4,313
5	1,224	954	1,526	2,408	3,642
6	1,669	1,275	1,512	1,599	2,592
7	1,964	1,158	1,871	1,815	2,435
8	1,969	1,247	2,373	2,312	2,404
9	2,149	3,012	8,996	3,772	3,304
10	12,155	5,850	27,013	8,425	10,687
11	49,350	9,000	40,065	22,303	19,931
12	132,030 *	71,298	97,230	47,037	128,914
13	124,940	165,551	210,891 *	151,845	260,534 *
14	118,125	216,211 *	186,673	200,525 *	252,342
15	125,435	142,660	157,130	180,810	226,823
16	85,145	62,233	96,940	59,815	135,141
17	69,895	37,124	37,475	27,218	67,543
18		20,460			
TOTAL DAYS USE	4,144,108	4,575,229	5,258,672	4,583,059	7,939,610

* Indicates peak concentration

COMMENTS:

UM-5

WEEKLY DUCK POPULATIONS AND PEAK NUMBERS

Refuge: Upper Mississippi Refuge
Period: September-December, [redacted]

Week of Period:	1968	1969	1970	1971	1972
1	39,900	56,365	42,515	50,120	67,270
2	56,520	66,980	54,770	60,145	85,950
3	70,255	71,590	68,230	67,785	99,645
4	87,360	80,950	80,115	75,415	119,225
5	90,950	99,415	106,630	101,020	141,610
6	78,725	109,185	106,340	124,495	152,220
7	80,941	146,275	141,800	167,040	198,380
8	101,528	169,500	164,025	197,805	216,265 *
9	117,912 *	180,935 *	185,832 *	228,585 *	208,975
10	109,955	170,970	146,800	188,885	198,770
11	91,520	148,317	119,558	171,465	106,765
12	57,775	72,375	86,895	146,605	100,030
13	39,655	23,380	43,600	69,530	60,775
14	24,875	37,440	41,365	39,655	9,140
15	7,715	16,810	16,870	43,290	3,645
16	2,595	7,905	6,810	32,180	2,641
17	1,640	3,495	2,455	9,880	2,001
18		2,350	1,440	4,220	
TOTAL DAYS USE	6,507,257	8,821,735	8,568,971	12,122,110	12,413,149

* Indicates peak concentration

COMMENTS:

Geese

During the past ten years, the Canada geese peak in spring and fall has averaged under 3,000 for each period.

Swans

Swan peaks of the past ten years have averaged below 3,200 in spring and below 1,000 in fall.

Coot

Ten year averages on coot peaks are about 65,000 in spring and 182,000 in fall.

Additional information is available from Narrative Reports on file in the refuge and Regional offices.

Duck Migration Routes

Duck banding on this refuge has been concentrated on local and migrating wood ducks. Returns indicate the southern wood duck terminus concentrates in Louisiana, Texas and Mississippi with a minor fanning out to the east coast.

The states of Minnesota, Wisconsin, Iowa and Illinois, all common to the Upper Mississippi Refuge, account for 525 of 650 mallard band returns for this station. Tennessee, Arkansas, Mississippi, Louisiana, North Dakota and Michigan have provided a total of 65 returns, with Tennessee leading. Forty-five returns are from the balance of the states east of the Rockies and south of New England. Sixteen returns were received from three Canadian provinces.

No banding data is available for baldpate, canvasback and lesser scaup which are the other principal species using this refuge as a migration stop.

Water Chemistry

It is the responsibility of the refuge manager to establish contact with the Bureau's fisheries biologist in the locality and obtain a complete analysis of the water chemistry of the refuge. This analysis, plus a map giving the location of all sampling stations, should be made a part of the contingency plan.

It is recognized that such a baseline analysis will not remain sufficiently accurate for development of recommendations for disinfection of a contaminated area. However, it will acquaint the fisheries personnel with the location, sampling sites, potential problems and the logistics. They will then be in a position to respond promptly for an emergency analysis in the event of a DVE outbreak.

Bureau fisheries biologists capable of making complete water chemistry analysis are:

James W. Warren
Hatchery Biology Lab
Genoa, WI 54632
office: 608/689/2730
residence: 608/788/039

Dr. Robert Lennon, Director
Fish Control Lab
La Crosse, WI 54601
office: 608/784/9666
FTS: 608/782/4235
residence: 608/783/2802

Water Resources

Precipitation averages approximately 30 inches a year. Refuge water supplies for wildlife management purposes come from the Mississippi River, tributary streams, and local watershed runoff. The Spring Lake Pool 13 Closed Area low level dike with pump impoundment is the only major water control of any importance.

The refuge Water Management Plan, on file at the refuge headquarters and the Regional Office in the Twin Cities, deals in detail with river flows, pool acreages, water controls, etc. It is hereby made a part of this plan.

Water level control and stream flow on the Mississippi River is under the jurisdiction of the Corps of Engineers and managed for flood control and commercial navigation.

Inventory of Resources

Personnel

The refuge has a permanent staff of sixteen (16) available to assist in an emergency.

Other Bureau personnel in the State include the staff of the Necedah NWR, the staff of the Horicon NWR, two Special Enforcement Agents (St. Paul and Madison), Fishery Biologists at Genoa and LaCrosse, and an Enhancement Biologist at Stevens Point.

UMR TELEPHONE CONTACTS

Offices

Winona Headquarters	507/452-4232
Warehouse & National Signshop	507/452-5998
Trempealeau District Office	608/539-3190
LaCrosse District Office	608/782-6039
Lansing " "	319/533-4580
Guttenberg " "	319/252-1156
Cassville " "	608/725-2732
Savanna " "	815/273-2732

Personnel (Home Phones)

Ben Chio	Winona	507/454-1585
Bart Foster	"	507/452-2680
Bill Green	"	507/452-7136
Dunc Green	"	507/452-3411
Wayne Gueswel	"	507/452-1831
Jay Hammernick	"	507/454-3332
Lorraine Joswick	"	507/452-9487
Bill Shaw	"	507/452-1928
Hilma Volk	"	507/452-9744
Don Young	"	507/452-4801
Jerry Leinecke	Trempealeau	608/539-3197
Matt Kerschbaum	LaCrosse	608/788-7469
Pete Smith	"	608/782-7955
Doug Mullen	Lansing	319/544-6181
Bob Wilson	Guttenberg	319/252-1388
Bill Hutchinson	Cassville	608/725-5888
Jay Bellinger	Savanna	815/273-2084
Steve Breeser	"	815/273-2937

Other Bureau Personnel

USGMA Miles Camery, Madison WI	608/252-5237
" William Halstead, St. Paul, MN	612/725-7830
Rf. Mgr. Gerald Updike, Necedah, WI	608/565-2551
Fh. Mgr. Dave Ostergaard, Genoa, WI	608/689-2605
Rf. Mgr. Robert Personius, Mayville, WI	414/387-2658
Pl. Don Coble, Stevens Point, WI	715/346-5256
Pl. George Gard, " " "	715/346-2469

MINNESOTA CONSERVATION OFFICERS

Name:	Radio #	Address	Station	Zip Code	Area Code	Phone No.	County
Petersen, Dale (Superv)	K 150	Box 401	Owatonna	55060	507	451-4784	Steele
Anderson, Norman	K 157	1623 Poplar Dr.	Red Wing	55066	612	388-2470	Goodhue
Becker, Richard	K 152	207 - 5th St. SW	Austin	55912	507	437-2110	Mower
Chapin, Thomas	K 151	420 St. Thomas	Albert Lea	56007	507	373-0523	Freeborn
Gannaway, William	K 161	37 Lennox	Winona	55987	507	452-3512	Winona
Gilbertson, John	K 158	3522 - 6th Place NW	Rochester	55901	507	282-7683	Olmsted
Ham, Phil	K 154	490 S Hill	LaCrescent	55947	507	895-2447	Houston
Hoeppner, Phil	K 159	Box 246	Wabasha	55981	612	565-4819	Wabasha
Piper, Kermit	K 153	1933 Oak St.	Hastings	55033	612	437-5936	Dakota
Rislove, Robert	K 156	Box 293	Preston	55965	507	765-3365	Fillmore
Slinger, Donald	K 155	Box 119	Owatonna	55060	507	451-0717	Steele
Rice, Paul	K 142	304 N Sherburne	Stillwater	55082	612	439-7920	Washington
Peterson, Larry	K 114	Box 622	Lindstrom	55045	612	257-8042	Chisago

IOWA OFFICERS

Purtilo, Gary-Water Patrol			Harpers Ferry	52146	319	586-2464	Iowa
Smith, Curtis (Superv)	C 35 Elkader		Strawberry Point	52076	319 319	933-6052 933-2216	(home) (office)
Downing, Berl	96-11 Decorah	215 Riverview Dr.	Decorah	52101	319	382-5102	(home)
Macheak, Wilfrid	95-7 Forest City		Forest City	50436	515	582-3553	(home)
Oden, Robert	3-13 Waukon	Northgate Addition	Waukon	52172	319	568-2724	(home)
Roemig, Alan	66-20 Osage	1020 Maple	Osage	50461	515	732-3307	(home)
Horton, John	22-7 Elkader	Box 166	Garnavillo	52049	319	964-2119	(home)
Rowley, Keith	31-47 Dubuque	Box 306	Farley	52046	319	874-3935	(home)

U. S. COAST GUARD

BMC James C. Rutledge
U. S. Coast Guard — 1304 Vermillion St. — Hastings — 55033 — 612 — 437-6557

EN2 Jeff Herlihy
BM3 Joe Sieverding

WISCONSIN WEST CENTRAL DISTRICT CONSERVATION WARDENS

Name	Radio No.	Employee No.	Address	Station	Zip Code	Area Code	Phone No.	County
Anderson, Owen	C 215	02478	Rt 1, Hiawatha Park	Rice Lake	54868	715	234-2815	Barron
Barton, William	C 210	04842	Box 528	BRF	54615	715	284-5301	BRF
			Rt 1	BRF		715	284-2883	
Chaffee, Glenn	C 192	12862	Box 223	Luck	54853	715	472-2085	Polk
Clark, Calvin	C 191	14140	Box 344	Sparta	54656	608	269-6808	Monroe
Cloutier, Laurence	C 233	14279	Box 528	BRF		715	284-5301	Jackson
			715 Alder St.	BRF		715	284-2177	
Everson, James	C 206	23098	Rt 1	Cochrane	54622	608	248-2255	Buffalo
Frick, Carl	C 151	25090	818 S 19th St.	LaCrosse		608	784-2921	LaCrosse
Froggatt, David	C 232	25382	1300 W Clairemont	E. C.		715	836-2873	WCD
			Rt 1	BRF		715	284-4420	
Gurske, Gary	C 229	28755	Courthouse	Neillsville	55456	715	743-3961	Clark
			Box 182	Neillsville	55456	715	743-4227	
Hammes, David	C 157	30054	State Office Bldg	LaCrosse	54601	608	788-2534	LaCrosse
			120 S 19th St.	LaCrosse	54601	608	782-4641	
Hiebing, William	C 185	33631	Rt 1, Box 165	Prairie du Chien	53821	608	326-8377	Crawford
Holmes, John	C 240	34882	Courthouse	Menomonie	54751	715	235-9023	Dunn
			1600 10th St.	Menomonie	54751	715	235-9262	
Kincannon, Marion	C 186	41901	422 W Council St.	Tomah	54660	608	372-4375	Monroe
Kubisiak, Harold	C 161	45205	Sheila St.	Whitehall	54773	715	538-4185	Tremp.
Larkin, Kenneth	C 106	46625	Rt 4, Box 317	Chippewa Falls	54729	715	723-2267	Chippewa
Miller, Lawrence	C 142	56530	1300 W Clairemont	E. C		715	836-2936	E. C. Area
			510 16th St.	E. C.	54701	715	832-3208	
Pelikan, Joseph	C 135	63874	Courthouse	Menomonie	54751	715	235-9023	Menomonie
			Rt 6	Menomonie	54751	715	235-2979	
Radke, Douglas	C 205	68080	Box 248	Viroqua	54665	608	637-7140	Vernon
Radke, Werner	C 136	68087	1300 W Clairemont	E. C.		715	836-2938	WCD
			208 S 11th St.	BRF		715	284-4677	
Schroeder, Arthur	C 134	74703	1300 W Clairemont	E. C.		715	836-2937	E. C.
			Rt 2	Fall Creek		715	835-3053	
Sieger, John	C 245	77062	Box 65	Trempealeau	54661	608	534-6521	Tremp.
Stavlo, Omar	C 152	80315	511 6th St.	Hudson	54016	715	386-9483	St. Croix
Thornton, Thomas	C 174	84795	1236 E Durand St.	Durand	54736	715	672-8828	Pepin
Volenec, Dean	C 195	87651	Box 701	Ellsworth	54011	715	273-5936	Pierce
Ward, Robert	C 133	89330	233 S St.	Amery	54001	715	268-7222	Polk

State DNR personnel of the four states are stationed nearby and can be counted on to respond to an emergency. At least 30 are available locally and many more can be obtained from other portions of the States. Numerous sportsmen's club members and students of the several colleges would also be available if needed on a volunteer or cooperative help basis.

Equipment

Refuge vehicles include:

Sedan deliveries	10
Station wagons	2
Pickups	2
Stake Truck	2
Dump Truck	1
Farm Tractor	2
Sport Boats (with motor)	8
Larger boats (with motor)	14

A similar list of equipment is available from the nearby Necedah Refuge. Agents and Biologists have another 10 vehicles (sedans, pickups and station wagons).

An automotive maintenance shop for repair and maintenance of vehicles is located at the Winona refuge headquarters. There also is a 500 gallon gasoline storage tank and pump at Winona, Trempealeau, Genoa, Guttenberg, and Cassville.

The refuge has five Minipak portable radios on frequency 42.38, one mobile unit on 42.20 - 42.38 - 42.82 - 42.88, one mobile unit on 42.20 - 42.38 - 42.50, and eleven obsolete pack sets on Bureau frequency.

Space for storage of locally-available equipment is present at the six district headquarters of the refuge and at the Winona Headquarters Warehouse.

Source and Availability of Chemicals

It is the responsibility of the Central and Regional offices to designate which (if any) chemicals are to be used on a given project. Once this has been determined, it is the responsibility of the Refuge Manager to determine the local sources and availability of the chemicals.

North Central Chemicals, Inc.
Rose and Gohres
LaCrosse, Wisc.
608/784-0024

Technical Liaison

As a result of the Lake Andes experience, it is the recommendation of the Region VI team that a Doctor of Veterinary Medicine be used to act as a liaison to the U. S. Department of Agriculture. Such a man would be able to communicate effectively with the exotic disease specialists of the USDA (who have a primary jurisdiction in such cases) and in turn translate this information to the Bureau DVE Attack Team. This individual will be appointed by the DVE Chief.

Aerial Transportation

Airport facilities suitable for light, single engine aircraft are available at Winona, Minn.; La Crosse, Cassville, and Prairie Du Chien, Wisc.; Dubuque, Iowa; Savanna, Ill. and Quad Cities area. Limited airline service available at Winona, LaCrosse, and Quad Cities airports.

Accomodations

Hotels and/or motels and eating places are available at:

Winona	Cassville
La Crosse	Dubuque
Lansing	Savanna
Prairie Du Chien	Quad Cities
Guttenberg	

Disposal Facilities

If permitted by state regulations, an on site incinerator will be constructed. Otherwise, the nearest state-approved sanitary landfill will be utilized. Birds will be hauled in covered vehicles.

Safety Equipment

The use of proper personal protective equipment during a possible outbreak of DVE is essential. There is no need to stock-pile this equipment at field stations since it is readily available on an emergency basis from:

Mine Safety Appliances
P. O. Box E
Excelsior, Minnesota 55331

Manager C. L. Schmidt can be reached at (612) 721-1088 but safety equipment purchases should be coordinated through Safety Officer Miller (612) 725-3512.

M. S. A. is a desirable source of supply since they have a contractural arrangement with General Services Administration and also because of their system of training personnel and delivery of equipment. Arrangements can be made for delivery from their Chicago office or Bureau aircraft can be scheduled to deliver the equipment in a few hours directly to the refuge.

The use of safety equipment will depend on the type of treatment used and the chemicals to be handled by personnel at the site. The size of the outbreak and the size of the crew will determine the amount of equipment necessary. The following list of safety equipment is suitable for a crew of 20 men assigned to a DVE problem:

	Cat. #	Item	Number	Amount	Total
1.	#36921 #36928	Lineman's Suit Hood	20 suits	$26.73 each	$534.60
2.	#36727	Neoprene Gloves	2 doz. pr.	13.94 doz.	27.88
3.	#457153 #94007	Air Mask (SCBA) Cylinder	2 sets 10 each	380.00 each 82.50 each	760.00 825.00
4.	#457076 #81524	Gas Mask Canisters	20 each 100 each	100.50 each 10.90 each	2,010.00 1,090.00
5.	#456975 #457135	Cover Lense Nosecup	1 pk. 20 each	7.00 pk. 8.70 each	7.00 174.00
6.	#454819	Pres. Spec. Kit	10 each	6.65 each	66.50
					$5,494.88

The above equipment is fine, provided the personnel involved are trained in the use of the equipment. Mine Safety Appliance, under GSA contract, will supply the equipment and also train personnel in its use. The equipment is all Bureau of Mines approved, and will do the kind of job we will need should extensive chemical treatment be necessary. The use of the lineman's suits will eliminate the necessity of purchasing new clothing daily, and is re-usable over an extended period of time, providing it is showered clean daily. The material is durable and waterproof.

PREVENTATIVE MANAGEMENT

Very little factual information exists on the manner in which DVE is transmitted. It has not been definitely established that DVE is density-dependent; some of the incidences on record occurred where there were few birds and sparse spacing. Similarly, it has not been established that stress stimulates DVE carriers to shed the virus. Nevertheless, it is a matter of record that crowding does cause stress in some species and there are strong indications that stress may stimulate DVE carriers to release the virus. In any event, a contagious disease--once activated--has a rate of spread and an ultimate total impact directly proportionate to the density and numbers of the population.

There are also suggestions that weather may contribute to the shedding of the virus. It should be emphasized, however, that cold weather is not necessarily implied here. Some of the most persistent eruptions of DVE in muscovie ducks in Pennsylvania and New York have occurred regularly in May. Indications are that it is inclement extremes which are conducive to stress. Examples may be abrupt changes in temperature--hot or cold--, extended periods of rain, etc. These facts tend to discount the probability that DVE will evidence geographical propensities. We should therefore expect DVE and prepare to deal with it at any latitude, during any season, and in any climate.

Sanitation as a factor in DVE eruption is also highly suspect. Although the water quality at Lake Andes was good--based on 14 chemical analyses--(and very subjective standards)--it is a fact that filth is the most common denominator in all prior recorded incidences of DVE in the United States. Stagnation is a function of water depth and flowage, among other things, and stagnation leads to filth when animal wastes are deposited in significant quantities.

The matter of body wastes is also though to be a key factor in the transmission of DVE, although this has not been definitely established. Since the nature of DVE involves extensive internal hemorrhaging in the intestinal tract, there is usually a discharge of body fluids, including blood, incorporated with the fecal matter of infected birds. If the virus is, in fact, transmitted through feces, this then lends another dimension to crowding as a factor in the occurrence of DVE.

Until such time as the epidemiology is thoroughly research, the refuge manager will have to rely on the information developed by the U.S.D.A. and Bureau information (attached) from the Lake Andes outbreak.

It has been emphatically stated from a number of sources, both within and without the Bureau that there is justification to discourage large concentrations of waterfowl. We are fully aware that in some situations breaking and/or dispersing waterfowl is inadvisable, for a number of reasons. In some instances the consequences of dispersal many have an even greater impact than the DVE potential.

Some of the concern for the dispersing of waterfowl concentrations include the anxiety such activity may cause the State Conservation Department and the general public. If an undesirable concentration occurs on State or private lands, who is going to make the dispersal effort? The State Directors should be briefed and brought into the planning process at the earliest possible time.

The most practical solution at the present time is to continue with the policy developed from the System Objectives and the Interim Waterfowl Management Guidelines which is to maintain waterfowl populations at current levels. This situation appears to be less disruptive than other alternatives presently being considered.

For the most part, increases or decreases at a certain refuge merely represent a corresponding decrease or increase at another location in the Flyway. Therefore, the present policy is essentially "status quo" until some omniscient being decrees how the matter will be resolved. The refuge manager is expected to undertake the management practices that will accomplish these population levels.

Waterfowl Population Manipulation Techniques

In the event the Bureau is required to manipulate waterfowl concentrations on the Upper Mississippi River Wild Life and Fish Refuge, it is suggested that the refuge be opened 100 per cent to waterfowl hunting. During a regular waterfowl season, approximately 20 per cent or 41,100 acres are closed to all hunting activities. These areas then tend to concentrate waterfowl. Normal or increased hunting pressure applied during periods of high concentrations will, if extended to the total refuge, act as an effective dispersal technique.

If DVE is suspected and dispersl is deemed necessary, the refuge manager will contact each state Department of Natural Resources Director involved and request that an Administrative Proclamation be issued, by that state, to open those areas on the refuge designated as closed to hunting. The proclamation will be sent to the appropriate news media (radio, television, newspapers) in the four states bordering the refuge.

If the above suggested plan does not produce the anticipated results, it is then recommended that the Bureau airplane and appropriate manpower be assembled to initiate hazing operations similar to those conducted at Horicon NWR. A copy of this 1966 hazing operation is attached and made a part of this plan.

It has been pointed out that there were numerous failures in the 1966 operation, some successes and much experience gained. In the event that the Bureau decides to undertake an effort to move ducks through UMR, the manpower and equipment can be marshalled and the operation undertaken in a much more expeditious manner.

The consequences of such action are readily apparent, as breaking up one potential DVE trouble spot (or depredation problem) merely moves it to another location.

From: Canada Goose Management in Wisconsin, 1966, With Particular Emphasis on the Horicon Marsh Problem.

SUMMARY

Increasing concentrations of Canada geese at Horicon National Wildlife Refuge in recent years are inimical to the welfare and proper distribution of this segment of the Mississippi Valley Population. Coincident with the buildup have been overharvests, short seasons, deterioration in hunting quality, increasing threat of crop depredations, and establishment of complicated and often futile regulations. In past years a bewildering assortment of management practices and regulations have attempted to alleviate the Horicon delimma.

In the autumn of 1966 a large scale experimental hazing operation was initiated on the refuge during the pre-season period of September 14 through noon, October 7, the day before the goose season began. The goal of the operation was to reduce the concentration at Horicon to 50,000 geese, and hopefully prompt some to migrate southward earlier than usual, or at least shift to other areas in Wisconsin. Legal obstacles imposed by the State of Wisconsin forced a delay and modification in the experiment's plan. Pilots were instructed to confine their aerial hazing to the refuge; this necessitated a shift in emphasis to removal of night-roosting sanctuary provided by the refuge. The operation finally got underway on September 24. In support of efforts to de-concentrate geese by making the refuge less attractive, the production of goose food on 550 acres of peatland had been eliminated.

Hazing methods utilized during the experiment included use of two fixed-wing aircraft, one helicopter, two airboats, numerous conventional boats, marsh vehicles, exploders mounted on floating platforms or placed at upland sites, firecrackers placed on caw-caw ropes or dropped from aircraft, aerial bursting shell crackers fired from shotguns, lights and scarecrows. Aircraft, airboats, and exploders seemed more effective than other hazing methods. Personnel from the Divisions of Wildlife Refuges, Management and Enforcement, and Wildlife Services cooperated in the effort; at the peak of the operation the last week 30 people participated in the experiment.

Geese were relatively easy to move from the refuge during daylight hours but at dusk they swarmed back onto the refuge from private lands to roost for the night. It appeared that the daylight hazing operation scattered geese outwards at least 10 miles, and possibly 20-25 miles from the refuge. Intensive efforts to prevent night use of the refuge were unsuccessful because of the mass numbers of geese involved and their persistence in returning to the marsh. Personnel and equipment simply were not adequate to exert sufficient stress on geese which tended to concentrate at night in

remote, largely inaccessible portions of the marsh. It was estimated that nearly 100,000 geese were present when the experiment ended. Cost of the operation was just under $25,000, about half that of the 1965 artificial feeding program.

The hazing operation failed to effect a reduction of geese at Horicon to 50,000. Furthermore, there is no evidence that there was any unusual movement into southern Illinois. Little goose use was recorded on state goose management satellite areas but abnormally high use was made of the privately managed Thornton area. No doubt, the hazing operation, along with other factors, contributed to the unprecedented goose harvest in the Horicon vicinity during the first 2 1/2 days of the season. The harvest probably was spread over a wider area and among more individual hunters than ever before. The probable breakup of some family groups may have contributed to geese being even more vulnerable to hunting pressure than in past years.

Contrary to predictions, crop depredations by geese were minimal, with damages of only $1,806.10 paid to 11 claimants. In 1965, 52 claimants were paid $15,094.60. Much improved crop and harvest conditions in 1966 were largely responsible for the reduction.

Public reaction was varied. Many major news media, some of national importance, thoroughly covered the operation. Considering the very wide attention given the experiment the volume of resulting correspondence and contacts was remarkably low. More comments from Wisconsin residents centered on quotas and regulations, than the hazing effort itself. Many people suggested reducing the population to a manageable level by allowing larger quotas.

An aerial census in mid-November indicated that 147,250 geese were present in the Horicon vicinity. A refuge report for the period of September 1 through December 31, 1966 estimated the goose-use days at 7,775,000, compared to 9,140,000 in 1965. The reduction was attributed to an earlier departure of geese in December. Thus the Horicon problem remains.

The 1966 experiment re-emphasizes the tenacity geese have in abandoning an area used traditionally in the past. We know how to increase goose use but understand little of how population trends can be halted or reversed when desired management goals are reached or exceeded. Consequently, goose managers should be alert to subtle changes in goose behavior and distribution; these are signs of potential problems. Management should be responsive to situations possibly leading to difficulties like those at Horicon. If we have learned this, we may conclude that the 1966 hazing operation was worthwhile.