

Wisconsin Department of Natural Resources
Division of Fish, Game and Enforcement
Bureau of Fish Management

Management Report No. 29

CONCENTRATIONS OF FISHERMEN ON THE
MISSISSIPPI RIVER AS DETERMINED BY
AERIAL ANGLER COUNTS BETWEEN 1963
AND 1965 WITH COMPARISONS TO PRIOR
COUNTS.

BY

Kenneth J. Wright

January 1, 1970

WISCONSIN DEPARTMENT OF NATURAL RESOURCES

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INTRODUCTION

To delineate concentrations of sport fishermen on the Mississippi River, aerial angler counts were conducted periodically from 1957 to 1965. This report summarizes the results of flights made from 1963 to 1965 and indicates the trends from 1957 to 1965. During these flights, all types of recreational activity on the river were recorded. In this way, heavily used portions of the Mississippi could be determined, and this knowledge could be applied to planning public access developments, future creel census studies, and determining general river usage by fishermen and others.

The aerial counts were conducted jointly by personnel from Minnesota and Wisconsin. Data for Pools 4 through 7 were obtained by the Minnesota Conservation Department, whose cooperation in making this information available is gratefully acknowledged.

DESCRIPTION OF THE STUDY AREA

The study area included in this report extended from Prescott, Wisconsin to the Wisconsin-Illinois boundary, a distance of 230 miles along the main channel of the Mississippi River (Figures 1 - 17).

Ten locks and dams are located within the study area. Each lock and dam is numbered and the reservoir above each dam is termed a pool and numbered correspondingly. The portion of the pool from the dam to a point 0.5 miles downstream is defined as tailwaters. Pools 3 through 11 were of primary importance in this study, although the tailwaters of Pool 12 are covered in this report. The entire study area included approximately 185,400 acres of main channel and backwaters. The lengths and areas of the pools concerned are listed in Table 1.

METHODS AND PROCEDURE

Flights were made over the entire Mississippi River boundary waters in a small observation-type airplane. Flight data obtained on the following dates were used in the analysis: May 30, and December 28, of 1963; January 26, May 2, May 30, July 4, and December 26, of 1964; May 1, May 30, and July 9, of 1965. Flights were made on a weekend or holiday when the greatest number of fishermen were expected to be on the river, and took place between 1:00 P.M. and 4:30 P.M., with the actual count usually terminating at 3:00 P.M.

During the winter flights, ice fishermen, boat fishermen, fishing houses, and cars were counted and the exact location of each recorded on a map. During summer flights, barge fishermen, fishing boats, and pleasure boats were tallied and located on maps in a similar manner.

Only data concerning boat and barge fishermen were used to define summer fishing concentrations. Bank fishermen could not be clearly observed because of obstructing vegetation during most of the fishing season. Data concerning both ice and boat fishermen were used to determine winter fishing concentrations. A few boat fishermen utilized the open water below the dams during the winter season.

RESULTS OF THE 1963 THROUGH 1965 AERIAL ANGLER COUNTS

Seven summer flights were made from 1963 through 1965. On these flights, 11,287 anglers were counted (Table 5). Of the total, 29.0 percent of the anglers were fishing in the tailwaters; 59.4 percent in the balance of the pools; and 11.6 percent in Lake Pepin.

One flight was made in the winter of 1963, two in 1964, and none in 1965. During the three winter flights, 4,596 anglers were counted (Table 8). Of this total, 2.7 percent were fishing in the tailwater area and 97.3 percent in the balance of the pools of which 2.6 percent were in Lake Pepin.

A total of 15,883 anglers were counted during the ten flights included in this report. Of these, 3,397 or 21.4 percent were located in the tailwater region (Tables 5 and 8).

Fishing barges are located almost exclusively in tailwaters, and were utilized in all pools except 3 and 6. Virtually no barge fishermen were observed during winter. Although the percentage of total anglers within each pool who made use of barges varied greatly from pool to pool, ranging from none in Pool 3 to 32.7 percent of all summer anglers in Pool 5, it is evident that this group encompasses an appreciable portion of Mississippi River fishermen. In certain areas, fishing barges provide a major source of localized fishing pressure. Barge anglers accounted for 12.0 percent of all summer fishermen tallied (Table 5).

The tailwaters of Pool 8 contained the largest concentration of anglers observed during summer flights (this was true also in 1957, 1961, and 1962). A total of 1,346 anglers were counted in Pool 8. Of these anglers, 54.1 percent (728) were fishing in the tailwaters (Table 5).

Eighty-eight percent of the anglers counted during the summers of 1963, 1964, and 1965 were boat fishing (using an average figure of 2 fishermen per fishing boat). Of these boat anglers, 21.5 percent were fishing tailwaters, and the other 78.5 percent were scattered over the rest of the pool (Table 9).

The number of fishermen in each pool varied widely over the three summers tallied, but the percentage of total anglers fishing the various pools showed only a slight change (Tables 2 - 4).

The correlation between winter and summer fishing concentration was not as consistent. For example, 21.2 percent of all winter anglers fished in Pool 9, but only 14.7 percent of all summer anglers fished in the same pool. On the other extreme, 19.5 percent of all summer anglers were located in Pool 4, whereas only 3.9 percent of the winter fishermen were found there (Tables 5 and 8).

During the winter season ice fishermen tend to group together so that large concentrations are found in relatively small areas. Surrounding territory usually contains a small number of fishermen who range outward from these concentrations into new areas.

SUMMARY OF 1963-65 AERIAL FLIGHTS DATA

1. A total of 15,883 anglers were counted during the ten flights included in the study, of which 2,308 (21.4 percent) were observed in the tailwaters and 13,575 (78.6 percent) were located in the balance of the pools.
2. During the three summers, 29.0 percent of the anglers counted were fishing in the tailwaters.
3. During the two winters, 2.7 percent of the fishermen were located in the tailwaters.
4. Fishing barges are located primarily in tailwaters and accounted for 12.0 percent of all summer fishermen tallied.
5. Percentagewise, there was little overall change in fishing intensity within each entire pool over the three summers, although actual numbers of anglers varied widely.
6. There was little correlation between summer and winter concentrations.
7. The tailwaters of Pool 8 contained the largest concentration of anglers observed during summer flights.
8. Approximately 22 percent of summer boat fishermen were located in tailwaters.
9. In general there is a direct relationship between size of pool and number of anglers.
10. Ice anglers tend to concentrate in small areas and do not range as widely as summer fishermen.

TRENDS IN ANGLER CONCENTRATION, 1957 THROUGH 1965

1. Combined data for pools 3 - 11 indicates that the proportion of anglers fishing in the tailwaters during the summer months increased by 12.5 percent from 1957 to 1965. The remainder of the pool areas experienced a 12.5 percent decrease. Only Pool 6 showed a significant decrease in the proportion of tailwater anglers to fishermen using other pool areas (Table 11).
2. The overall proportion of winter anglers fishing in the tailwaters decreased by 11.3 percent from 1957 to 1965. All ten pools experienced a decrease (Table 12).
3. Barge fishermen were not tallied in 1957. However, the percent of summer tailwater anglers fishing from barges has increased from 10.3 percent in 1960 to 12.0 percent in 1965. The fishing barges in the tailwaters of Pools 5, 8, and 9 receive the most intense barge fishing pressure, accounting for more than half of the tailwater fishermen counted in these pools.
4. Pool 4 is the largest of the 10 pools studied and it also had the largest concentration of fishermen (6 year average). The distribution of fishing pressure has remained fairly stable on most of the pools studied since 1957. The two exceptions are Pools 8 and 10 which have shown a slight decrease in angling pressure (Table 1).
5. Fishermen tend to concentrate in the same areas, year after year.
6. It was noted that ice anglers tend to concentrate into smaller areas than summer anglers. This may be affected by access and ice conditions.

Table 1. Relationship between number of anglers and size of pool, 1957 - 1965.

Pool Number	Size of Pool (Acres)	Length of Pool In Miles	Pools Ranked ^{2/} By Size	Pools Ranked By Number of Anglers ^{3/}					
				1957	1961	1962	1963	1964	1965
3	14,000 ^{1/}	14.3	6	10	10	10	10	10	10
4	38,300	14.1	1	1	2	1	3	3	1
5	12,600	14.7	8	8	7	6	7	7	7
5A	7,000	9.6	9	5	8	8	8	8	3
6	5,900	14.2	10	9	9	9	9	9	9
7	13,600	11.8	7	4	5	7	5	5	5
8	21,900	23.3	3	3	1	3	6	4	4
9	30,900	31.3	2	7	3	2	2	1	3
10	18,600	32.3	5	2	4	5	1	2	2
11	21,100	32.1	4	6	6	4	4	6	6

^{1/} Approximately 14,000 acres of Pool 3 is boundary water, the upper 3,900 acres is in the State of Minnesota.

^{2/} "1" indicates the largest size.
^{3/} "10" indicates the smallest size.

^{3/} "1" indicates the largest number of anglers.
^{3/} "10" indicates the least number of anglers.

Table 2. Anglers counted during summer, 1963.

Pool Number	Area Fished	May 30, 1963		Totals For Area Fished		Total Anglers In Pool	Percent Total In Each Pool
		Boat	Barge	Number	Percent		
3	*T	2	0	2	11.1	18	.9
	**BP	16	0	16	88.9		
4	T	22	0	22	4.6	475	24.2
	***LP	246	37	283	59.6		
	BP	170	0	170	35.8		
5	T	6	48	54	37.5	144	7.3
	BP	90	-	90	62.5		
5A	T	34	14	48	42.1	114	5.8
	BP	66	0	66	57.9		
6	T	26	0	26	28.9	90	4.6
	BP	64	0	64	71.1		
7	T	20	7	27	10.8	249	12.7
	BP	222	0	222	89.2		
8	T	68	26	94	48.5	194	9.9
	BP	100	0	100	51.5		
9	T	18	20	38	23.2	164	8.3
	BP	126	0	126	76.8		
10	T	72	19	91	30.0	303	15.4
	BP	212	0	212	70.0		
11	T	34	16	50	27.5	182	9.3
	BP	132	0	132	72.5		
12	T	16	16	32	100	32	1.6
Totals	Number	<u>1,762</u>	<u>203</u>			<u>1,965</u>	
	Percent	<u>89.7</u>	<u>10.3</u>				

*Tailwater
 **Balance of Pool
 ***Lake Pepin

Percent of total count fishing from barge = 10.3
 Percent of total count fishing from boats = 89.7
 Percent of total count fishing in tailwaters = 24.6
 Percent of total count fishing in balance of pool = 61.0
 Percent of total count fishing in Lake Pepin = 14.4

Table 3. Anglers counted during summer, 1964.

Pool No.	Area Fished	5-2-64		5-30-64		7-4-64		Totals For Area Fished		Total Anglers In Pool	Percent Total In Each Pool
		Boat	Barge	Boat	Barge	Boat	Barge	No.	%		
3	*T	0	0	0	0	2	0	2	2.5	80	1.3
	**BP	38	0	32	0	8	0	78	97.5		
4	T	32	0	10	0	4	0	46	3.9	1,170	19.4
	***LP	140	30	240	45	84	55	594	50.8		
	BP	374	0	102	0	54	0	530	45.3		
5	T	44	83	2	47	4	20	200	46.1	434	7.2
	BP	108	0	80	-	46	0	234	53.9		
5A	T	88	32	50	-	10	5	185	57.3	323	5.3
	BP	60	0	52	-	26	0	138	42.7		
6	T	40	0	20	14	2	0	76	49.4	154	2.5
	BP	22	0	20	-	36	0	78	50.6		
7	T	0	23	28	16	2	10	79	12.0	657	10.9
	BP	264	0	178	-	136	0	578	88.0		
8	T	232	44	88	28	36	22	450	57.3	786	13.0
	BP	98	0	142	0	96	0	336	42.7		
9	T	136	90	54	60	22	24	386	42.8	902	14.9
	BP	56	0	292	0	168	0	516	57.2		
10	T	40	42	34	22	8	16	162	18.0	900	14.9
	BP	118	0	354	0	266	0	738	82.0		
11	T	68	24	76	11	22	7	208	37.5	554	9.2
	BP	114	0	146	0	86	0	346	62.5		
12	T ^{1/}	20	22	28	3	8	0	81	100	81	1.3
Totals		Number	2,092	390	2,028	246	1,126	159	6,041		6,041
		Percent	84.3	15.7	89.2	10.8	87.6	12.4			

*Tailwater = 86.8
 **Balance of Pool = 13.2
 ***Lake Pepin = 31.0
 Percent of total count fishing in tailwaters = 59.1
 Percent of total count fishing in balance of pool = 9.9
 Percent of total count fishing in Lake Pepin = 9.9

^{1/}Only the tailwater section of this pool was included in the study.

Table 5. Summary of summer flight information, 1963 through 1965.

<u>Pool No.</u>	<u>Area Fished</u>	<u>Boat</u>	<u>Barge</u>	<u>Total For Area</u>	<u>Pool Total</u>	<u>Percent In Each Area</u>	<u>Percent Of Total Count</u>
3	*T	4	0	4	144	2.8	1.3
	**BP	140	-	140		97.2	
4	T	74	0	74	2,204	3.4	19.5
	BP	826	0	826		37.5	
	***LP	1,092	212	1,304		59.2	
5	T	72	254	326	776	42.0	6.9
	BP	450	-	450		58.0	
5A	T	216	51	267	601	44.4	5.3
	BP	334	-	334		55.6	
6	T	92	20	112	308	36.4	2.7
	BP	196	-	196		63.6	
7	T	102	82	184	1,266	14.5	11.2
	BP	1,082	-	1,082		85.5	
8	T	582	146	728	1,346	54.1	11.9
	BP	618	-	618		45.9	
9	T	334	260	594	1,656	35.9	14.7
	BP	1,062	-	1,062		64.1	
10	T	274	152	426	1,722	24.7	15.3
	BP	1,296	-	1,296		75.3	
11	T	282	114	396	1,098	36.1	9.7
	BP	702	-	702		63.9	
12	T	108	58	166	166	-	1.5
Total		<u>9,938</u>	<u>1,349</u>		<u>11,287</u>		

*Tailwater

**Balance of Pool

***Lake Pepin

Percent of total count fishing from boats = 88.0
 Percent of total count fishing from barge = 12.0
 Percent of total count fishing from tailwaters = 29.0
 Percent of total count fishing in balance of pool (excluding Lake Pepin) = 59.4
 Percent of total count fishing in Lake Pepin = 11.6

Table 6. Anglers counted during winter, 1963.

Pool No.	Area Fished	12-28-63		Totals For Area Fished		Total Anglers In Pool	Percent Of Total In Each Pool
		Ice	Boat	No.	%		
3	*T	0	0	-	0	12	.7
	**BP	12	0	12	100		
4	T	0	0	-	0	46	2.9
	***LP	12	0	12	26.1		
	BP	34	0	34	73.9		
5	T	0	0	-	0	81	5.0
	BP	81	0	81	100		
5A	T	6	0	6	14.0	43	2.7
	BP	37	0	37	86.0		
6	T	7	0	7	13.7	51	3.2
	BP	44	0	44	86.3		
7	T	14	0	14	8.1	172	10.7
	BP	158	0	158	91.9		
8	T	14	4	18	13.0	138	8.6
	BP	120	0	120	87.0		
9	T	3	0	6	1.3	460	28.6
	BP	453	1	454	98.7		
10	T	2	0	2	.6	360	22.4
	BP	358	0	358	.99		
11	T	0	4	4	1.6	243	15.1
	BP	237	2	239	98.4		
12	T	0	0	0	0	0	0
	BP	0	0	0	0		
Totals	Number	1,592	11	1,606		1,606	
	Percent	99.3	.7				

*Tailwater Percent of total count fishing on ice = 99.3
 **Balance of Pool Percent of total count fishing from boats = .7
 ***Lake Pepin Percent of total count fishing in tailwaters = 3.4
 Percent of total count fishing in balance of pool = 95.9
 Percent of total count fishing in Lake Pepin = .7

Table 7. Anglers counted during winter, 1964.

Pool No.	Area Fished	1-26-64		12-26-64		Totals For Area Fished		Total Anglers In Pool	Percent Total In Each Pool
		2- 1-64	Boat	Ice	Boat	No.	%		
3	*T	-	0	0	0	0	0	21	.7
	**BP	6	0	15	0	21	100		
4	T	0	0	0	0	0	0	131	4.4
	***LP	60	0	47	0	107	81.7		
	BP	8	0	16	0	24	18.3		
5	T	0	0	6	0	6	2.9	207	6.9
	BP	134	0	67	0	201	97.1		
5A	T	0	0	0	0	0	0	110	3.7
	BP	62	0	48	0	110	100		
6	T	0	0	10	0	10	16.7	60	2.0
	BP	22	0	28	0	50	83.3		
7	T	0	0	2	0	2	.3	599	19.9
	BP	297	0	300	0	597	99.7		
8	T	23 ^{1/}	2	22	0	47	9.2	509	16.9
	BP	242 ^{1/}	0	220	0	462	90.8		
9	T	0	0	0	0	0	0	519	17.3
	BP	138	0	381	0	519	100		
10	T	0	4	0	0	4	.8	511	17.0
	BP	158	0	349	0	507	99.2		
11	T	0	6	0	4	10	3.0	336	11.2
	BP	131	0	195	0	326	97.0		
12	T	0	0	0	0	0	0	0	0
	BP	0	0	0	0	0	0		
Totals	Number	<u>1,281</u>	<u>12</u>	<u>1,706</u>	<u>4</u>	<u>3,003</u>		<u>3,003</u>	
	Percent	<u>99.1</u>	<u>0.9</u>	<u>99.8</u>	<u>0.2</u>				

*Tailwater Percent of total count fishing on ice = 99.5
 **Balance of Pool Percent of total count fishing from boats = .5
 ***Lake Pepin Percent of total count fishing in tailwaters = 2.6
 Percent of total count fishing in balance of pool = 93.8
 Percent of total count fishing in Lake Pepin = 3.6

^{1/} Includes 230 anglers at fish contest at Goose Island.

Table 8. Summary of winter flights, 1963 and 1964.

<u>Pool No.</u>	<u>Area Fished</u>	<u>Ice</u>	<u>Boat</u>	<u>Total For Area</u>	<u>Pool Total</u>	<u>Percent In Each Area</u>	<u>Percent Of Total Count</u>
3	*T	0	0	0	33	0	.7
	**BP	33	-	33		100	
4	T	0	0	0	177	0	3.9
	***LP	119	0	119		67.2	
	BP	58	0	58		32.8	
5	T	6	0	6	288	2.1	6.3
	BP	282	-	282		97.9	
5A	T	6	0	6	153	3.9	3.3
	BP	147	0	147		96.1	
6	T	7	0	7	101	6.9	2.2
	BP	94	0	94		93.1	
7	T	16	0	16	771	2.1	16.8
	BP	755	0	755		97.9	
8	T	59	6	65	647	10.0	14.1
	BP	582	0	582		90.0	
9	T	3	0	3	976	.3	21.2
	BP	972	1	973		99.7	
10	T	2	4	6	871	.7	18.6
	BP	865	0	865		99.3	
11	T	0	14	14	579	2.4	12.6
	BP	563	2	565		97.6	
12	T	0	0	0	0	0	0
Total		<u>4,569</u>	<u>27</u>		<u>4,596</u>		

*Tailwater
 **Balance of Pool
 ***Lake Pepin

Percent of total count fishing on ice = 99.4
 Percent of total count fishing in boats = 0.6
 Percent of total count fishing in tailwaters = 2.7
 Percent of total count fishing in balance of pool (including Lake Pepin) = 97.3
 Percent of total count fishing in Lake Pepin = 2.6

Table 9. Location of summer boat fishermen from 1963 through 1965.

Pool No.	1963		1964		1965		Total Boat Anglers	Percent Of Total Boat Anglers In Each Pool
	T*	BP**	T	BP	T	BP		
3	2	16	2	78	0	46	144	1.4
4	22	416 ^{1/}	46	994	6	654	2,138	21.5
5	6	90	50	234	16	126	522	5.2
5A	34	66	148	138	34	164	584	5.9
6	26	64	62	78	4	54	288	2.9
7	20	222	30	578	52	282	1,184	11.9
8	68	100	356	336	158	182	1,200	12.1
9	18	126	212	516	104	250	1,226	12.3
10	72	212	82	738	120	346	1,570	15.8
11	34	132	166	346	82	224	984	9.9
12	16	-	56	-	36	-	108	1.1
Subtotal	318	1,444	1,210	4,036	612	2,328		
Total	1,762		5,246		2,940		9,948	
Percent in each area	18.0	82	23.1	76.9	20.8	79.2		

*Tailwater

**Balance of Pool

^{1/} Includes Lake Pepin.

Percent of total boat anglers in each area:

21.5 percent in tailwater
78.5 percent in balance of pool

Table 10. Fishing intensity in the tailwaters and entire pools during the summers of 1963 through 1965.

Pool No.	Tailwater				Balance of Pool			
	1963	1964	1965	Average	1963	1964	1965	Average
3	11.1	2.5	0	4.5	88.9	97.5	100	95.5
4	4.6	3.9	.8	3.1	95.4	96.1	99.2	96.9
					14.3 ^{1/}	10.0 ^{1/}	13.4 ^{1/}	12.7 ^{1/}
5	37.5	46.1	36.4	40.0	62.5	53.9	63.6	60.0
5A	42.1	57.3	20.7	40.0	57.9	42.7	79.3	60.0
6	28.9	49.4	15.6	31.3	71.1	50.6	84.4	68.7
7	10.8	12.0	21.7	14.8	89.2	88.0	78.3	85.2
8	48.5	57.3	50.3	52.0	51.5	42.7	49.7	48.0
9	23.2	42.8	40.5	35.5	76.8	57.2	59.5	64.5
10	30.0	18.0	33.3	27.0	70.0	82.0	66.7	72.9
11	27.5	37.5	32.9	32.6	72.5	62.5	67.1	65.6
12 ^{2/}	100	100	100	-	-	-	-	-

^{1/}Lake Pepin intensity.

^{2/}Only the tailwater of Pool 12 is in Wisconsin.

Average tailwater intensity 1963-65 = 28.1

Average intensity balance of pool 1963-65 = 71.7

Table 11. Comparison of aerial counts of summer fishermen during the summers of 1957, 1961, 1962, 1963, 1964, and 1965.

Pool No.	Area Fished	1957			1961			1962			1963			1964			1965		
		No.	Flights %	Change In Percent	No.	Flights %	Change In Percent	No.	Flights %	Change In Percent	No.	Flights %	Change In Percent	No.	Flights %	Change In Percent	No.	Flights %	
3	*T	14	6.8	- 4.7	2	2.1	- 2.1	0	0	+11.0	2	11.1	- 8.6	2	2.5	- 2.5	0	0	
	**BP	193	93.2		94	97.9		46	100		16	88.9		78	97.5		46	100	
4	T	63	2.7	+ 1.8	58	4.5	- 1.3	26	3.2	+ 1.4	22	4.6	- .7	46	3.9	- 3.1	6	.8	
	***LP	-	-		602	47.2	+ .3	397	47.5	+12.1	283	59.6	- 8.8	594	50.8	+ 9.8	427	60.6	
	BP	2,292	97.3		616	48.3	+ 1.0	412	49.3		170	35.8		530	45.3		272	38.6	
5	T	51	10.7	+31.6	257	42.3	+ 4.1	140	46.4	+ 8.9	54	37.5	+ 8.6	200	46.1	- 9.7	72	36.4	
	BP	424	89.3		351	57.7		162	53.6		90	62.5		234	53.9		126	63.6	
5A	T	94	17.9	+ 9.8	100	27.7	+ 6.7	73	34.4	+ 7.7	48	42.1	+15.2	185	57.3	-36.6	34	20.7	
	BP	430	82.1		261	72.3		139	65.6		66	57.9		138	42.7		130	79.3	
6	T	76	39.8	-33.1	13	6.7	- .1	8	6.6	+22.3	26	28.9	+20.5	76	49.4	-33.8	10	15.6	
	BP	115	60.2		181	93.3		114	93.4		64	71.1		78	50.6		54	84.4	
7	T	46	12.2	- 2.7	65	9.5	+ 4.5	39	14.0	- 3.2	27	10.8	+ 1.2	79	12.0	+15.1	78	27.1	
	BP	332	87.8		619	90.5		240	86.0		222	89.2		578	88.0		282	78.3	
8	T	198	33.6	- .2	388	33.4	+ 4.2	187	37.6	+10.9	74	48.5	+ 8.8	450	57.3	- 7.0	184	50.3	
	BP	392	66.4		774	66.6		310	62.4		100	51.5		336	42.7		182	49.7	
9	T	92	27.8	+ 2.4	225	30.2	+17.5	142	47.7	-24.5	38	23.2	+19.6	386	42.8	- 2.3	170	40.5	
	BP	239	72.2		520	69.8		156	52.3		126	76.8		516	57.2		250	59.5	
10	T	65	9.3	+ 7.6	179	16.9	+ 3.6	47	20.5	+ 9.5	91	30.0	-12.0	162	18.0	+15.3	173	33.3	
	BP	632	90.7		882	83.1		182	79.5		212	70.0		738	82.0		346	66.7	
11	T	165	34.7	+ 7.6	198	27.1	+13.4	94	40.5	-13.0	50	27.5	+10.0	208	37.5	- 4.6	110	32.9	
	BP	311	65.3		534	72.9		138	59.5		132	72.5		346	62.5		224	67.1	
Subtotal	T	834	13.9	+ 7.6	1,485	21.5	+ 3.3	756	24.8	- 1.4	452	23.4	+ 6.7	1,794	30.1	- 3.7	837	26.4	
	BP	5,360	86.1		4,832	69.8		1,899	62.2	+ 1.6	1,198	62.0	- 4.6	3,572	59.9	+ 3.4	1,912	60.2	
Total	LP	-	-		602	8.7	+ 4.3	397	13.0		283	14.6		594	10.0		427	13.4	
					6,919			3,052			1,933			5,960			3,176		

*Tailwaters
 **Balance of Pool
 ***Lake Pepin

Overall change = 12.5 percent increase in the amount of tailwater fishing from 1957 through 1965.

1/ indicates the amount and direction of change between two years.

Table 12. Comparison of aerial counts of winter fishermen during the winter of 1957-58, 1960-61, 1961-62, and 1963-64.

Pool No.	Area Fished	1957-58			1960-61			1961-62			1963-64	
		Two Flights No.	%	Percent ^{1/} Change	Two Flights No.	%	Percent Change	Two Flights No.	%	Percent Change	Three Flights No.	%
3	*T	0	0.0	-	0	0.0	-	0	0.0	-	0	0
	**BP	118	100.0		18	100.0		40	100.0		33	100
4	T	20	2.9	+ 2.5	4	5.4	- 5.4	0	0.0	-	0	0
	***LP	-	-		37	50.0	-13.0	60	37.0	+26.2	119	63.2
	BP	681	97.1		33	44.6	+18.4	102	63.0	-26.2	58	36.8
5	T	7	4.1	- 4.1	0	0.0	-	0	0.0	-	6	0
	BP	165	95.9		111	100.0		144	100.0		282	100
5A	T	11	6.7	- 1.9	2	4.8	+10.0	8	14.8	- 9.1	6	5.7
	BP	152	93.3		40	95.2		46	85.2		147	94.3
6	T	31	30.4	-30.4	0	0.0	+ 4.4	2	4.4	+ 5.2	17	9.6
	BP	71	69.6		11	100.0		44	95.6		94	90.4
7	T	105	15.6	-14.4	2	1.2	- .6	2	.6	+ 4.6	16	5.2
	BP	570	84.4		169	98.8		310	99.4		755	94.8
8	T	75	14.8	- 9.6	10	5.2	- 4.1	4	1.1	+11.9	65	13.0
	BP	431	85.2		181	94.8		348	98.9		582	87.0
9	T	208	52.4	-49.2	8	3.2	- .6	11	2.6	- 1.3	6	1.3
	BP	189	47.6		242	96.8		405	97.4		973	98.7
10	T	37	7.0	- .7	6	6.3	- 5.1	4	1.2	- .6	6	.6
	BP	493	93.0		90	93.7		329	98.8		865	99.4
11	T	12	7.3	- 5.3	3	2.0	- 1.7	1	.3	+ 1.3	14	1.6
	BP	153	92.7		150	98.0		375	99.7		565	98.4
Subtotal	T	506	14.3	-11.2	35	3.1	- 1.9	32	1.2	+ 1.8	136	3.0
	BP	3,023	85.7		1,082	96.9		2,603	98.8		4,492	97.0
Total		3,529			1,117			2,635			4,609	

*Tailwaters
 **Balance of Pool
 ***Lake Pepin

Overall change = 11.3 percent decrease in the amount of tailwater fishermen.

^{1/}Indicates the amount and direction of change between two years.

Table 13. Percent of total summer angler count in each pool, 1957 through 1965.

<u>Pool No.</u>	<u>1957 Percent</u>	<u>1961 Percent</u>	<u>1962 Percent</u>	<u>1963 Percent</u>	<u>1964 Percent</u>	<u>1965 Percent</u>
3	3.3	1.4	2.1	.9	1.3	1.4
4	37.8	18.4	27.2	24.2	19.4	21.8
5	7.6	8.8	9.8	7.3	7.2	6.2
5A	8.4	5.2	6.8	5.8	5.3	5.1
6	3.1	2.8	4.0	4.6	2.5	2.0
7	6.1	9.9	9.1	12.7	10.9	11.1
8	9.5	16.8	16.2	9.9	13.0	11.3
9	5.3	10.8	9.7	8.3	14.9	13.0
10	11.2	15.3	7.5	15.4	14.9	16.1
11	7.7	10.6	7.6	9.3	9.2	10.3

Table 14. Percent of total winter angler count in each pool, 1957 through 1964.

<u>Pool No.</u>	<u>1957 Percent</u>	<u>1958 Percent</u>	<u>1960 Percent</u>	<u>1961 Percent</u>	<u>1962 Percent</u>	<u>1963 Percent</u>	<u>1964 Percent</u>
3	1.6	4.9	1.7	1.6	1.5	.7	.7
4	24.5	15.8	5.4	16.3	21.2	2.9	4.4
5	3.0	6.6	13.1	8.1	8.4	5.0	6.9
5A	4.8	4.2	4.5	4.6	5.6	2.7	3.7
6	3.0	2.8	1.2	2.6	3.2	3.2	2.0
7	21.9	16.7	19.9	10.7	8.2	10.7	19.9
8	15.5	13.3	12.4	16.7	15.3	8.6	16.9
9	11.8	10.8	15.3	14.1	18.0	28.6	17.3
10	10.7	18.8	7.1	14.5	9.1	22.4	17.0
11	3.3	5.9	18.5	10.8	9.5	15.1	11.2

- Public parking bays ■
- Public launching ▲
- Other public facilities ▲
- Private launching ●
- Other private facilities ○

Figure 1

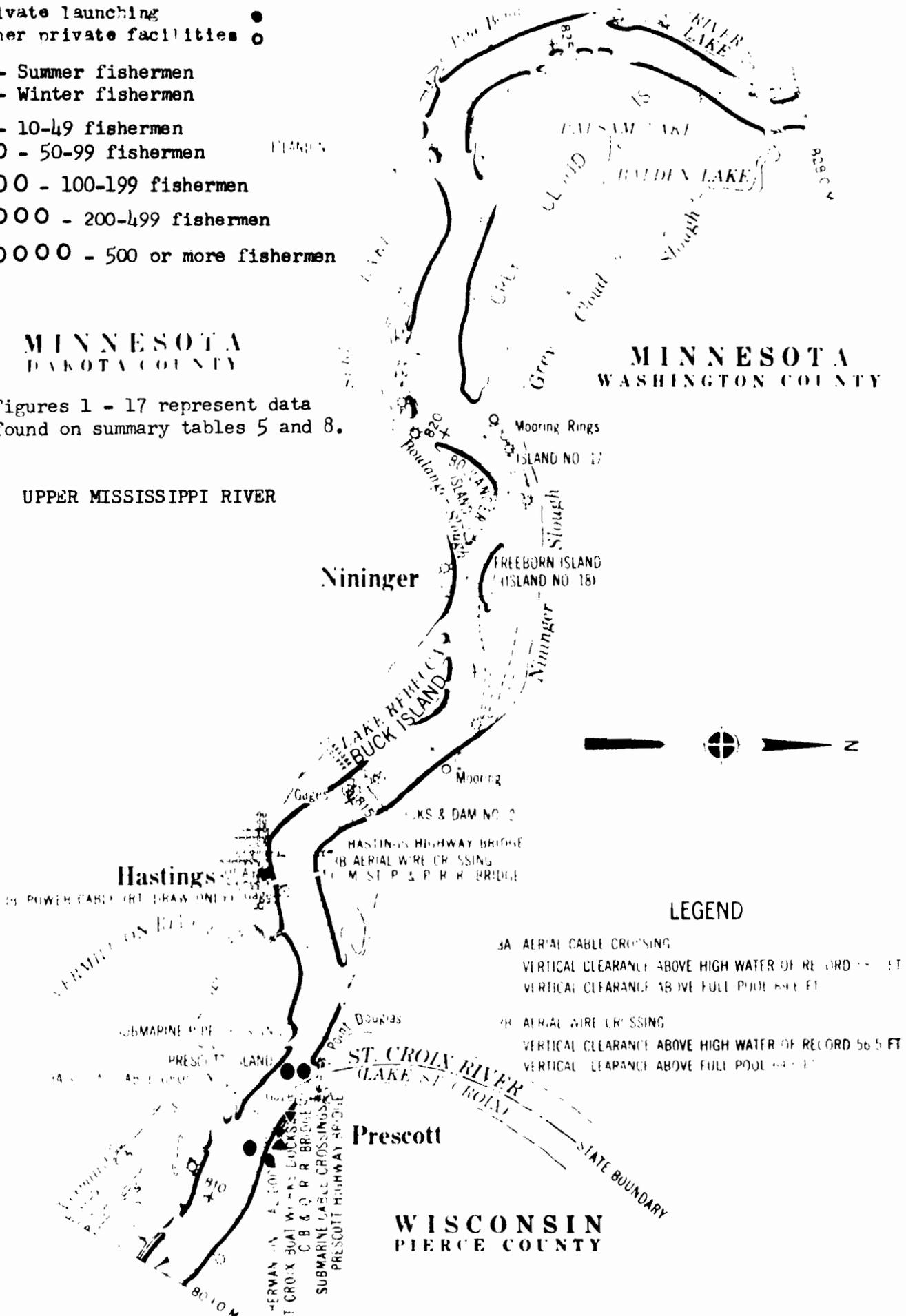
- - Summer fishermen
- - Winter fishermen
- - 10-49 fishermen
- - 50-99 fishermen
- - 100-199 fishermen
- - 200-499 fishermen
- - 500 or more fishermen

MINNESOTA
DAKOTA COUNTY

MINNESOTA
WASHINGTON COUNTY

Figures 1 - 17 represent data found on summary tables 5 and 8.

UPPER MISSISSIPPI RIVER



LEGEND

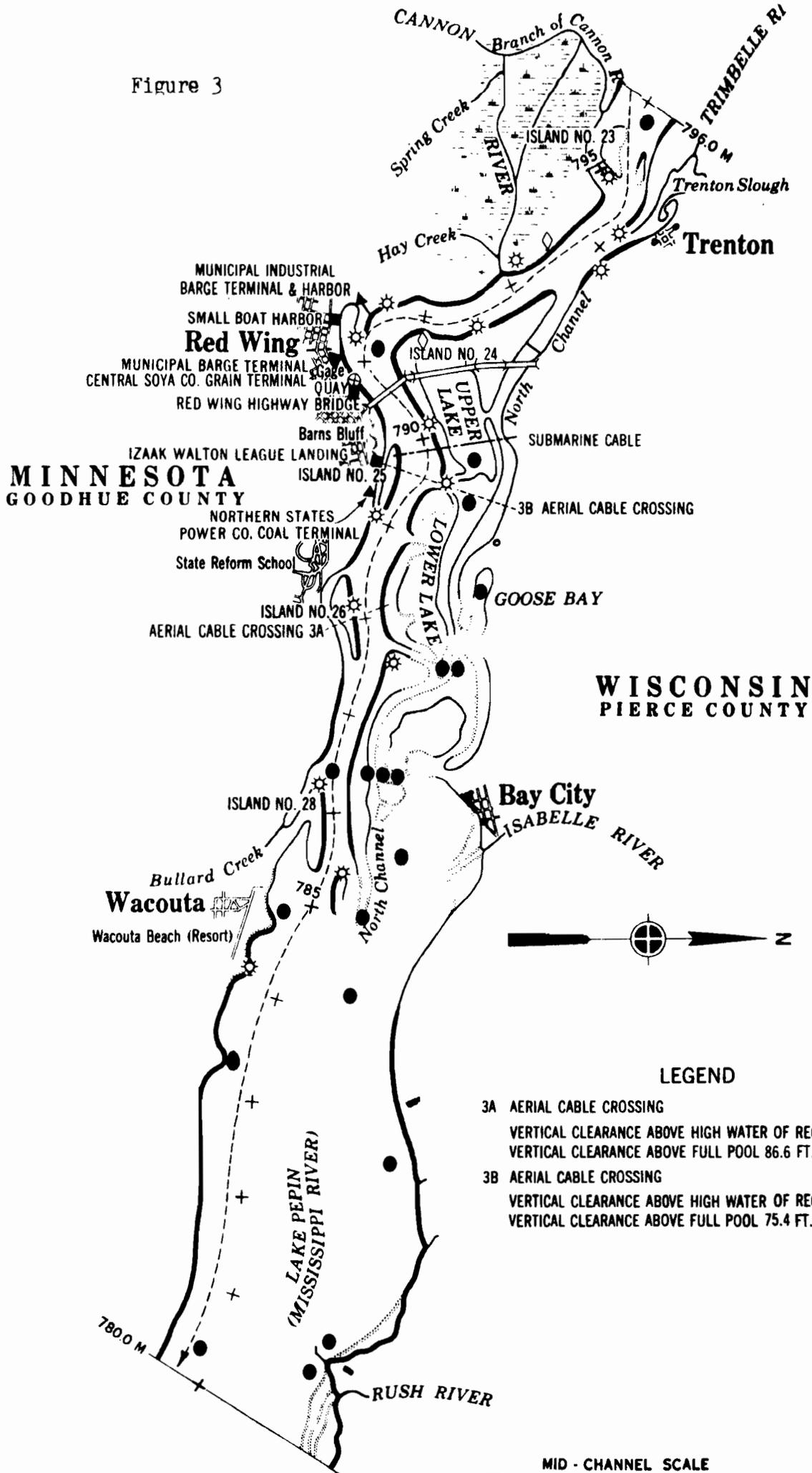
- JA AERIAL CABLE CROSSING
VERTICAL CLEARANCE ABOVE HIGH WATER OF RECORD 110 FT
VERTICAL CLEARANCE ABOVE FULL POOL 65 FT
- JR AERIAL WIRE CROSSING
VERTICAL CLEARANCE ABOVE HIGH WATER OF RECORD 56.5 FT
VERTICAL CLEARANCE ABOVE FULL POOL 44 FT

WISCONSIN
PIERCE COUNTY

Figure 2



Figure 3



WISCONSIN
PIERCE COUNTY



LEGEND

- 3A AERIAL CABLE CROSSING
VERTICAL CLEARANCE ABOVE HIGH WATER OF RECORD 74.1 FT.
VERTICAL CLEARANCE ABOVE FULL POOL 86.6 FT.
- 3B AERIAL CABLE CROSSING
VERTICAL CLEARANCE ABOVE HIGH WATER OF RECORD 63.0 FT.
VERTICAL CLEARANCE ABOVE FULL POOL 75.4 FT.

MID - CHANNEL SCALE

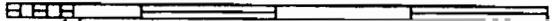


Figure 4

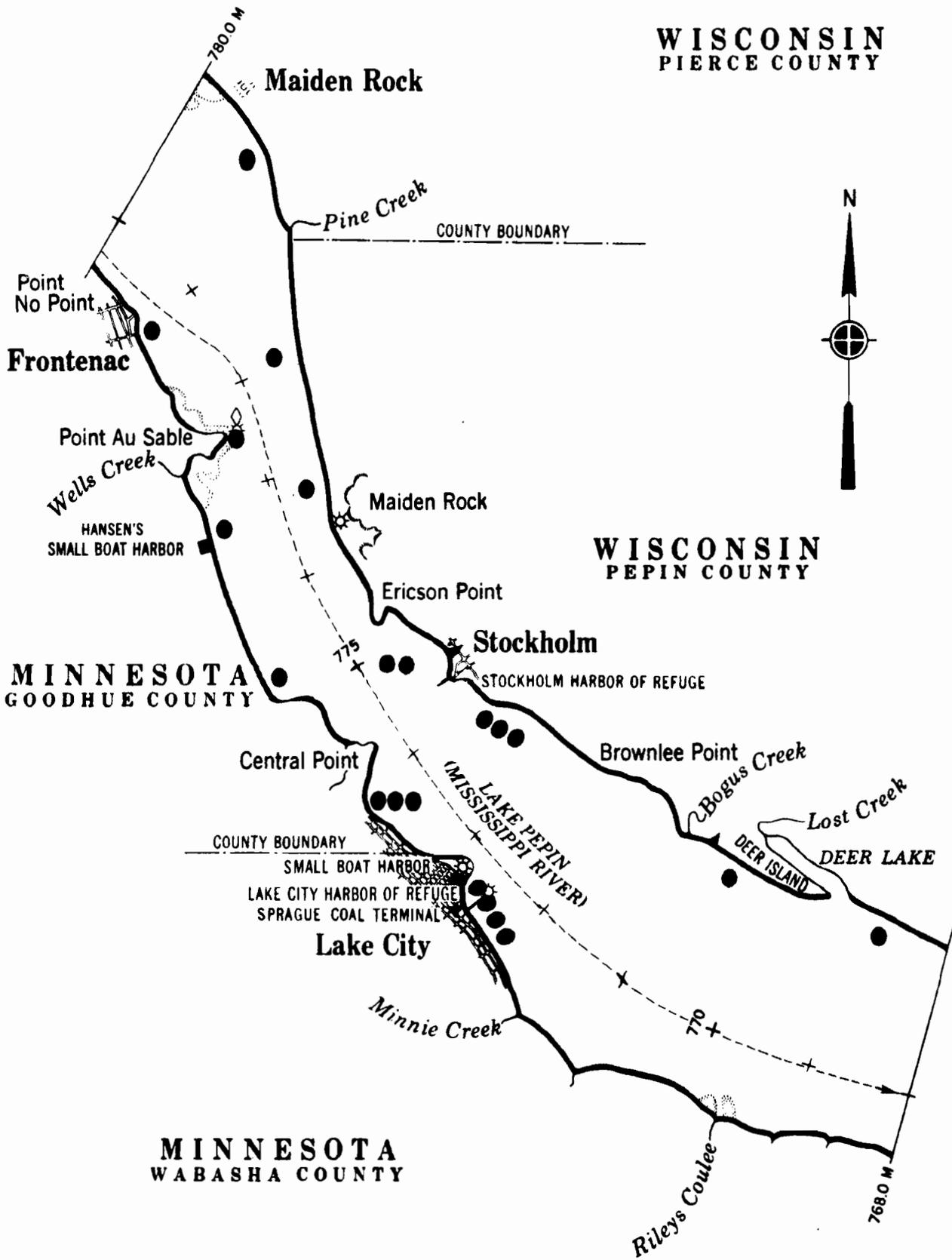


Figure 5



MINNESOTA
WABASHA COUNTY

WISCONSIN
PEPIN COUNTY

WISCONSIN
BUFFALO COUNTY

LEGEND

3A AERIAL CABLE CROSSING
VERTICAL CLEARANCE ABOVE HIGH WATER OF RECORD 62.2 FT.
VERTICAL CLEARANCE ABOVE FULL POOL 72.1 FT.

MID - CHANNEL SCALE



Figure 6
LEGEND

3 AERIAL WIRE CROSSING
 VERTICAL CLEARANCE ABOVE HIGH WATER OF RECORD 73.1 FT.
 VERTICAL CLEARANCE ABOVE FULL POOL 82.8 FT.

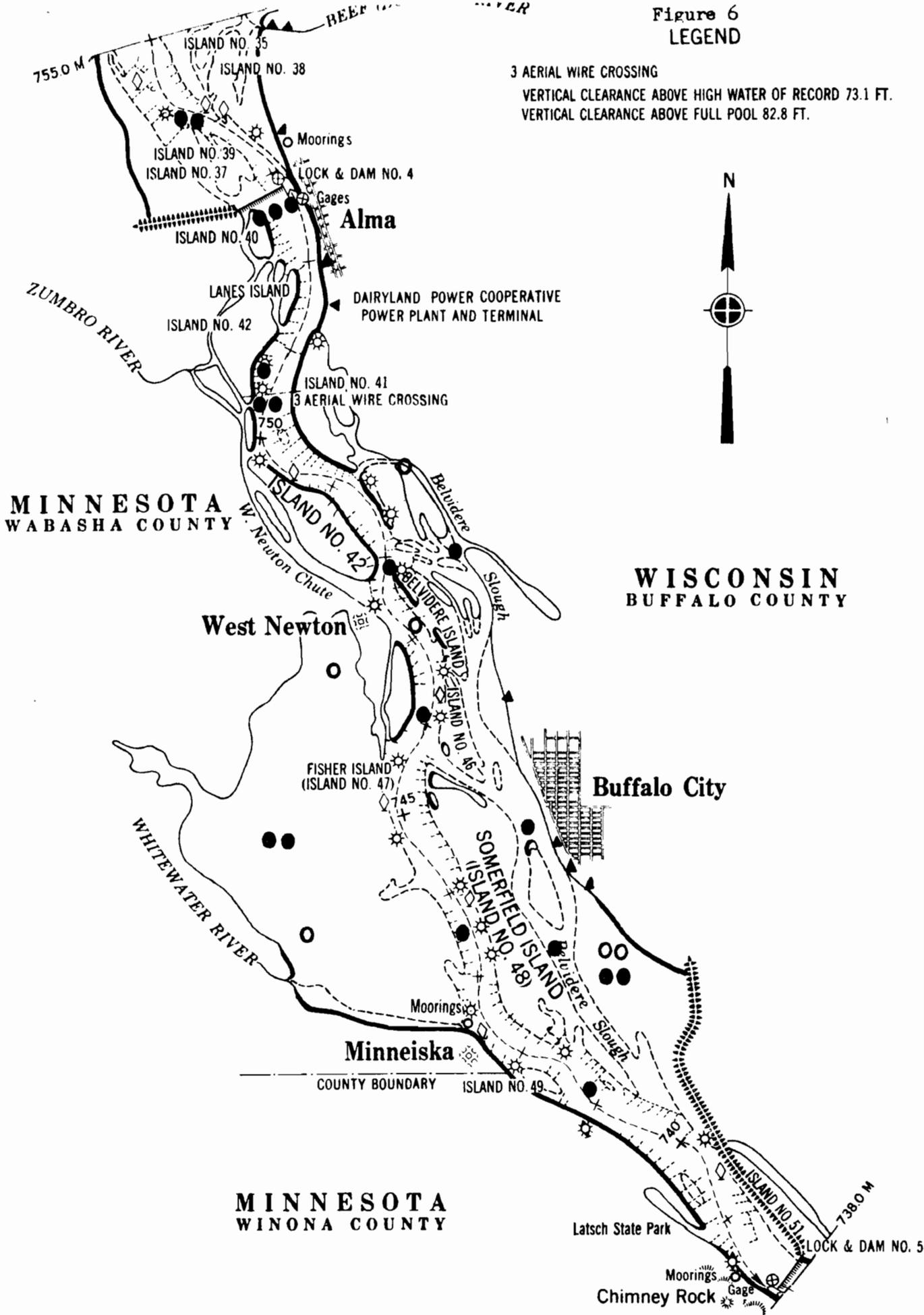


Figure 7

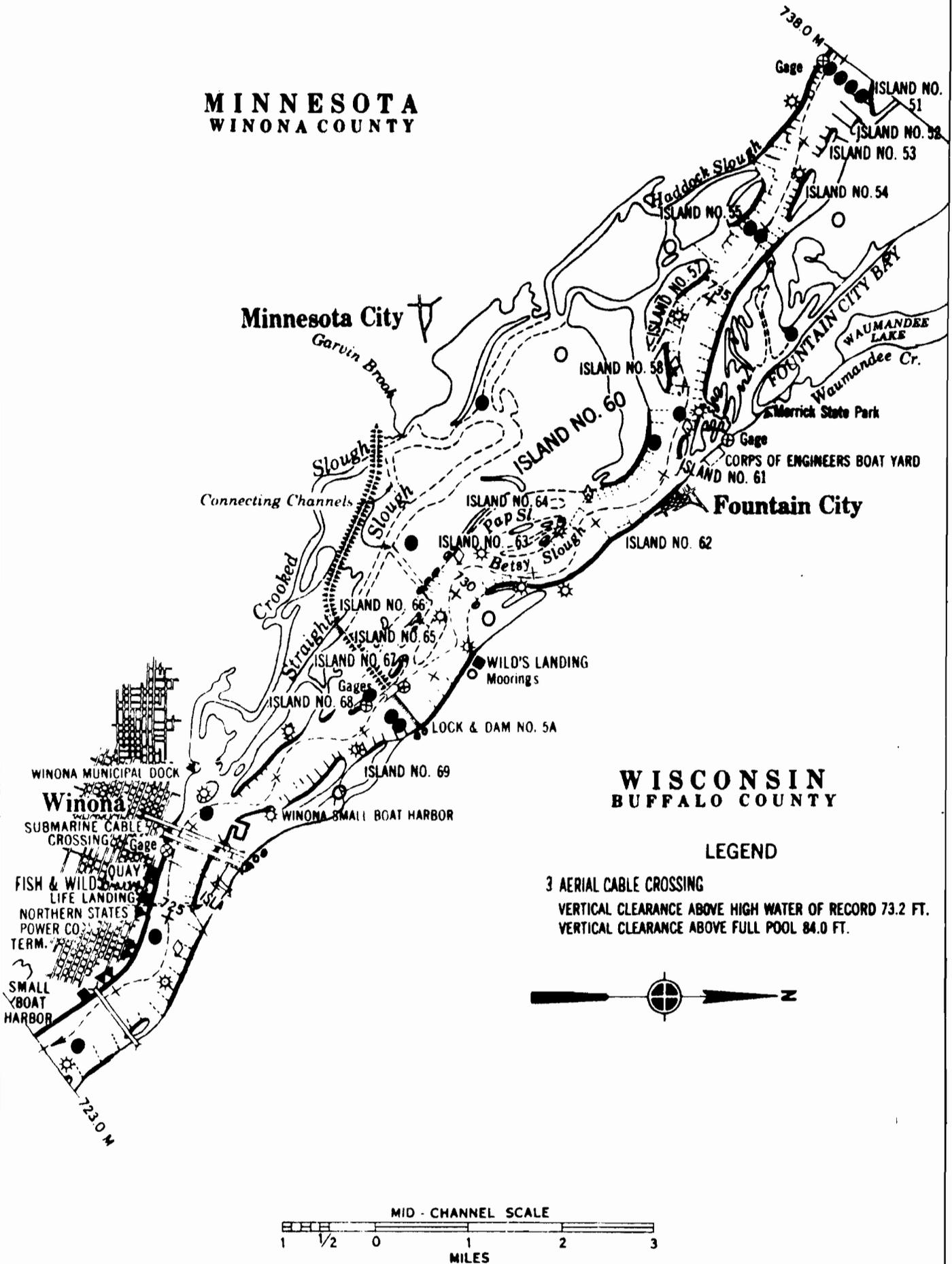


Figure 0

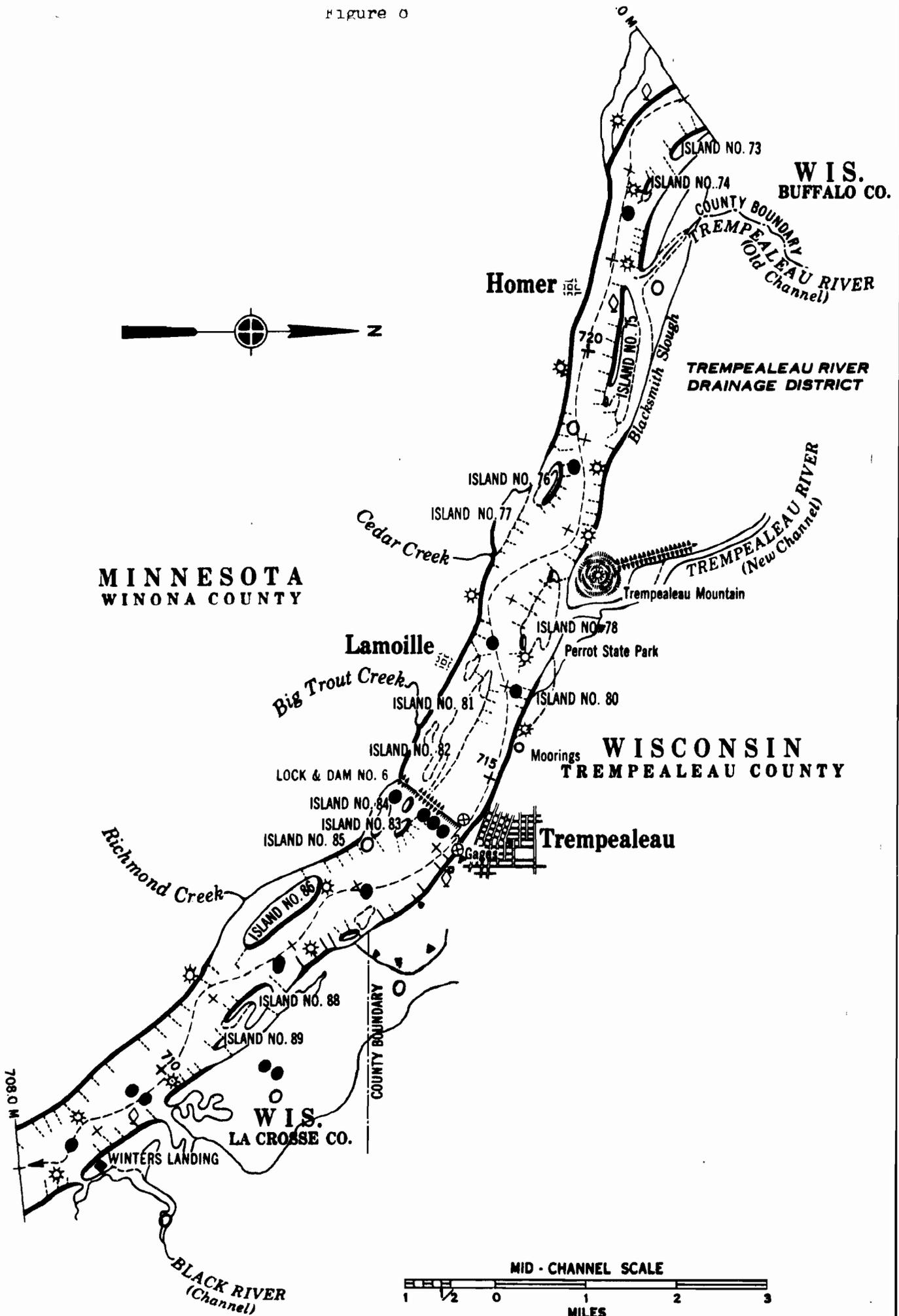


Figure 9

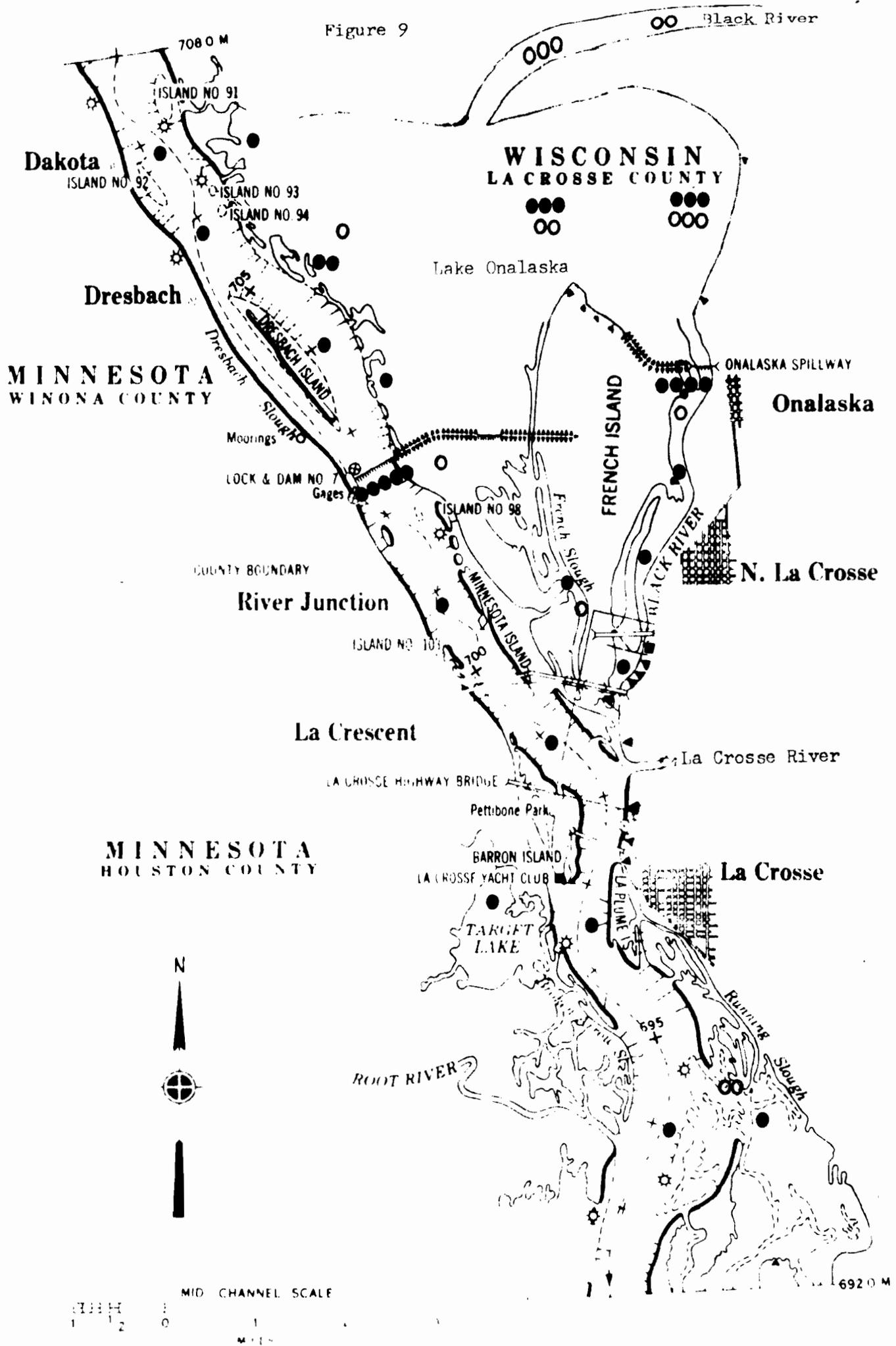
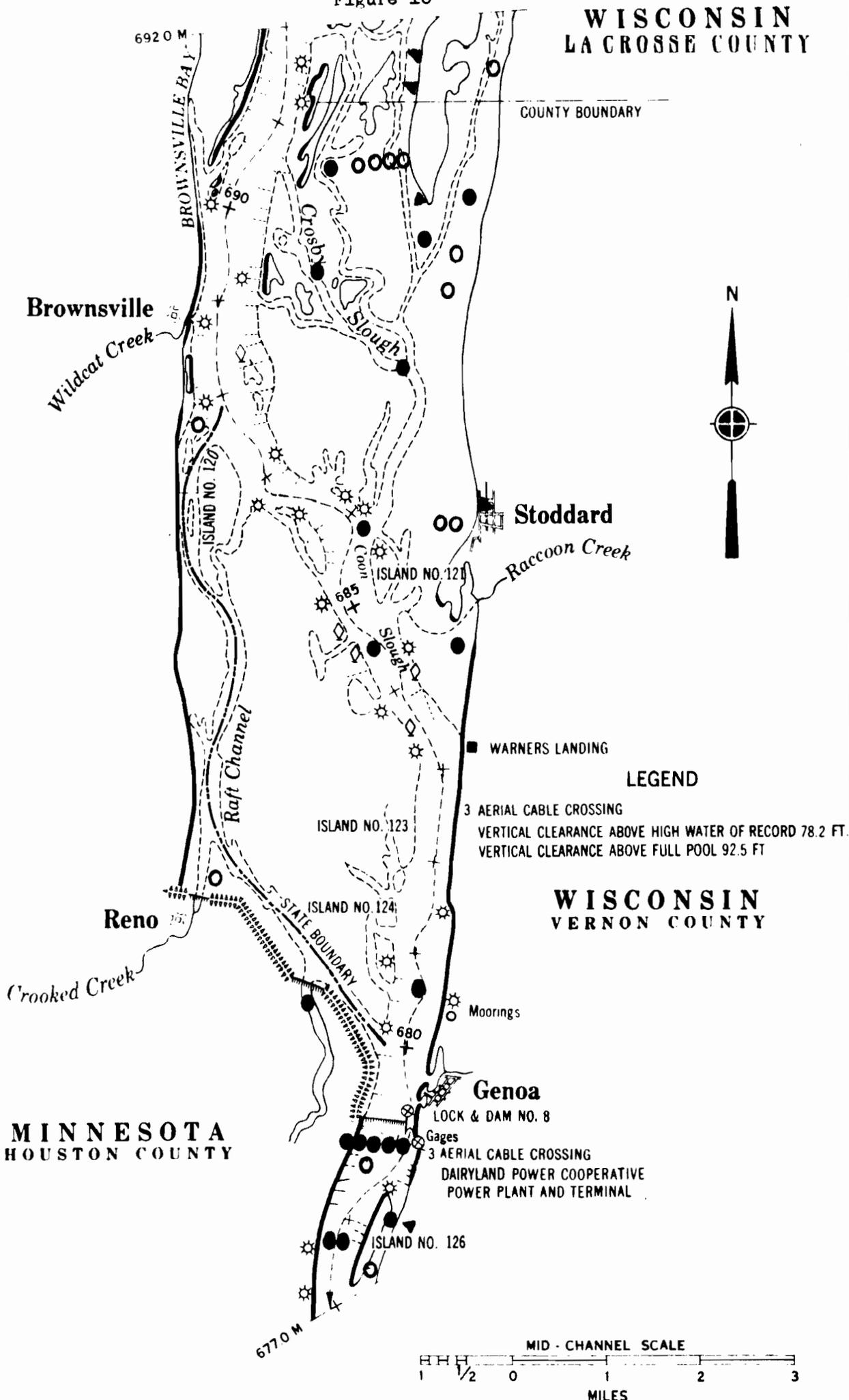


Figure 10

WISCONSIN
LA CROSSE COUNTY



COUNTY BOUNDARY



LEGEND

- WARNERS LANDING
- 3 AERIAL CABLE CROSSING
VERTICAL CLEARANCE ABOVE HIGH WATER OF RECORD 78.2 FT.
VERTICAL CLEARANCE ABOVE FULL POOL 92.5 FT

WISCONSIN
VERNON COUNTY

MINNESOTA
HOUSTON COUNTY

- LOCK & DAM NO. 8
- Gages
- 3 AERIAL CABLE CROSSING
- DAIRYLAND POWER COOPERATIVE
POWER PLANT AND TERMINAL



MINNESOTA
HOUSTON COUNTY

Figure 11

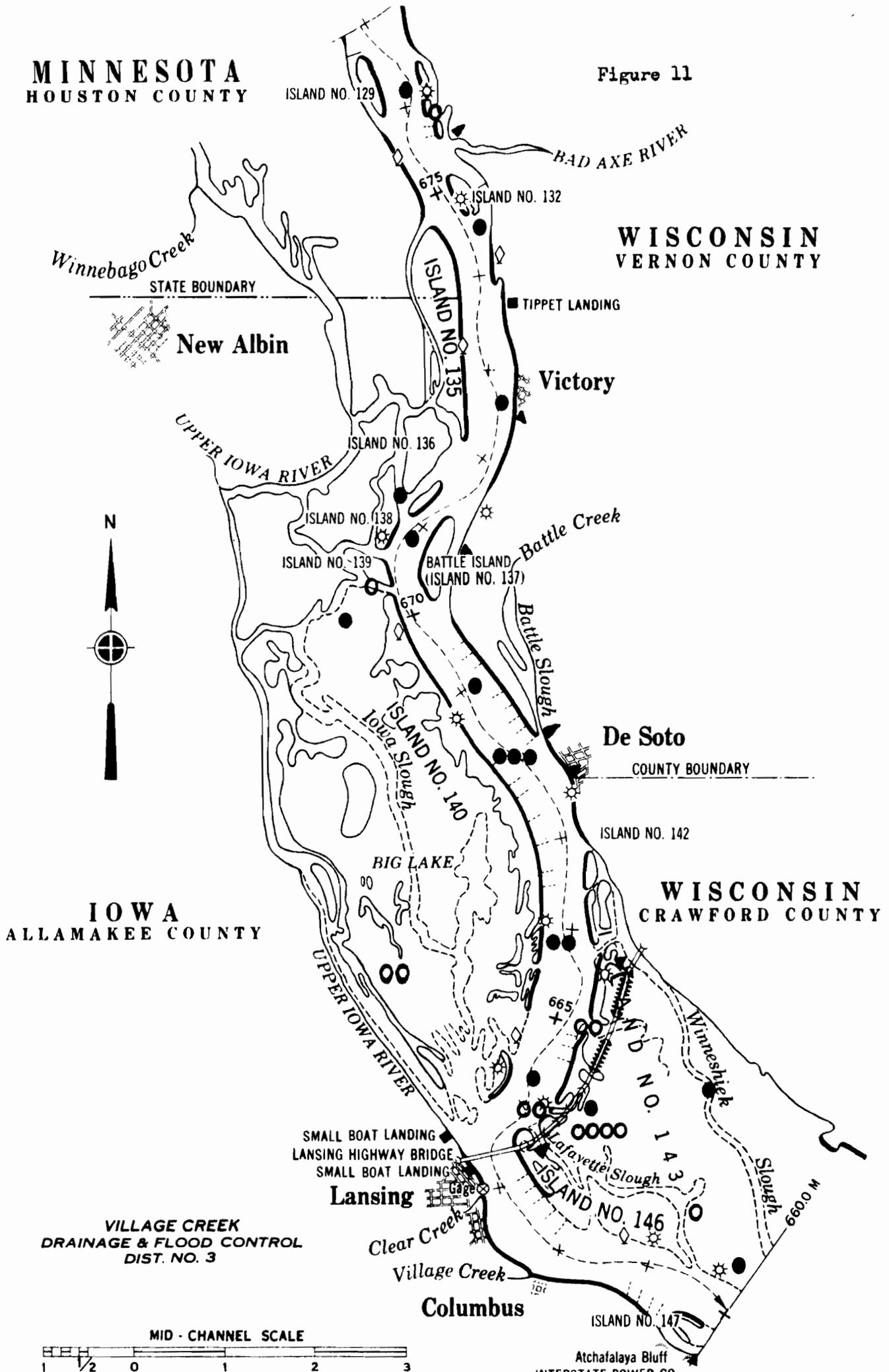
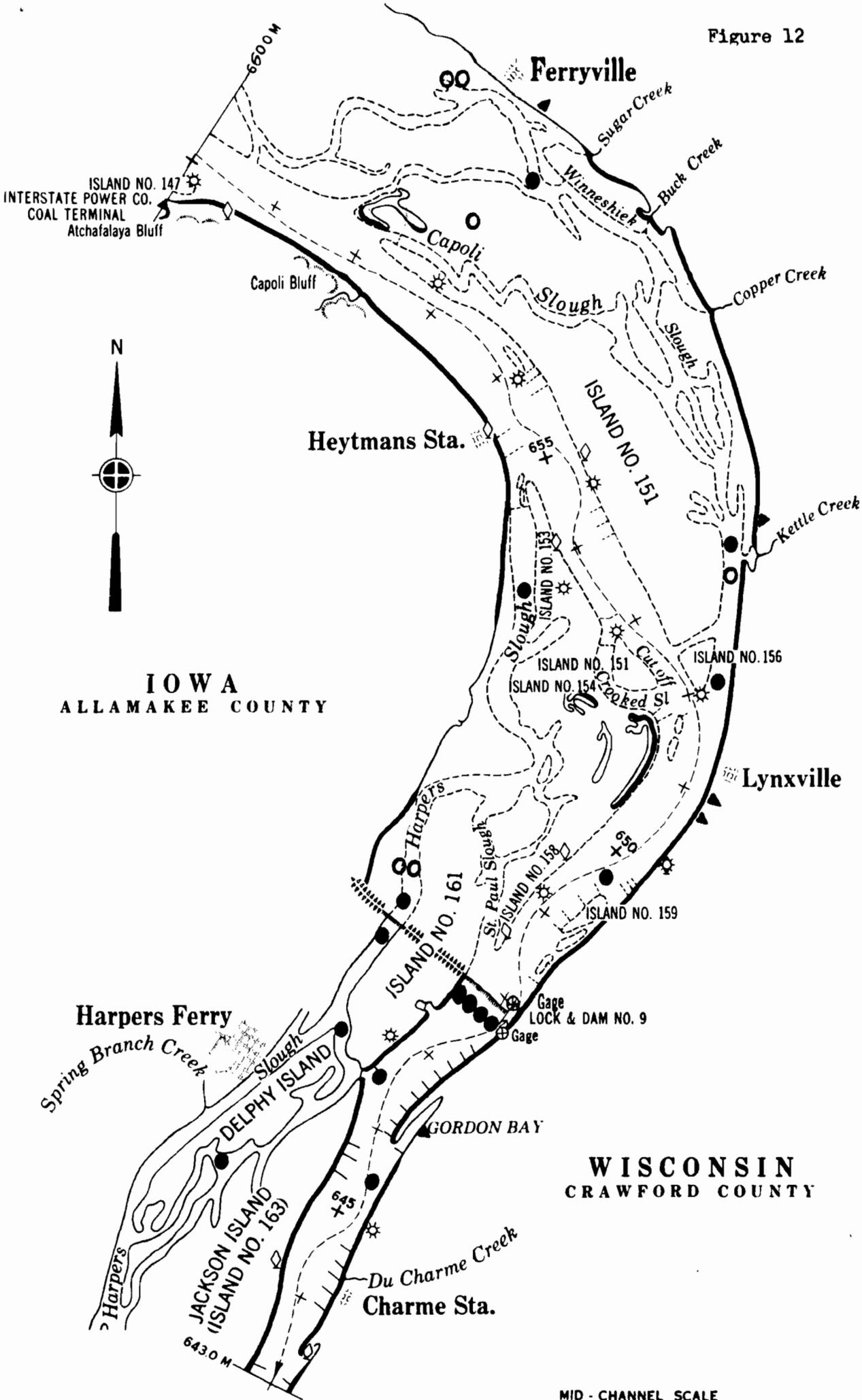


Figure 12



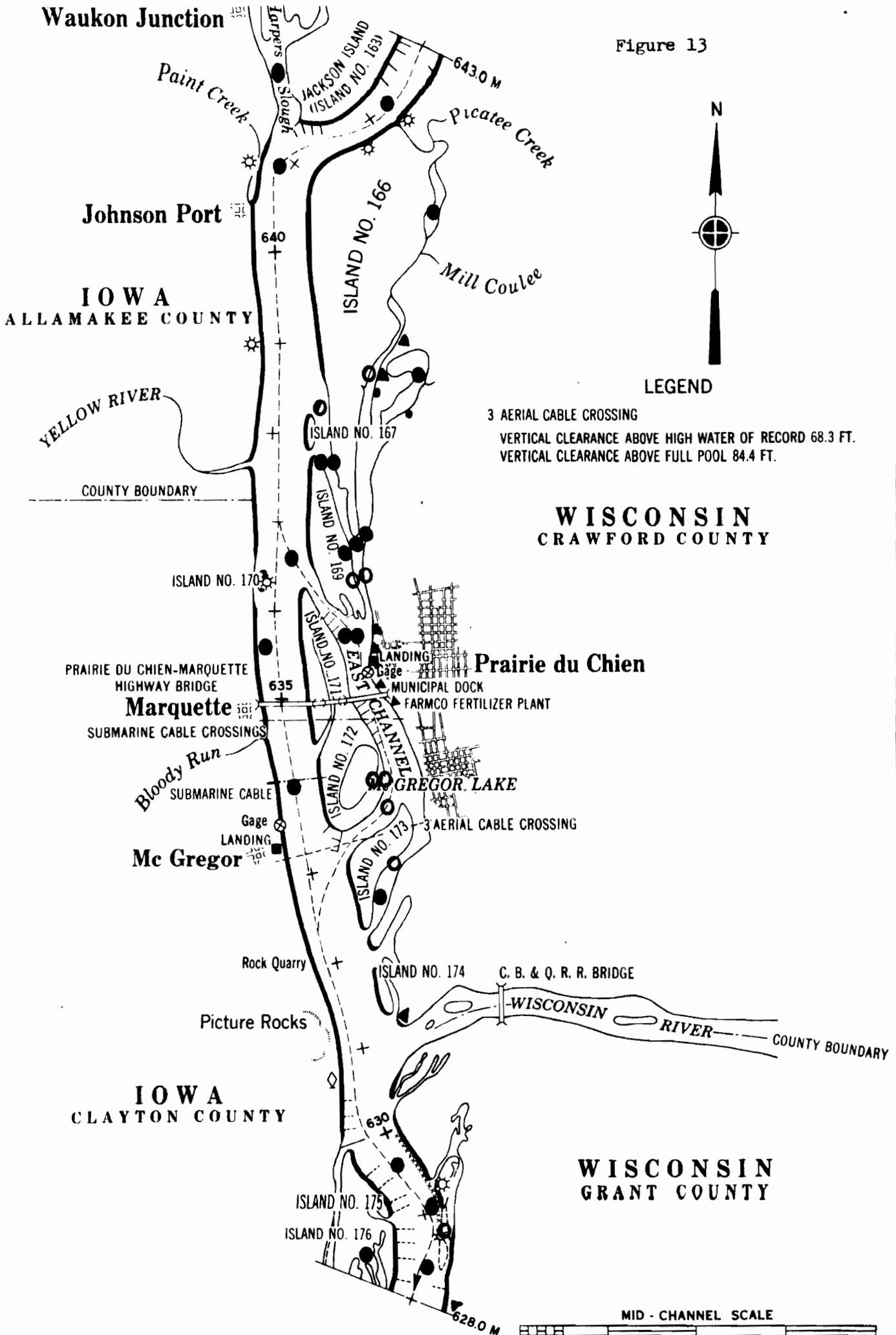
IOWA
ALLAMAKEE COUNTY

WISCONSIN
CRAWFORD COUNTY

MID - CHANNEL SCALE

Waukon Junction

Figure 13



LEGEND

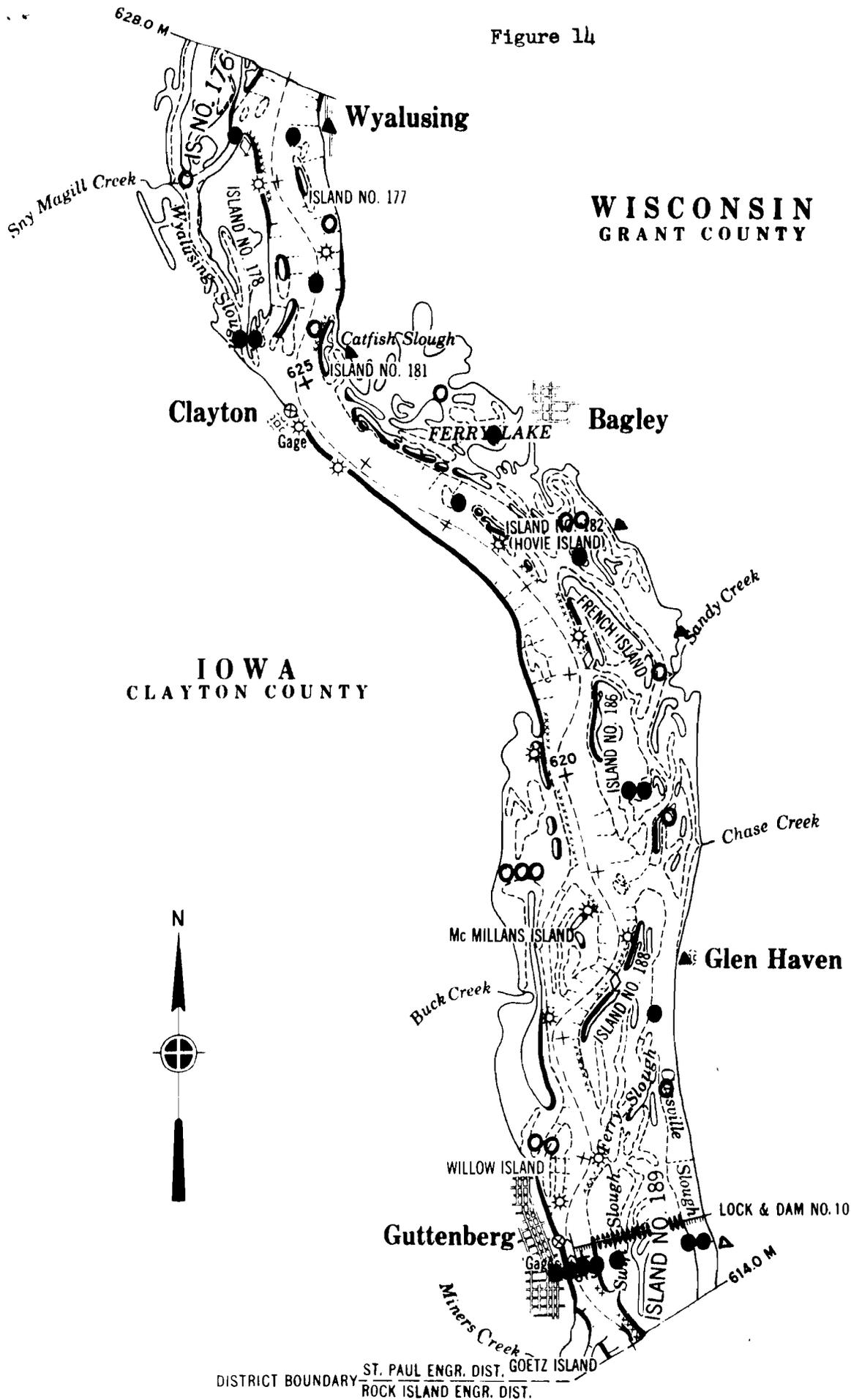
- 3 AERIAL CABLE CROSSING
- VERTICAL CLEARANCE ABOVE HIGH WATER OF RECORD 68.3 FT.
- VERTICAL CLEARANCE ABOVE FULL POOL 84.4 FT.

WISCONSIN
CRAWFORD COUNTY

WISCONSIN
GRANT COUNTY

MID - CHANNEL SCALE

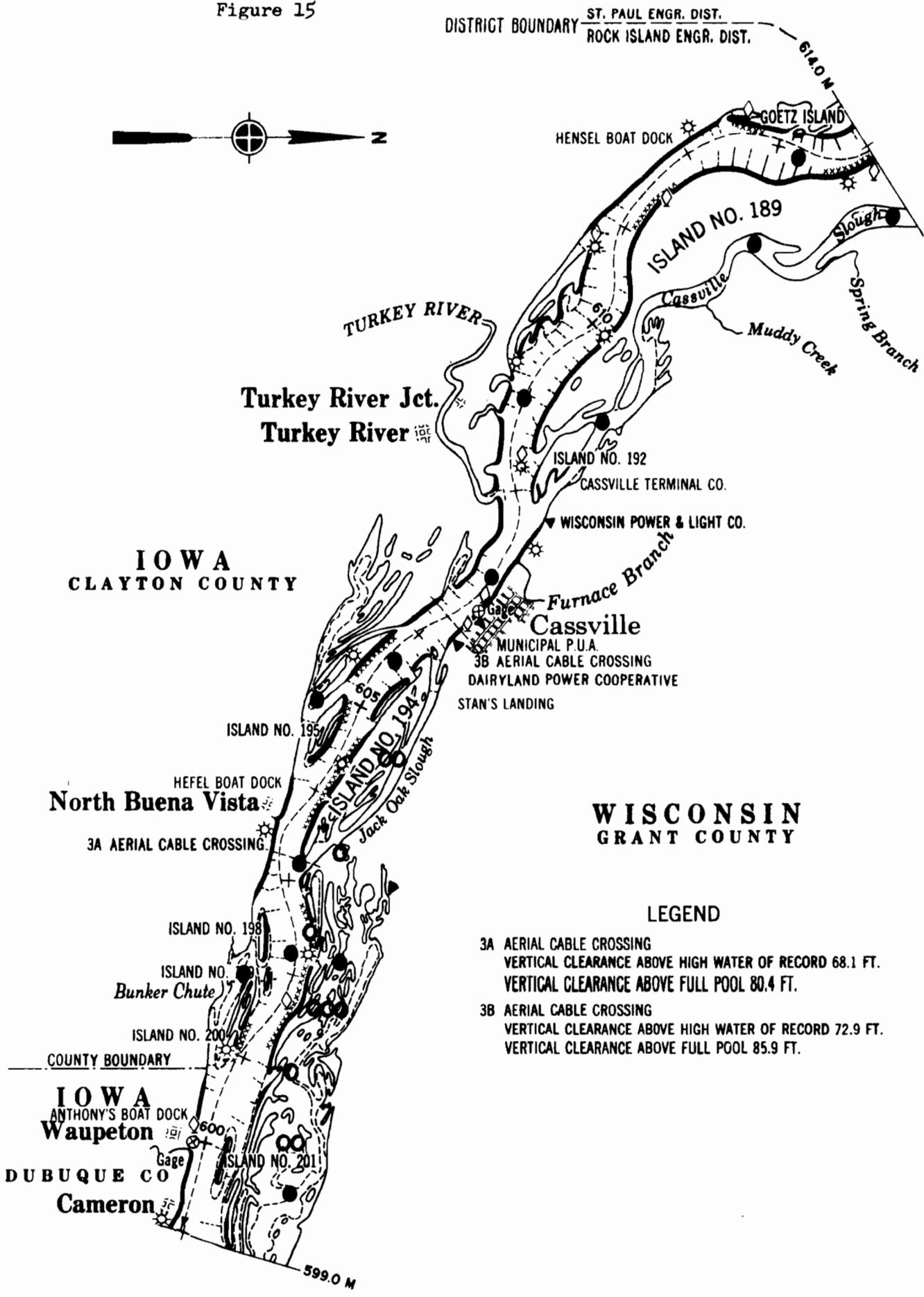
Figure 14



MID - CHANNEL SCALE

Figure 15

DISTRICT BOUNDARY ST. PAUL ENGR. DIST.
ROCK ISLAND ENGR. DIST.



WISCONSIN
GRANT COUNTY

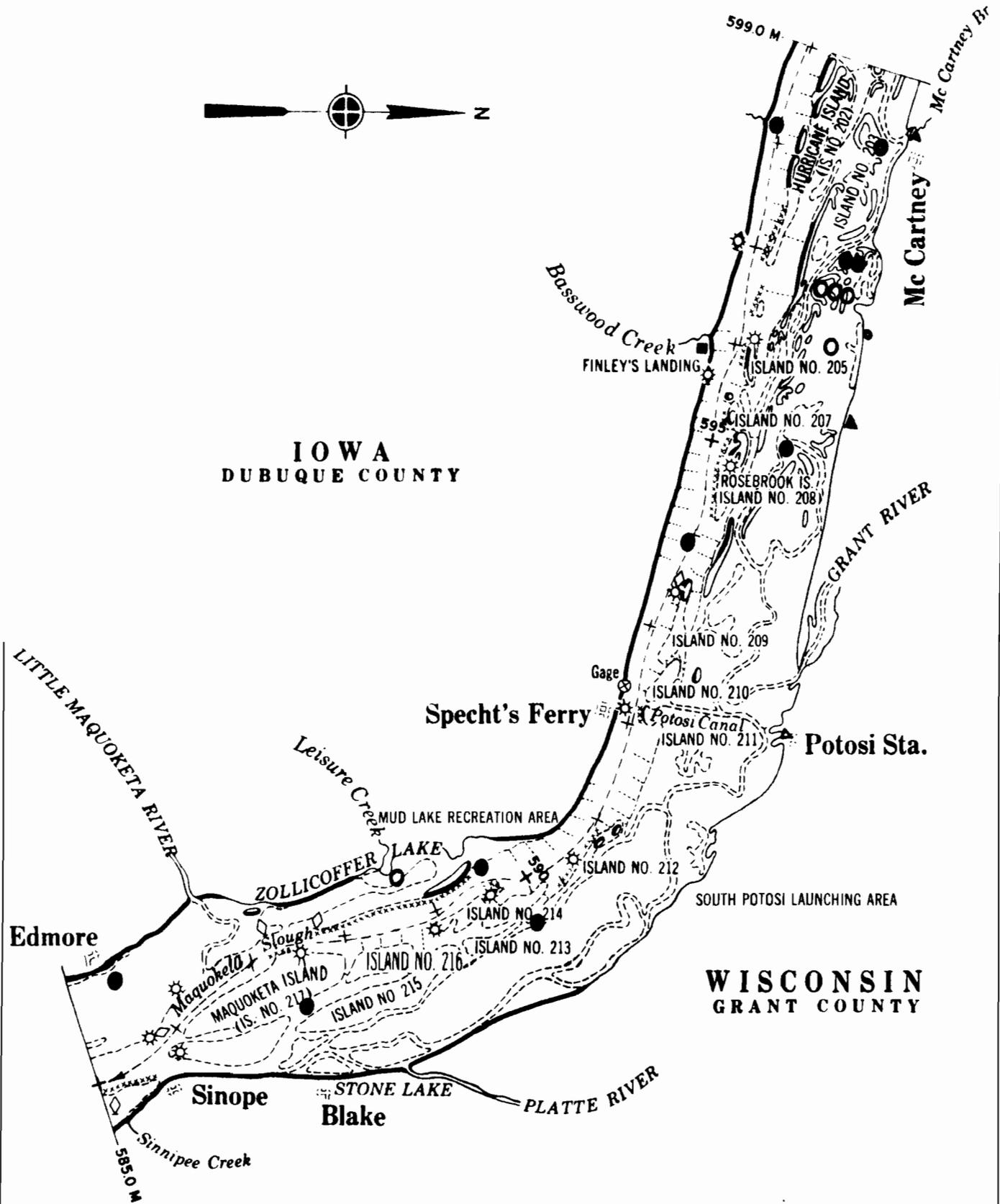
LEGEND

- 3A AERIAL CABLE CROSSING
VERTICAL CLEARANCE ABOVE HIGH WATER OF RECORD 68.1 FT.
VERTICAL CLEARANCE ABOVE FULL POOL 80.4 FT.
- 3B AERIAL CABLE CROSSING
VERTICAL CLEARANCE ABOVE HIGH WATER OF RECORD 72.9 FT.
VERTICAL CLEARANCE ABOVE FULL POOL 85.9 FT.

MID - CHANNEL SCALE



Figure 16



IOWA
DUBUQUE COUNTY

Specht's Ferry

Potosi Sta.

WISCONSIN
GRANT COUNTY



Figure 17

