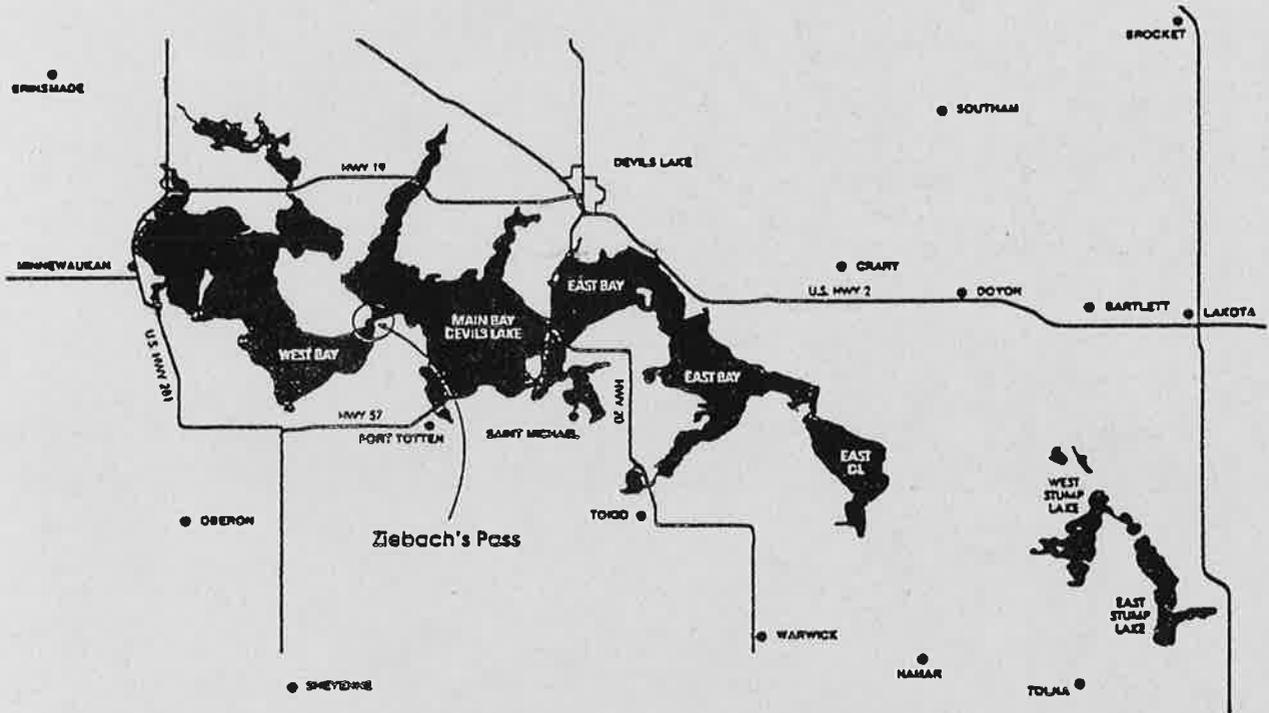


PRELIMINARY ENGINEERING REPORT  
ZIEBACH PASS  
SWC #1882  
RAMSEY COUNTY



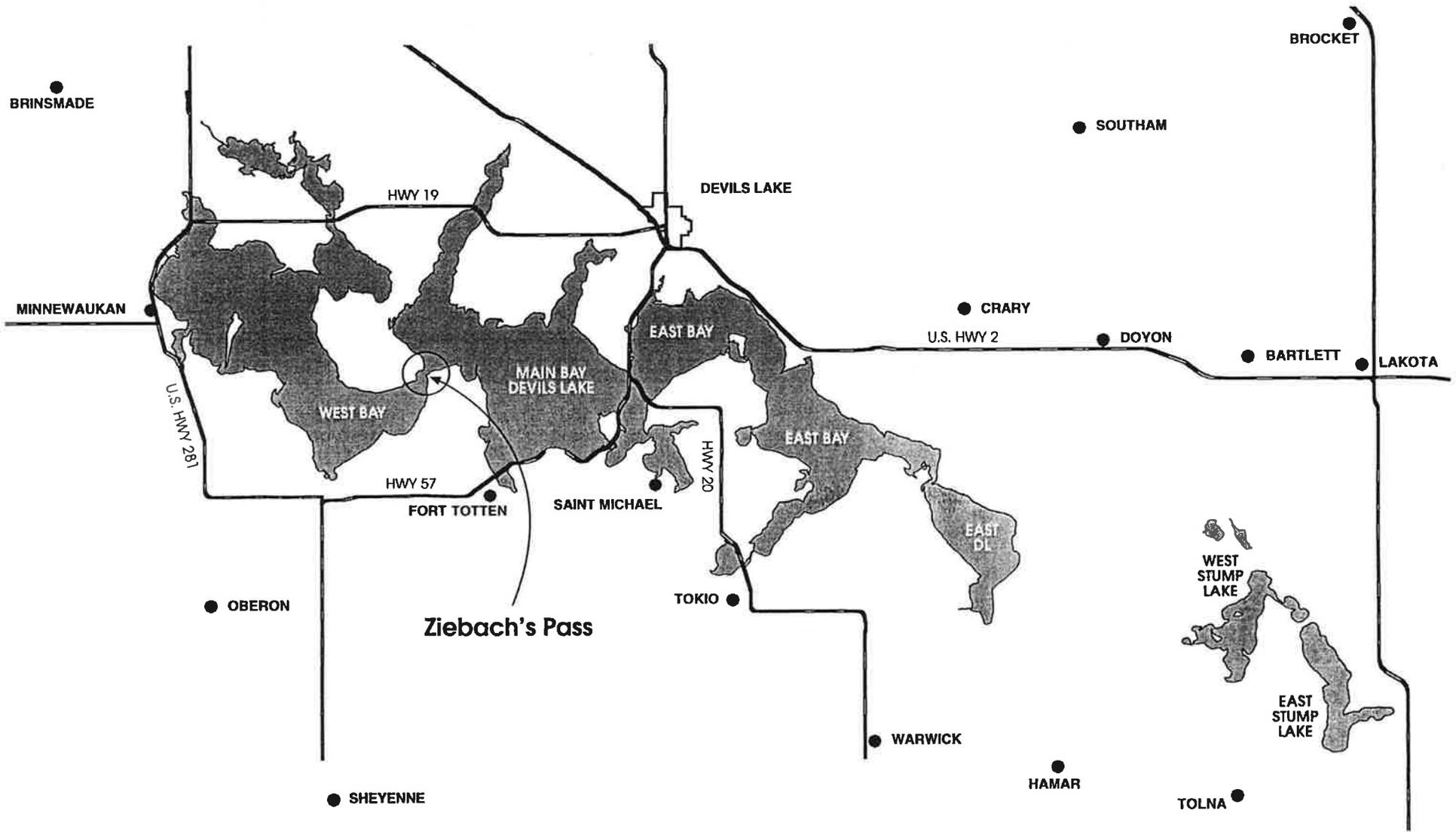
NORTH DAKOTA  
STATE WATER COMMISSION  
FEBRUARY 1996

## **I. INTRODUCTION**

It has been proposed that a dam be constructed over the old road bed across Ziebach's Pass in Section 30, Township 153 North, Range 65 West to store water in the West Bay of Devils Lake, the location of the project is shown in Figure 1. There is significant local support for this proposal, especially if an outlet to the Sheyenne River is to be built. This Reconnaissance Report describes the plan and the impacts that are known at this time. It must be understood that limited data is available for this plan and many assumptions were made in developing this report. Due to the lack of data and the assumptions required; the cost estimates, potential impacts, and possible elevations are the best estimates at this time. One purpose of this report is to assist decision makers in determining if it is feasible to continue with this plan and gather the necessary data to more accurately assess the plan and its impacts.

## **II. ALTERNATIVES**

Two alternatives are considered in this report. The first alternative consists of a structure at Ziebach's Pass and mitigation of the impacts of the plan. The second alternative would add a control structure on the Mauvais Coulee where it crosses Highway 19; a control structure on Mauvais Coulee in the northwest quarter of Section 13, Township 154 North, Range 67 West; and a cut off channel along Highway 281. These features are shown in Figure 2. The second alternative would have the added cost of the control structures and channel. However it would lessen the impacts of the plan and would reduce the land required.



**FIGURE 1**  
Location Map

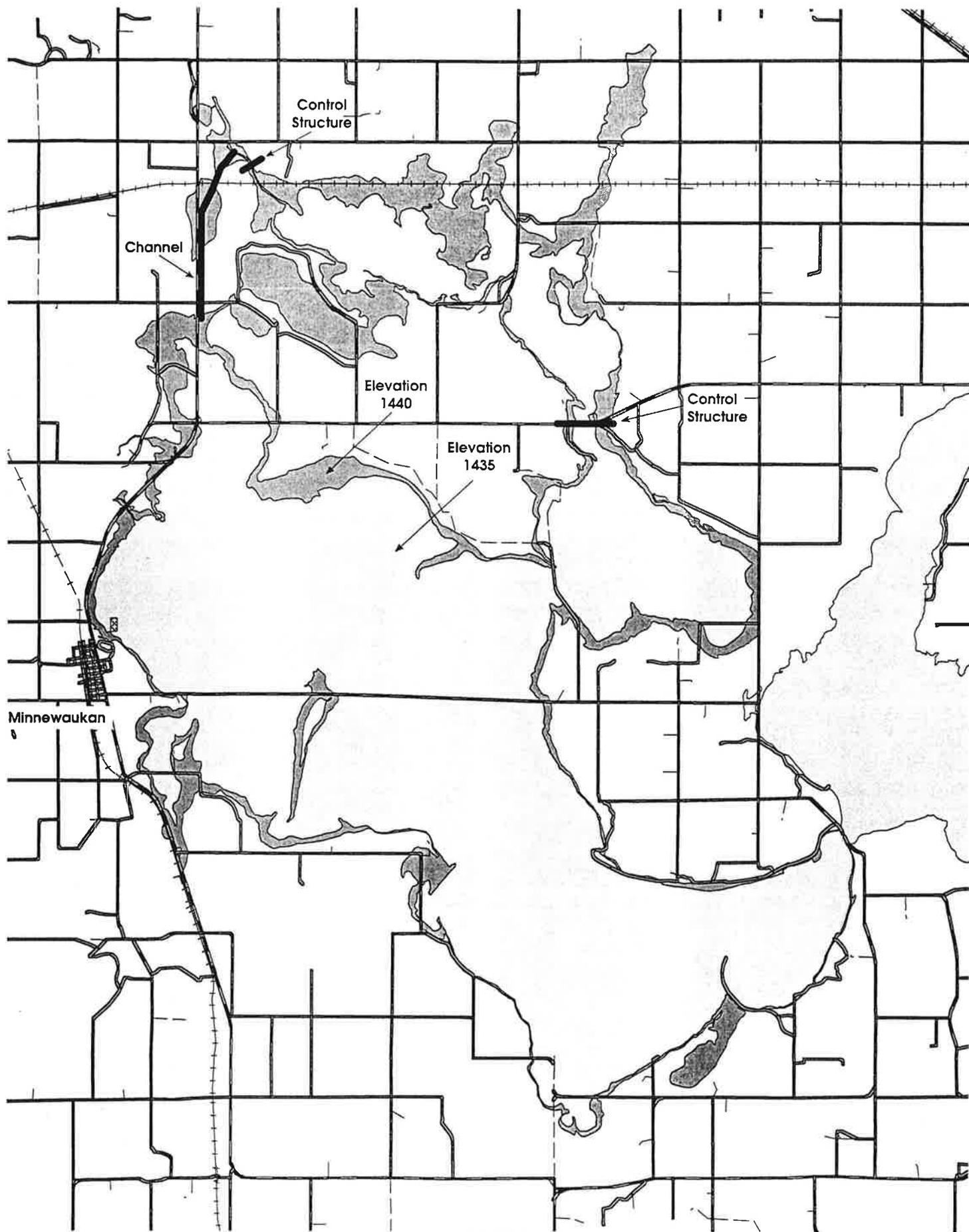


FIGURE 2  
Alternative 2

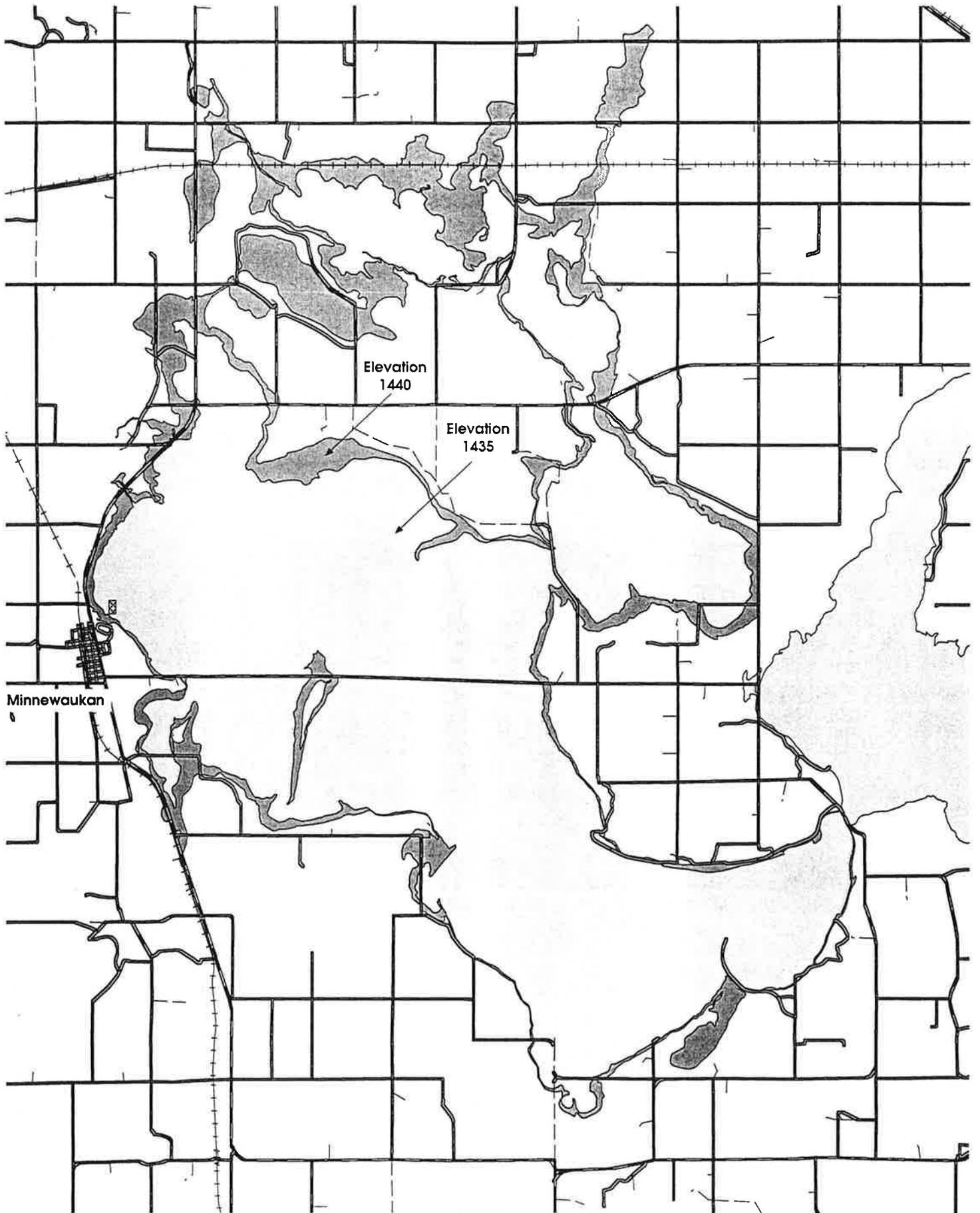
### III. STORAGE AVAILABLE

To determine the volume of water that could be stored in West Bay by this plan, it was necessary to make some assumptions. It was assumed that the starting elevation of the lake would be 1435 feet msl. However, the structure across Ziebach Pass cannot be completed in time to store runoff in the spring of 1996. The elevation by the spring of 1997 is impossible to predict. It was also assumed that water would be held to an elevation of 1439 feet msl. This elevation may need to be adjusted depending on the impacts caused by holding water at this elevation. The Corps of Engineers Contingency Plan assumes West Bay will be held at an elevation 1438 feet msl if a structure is built at Ziebach's Pass.

The area and capacity upstream of Ziebach's Pass between elevations 1435 and 1440 for Alternative 1 are:

Elevation (Ft. msl)	Area (Acres)	Additional Area Inundated (Acres)	Capacity (Ac-Ft)
1435	25,750	0	0
1436	27,094	1,344	26,422
1437	28,438	2,688	54,188
1438	29,782	4,032	83,298
1439	31,126	5,376	113,752
1440	32,470	6,720	145,550

Approximately 7,000 acres of land (Figure 3) would need to be acquired to elevation 1440 feet msl for Alternative 1 at approximately \$200 per acre for a total land acquisition cost of \$1.4 million.



**FIGURE 3**  
**Alternative 1**  
**West Bay Area Inundated at Elevation 1440**

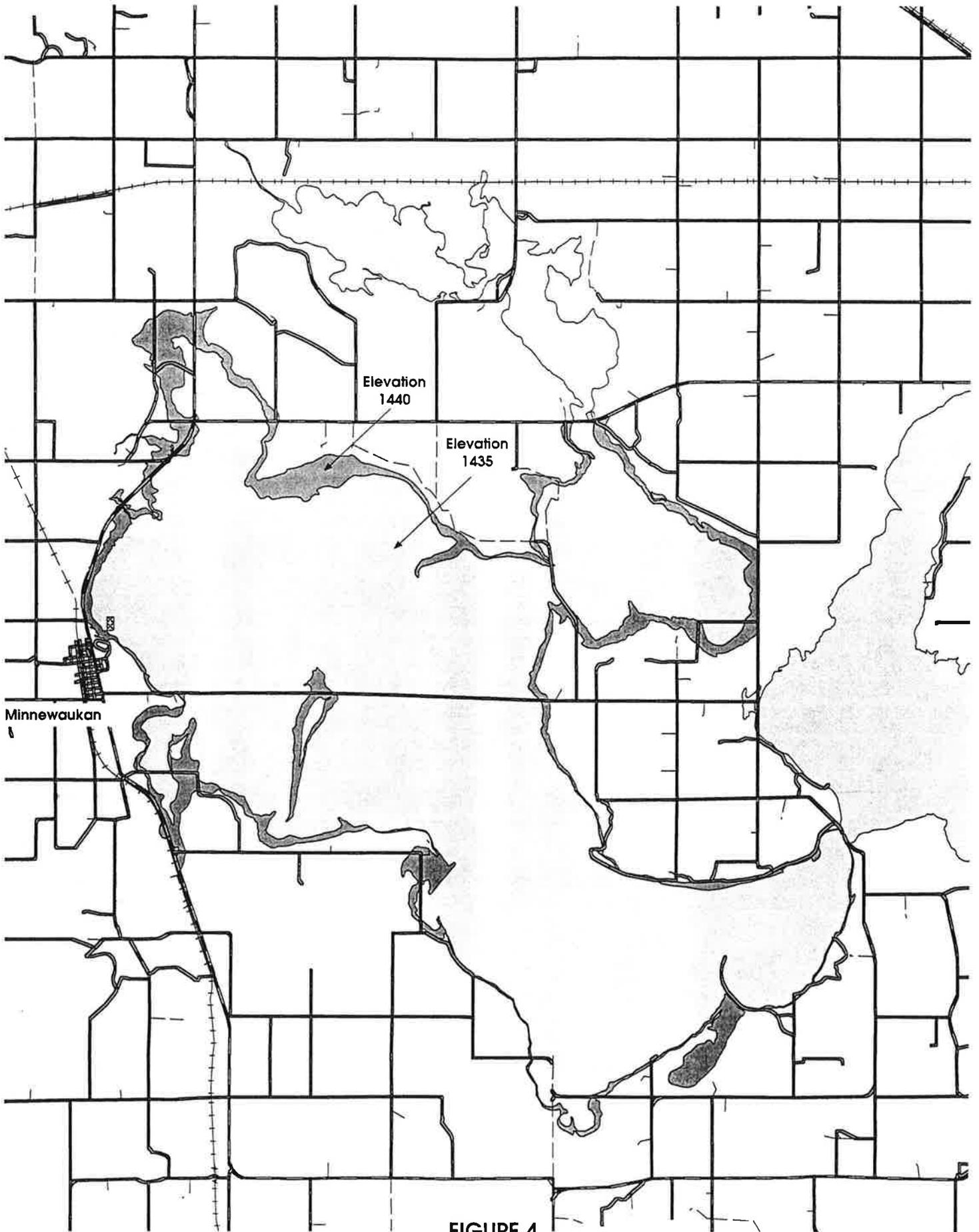
The area and capacity upstream of Ziebach's Pass between elevations 1435 and 1440 for Alternative 2 are:

Elevation (Ft. msl)	Area (Acres)	Additional Area Inundated (Acres)	Capacity (Ac-Ft)
1435	23,280	0	0
1436	23,966	686	23,623
1437	24,652	1,342	47,932
1438	25,338	2,058	72,927
1439	26,024	2,744	98,608
1440	26,710	3,430	124,975

Approximately 3,430 acres of land (Figure 4) would need to be acquired to elevation 1440 feet msl. for Alternative 2 at approximately \$200 per acre for a total land acquisition cost of \$686,000.

Alternative 1 would store approximately 114,000 acre feet of water at an elevation of 1439 feet msl. This would reduce the elevation of the lake east of Ziebach's Pass by approximately 18 inches. If West Bay is held at an elevation of 1438 feet msl, the estimated storage is 83,300 acre feet. This would be 13 inches off the remainder of the lake. Alternative 2 would store approximately 98,600 acre feet of water at an elevation of 1439 feet msl. This would reduce the elevation of the lake east of Ziebach's Pass by approximately 16 inches. If West Bay is held at an elevation of 1438 feet msl, the estimated storage is 72,900 acre feet. This would be 12 inches off the remainder of the lake.

It may also be necessary to reestablish the west end outlet to Dry Lake to move some or all of the runoff from the Dry Lake drainage basin down Mauvais Coulee instead of Channel A to allow it to be stored. A control structure on Dry Lake and a channel from Dry Lake to Mikes



**FIGURE 4**  
**Alternative 2**  
**West Bay Area Inundated at Elevation 1440**

Lake would be necessary to reestablish the drainage pattern. This concept has local opposition. Five major inflow years have occurred since the construction of Channel A. Three of those years the volume of water entering Devils Lake via Mauvais Coulee would not have used all of the storage made available by this plan. The following table shows the inflow volume for these five years.

Year	Mauvais Coulee Inflow Volume (Acre-feet)	Channel A Inflow Volume (Acre-feet)
1979	171,900	Not Available
1987	47,470	62,950
1993	76,250	145,200
1994	88,220	73,420
1995	199,242	116,756

#### IV. Structure

The proposed embankment across Ziebach's Pass would have a length of 1,400 feet and a 30-foot top width at elevation 1445 feet msl. The side slopes of the structure would be 4 horizontal to 1 vertical with concrete mat erosion protection from elevation 1431 to 1443 feet msl. Two 10 foot square box culverts would extend through the structure. The bottom of these culverts would be at elevation 1419 feet msl. A drop structure with a control elevation of 1439 feet msl would control the flow into the culverts. The drop structure would also have four 8 foot square slide gates with a bottom elevation of 1419 feet msl. The estimated cost of this structure is \$5,860,000. This does not include a road on the top of the structure.

As originally proposed, the structure would be built over the old road bed. North Dakota Parks and Recreation has proposed an alternative location for the structure that would lessen the

impacts on the Grahams Island State Park. The two proposed locations are shown in Figure 5. The cross section of the structure would not change if built in the location proposed by Parks and Recreation, except for possible changes in the topography of the lake bottom. There is no topographical data available for the alignment proposed by Parks and Recreation. It was assumed that the bottom of the lake would be similar in this location and adjacent to the old road. The Parks and Recreation alignment would increase the length of the structure approximately 800 feet, from approximately 1,400 feet to approximately 2,200 feet. This would increase the cost of the structure. However, these increased costs may be offset by savings resulting from reduced impacts in the park.

## **V. PROJECT IMPACTS**

### **Transportation Issues:**

A number of highways, secondary roads, and a railroad may be impacted by this plan. Figure 6 shows the approximate locations of these facilities. The North Dakota Department of Transportation (DOT) has provided the estimated costs of raising these highways to an elevation of 1445 feet msl.

### **Highway 281:**

The following reaches of Highway 281 are all in the area of the junction with Highway 19. The DOT is in the process of raising the road in this area. The current elevation is 1438.1 feet msl. The proposed elevation for the summer of 1996 is 1443.0 feet msl. If West Bay is raised to 1439 feet msl these roads should be raised to 1444 feet msl.

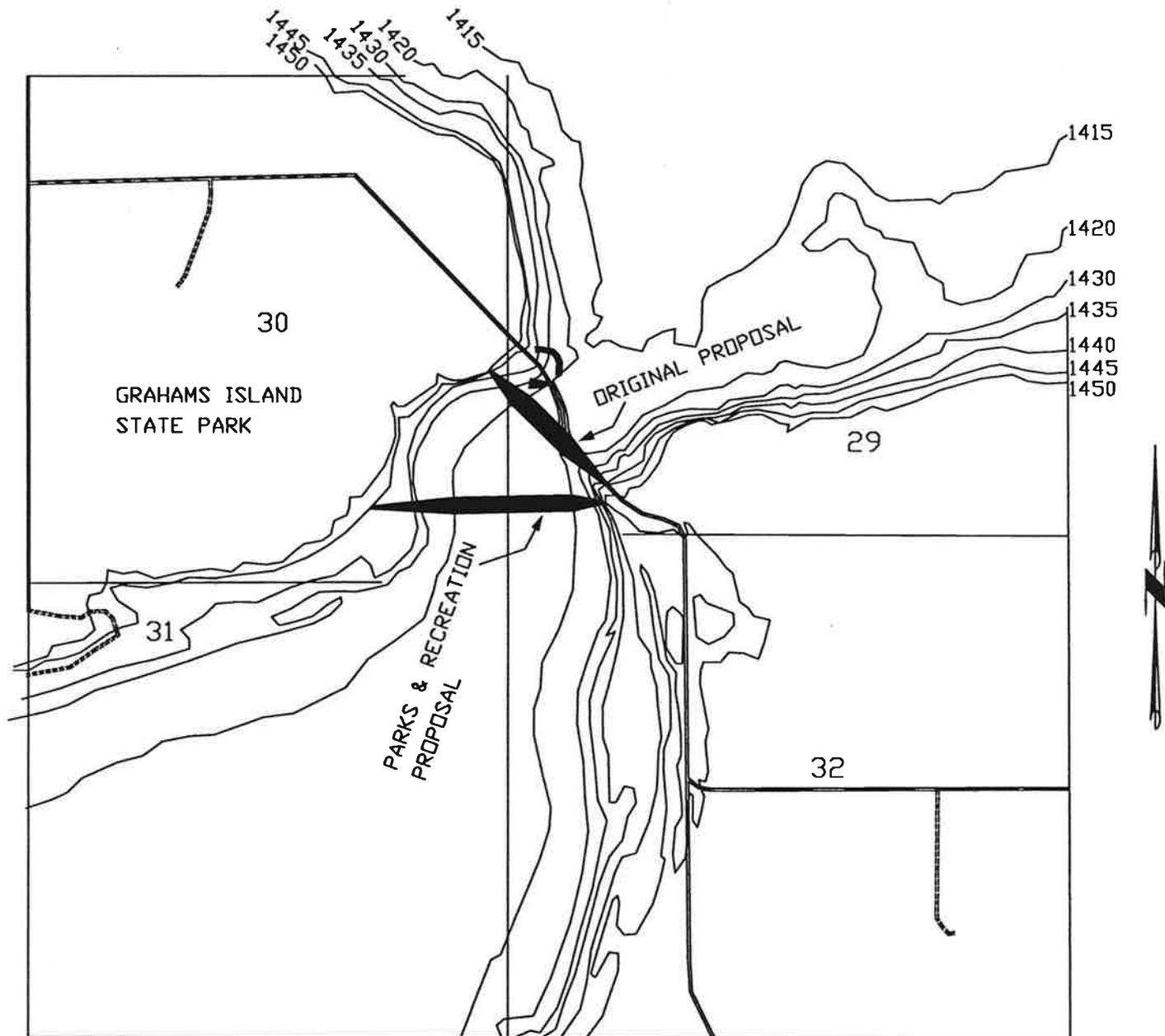
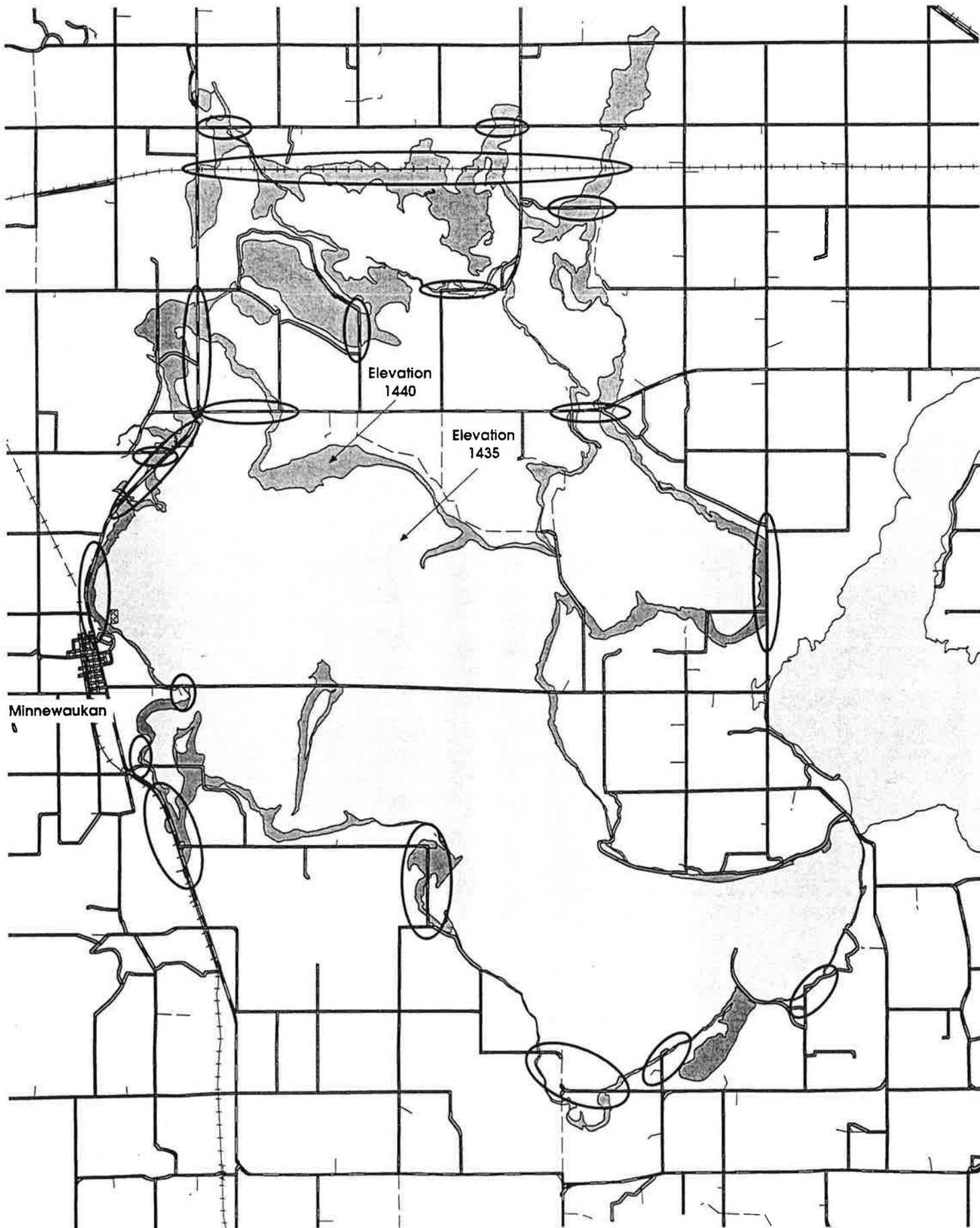


Figure 5  
Ziebach Pass Structure Location



**FIGURE 6**  
**Roads and Railroads Impacted**  
**at Elevation 1440**

Sections 25 and 26, T 154 N, R 67 W; approximately 4,150 feet.

Sections 35 and 36, T 154 N, R 67 W; approximately 2,600 feet.

Section 35, T 154 N, R 67 W; approximately 3,300 feet.

Section 2, T 153 N, R 67 W; approximately 3,250 feet.

Section 10, T 153 N, R 67 W; approximately 3,700 feet.

The estimated cost of the additional road raise in these areas is \$2,880,000.

South of Minnewaukan in Section 26, T 153 N, R 67 W; approximately 3,750 feet of Highway 281 may need to be raised. This area is not currently being raised by the DOT. The estimated cost to raise the road in this area is \$685,000.

The total estimated cost to raise Highway 281 to an elevation of 1445 feet msl is \$3,565,000.

**Highway 19:**

The following reaches of Highway 19 are all in the area of the junction with Highway 281. The Department of Transportation is in the process of raising the road in this area. The current elevation is 1442 feet msl. The proposed elevation for the summer of 1996 is 1443 feet msl. If West Bay is raised to 1439 feet msl. these roads should be raised to 1444 feet msl.

Section 36, T 154 N, R 67 W; approximately 5,280 feet.

Section 31, T 154 N, R 66 W; approximately 100 feet.

The Mauvais Coulee bridge in Section 34, T 154 N, R 66 W; approximately 2,900 feet. The DOT is in the process of raising this area also. The current elevation is 1438.5 feet msl. The proposed elevation is 1443.4.

The estimated cost is to raise Highway 19 to an elevation of 1445 feet msl is \$1,455,000.

### **Secondary Roads:**

A number of secondary roads may be impacted by the plan. Some of these roads will have to be raised, it may be possible to abandon some of the roads, other roads listed here may not be impacted. No cost estimates were made for these roads because there was not enough information available.

The following roads would have to be raised if this plan is implemented:

The North-South county line road would need to be raised to 1444 feet msl for approximately 5,900 feet.

Road between Sections 29 and 32, T 153 N, R 66 W and into farmstead; approximately 1,400 feet.

Roads into three farmsteads near Minnewaukan in Section 23, T 153 N, R 67 W, approximately 1,420 feet.

The following roads might have to be raised, additional information concerning the current elevation of the roads and the necessity of the roads is required:

Road through Section 32, T 153 N, R 66 W.

Road into farmstead in the SW 1/4 of Section 1, T 152 N, R 66 W; this farmstead may be abandoned.

Road into building in Section 10, T 152 N, R 66 W.

Road between Sections 8 and 9, T 152 N, R 66 W.  
This road may already be closed due to flooding.

Road between Sections 9 and 16, T 152 N, R 66 W.  
This road may already be closed due to flooding.

Road in Section 8, T 152 N, R 66 W.  
This road may already be closed due to flooding.

Road between Section 35, T 154 N, R 67 W, and Section 2, T 153 N, R 67 W.

Road between Sections 12 and 13, T 154 N, R 67 W.  
The low cord of this bridge is 1438.8 feet msl., the top of the road is 1441.6 feet msl. Therefore, this road may not need to be raised.

The following roads may have to be raised under Alternative 1, additional information concerning the current elevation of the roads and the necessity of the roads is required. These roads would not be impacted by Alternative 2:

Road between Sections 15 and 22, T 154 N, R 66 W.

Road between Sections 21 and 22, T 154 N, R 66 W.  
This road may already be closed due to flooding.

Road between Sections 9 and 16, T 154 N, R 66 W.

Road between Sections 29 and 30, T 154 N, R 66 W.

Road between Sections 21 and 28, T 154 N, R 66 W.  
This road may already be closed due to flooding.

#### **Island Road/Minnewaukan Flats Road:**

Approximately two miles of the Island Road running east from Minnewaukan is at an elevation of 1435. This stretch of road was inundated during the summer of 1995. The road is currently in use. It would not be feasible to raise this road to 1444 feet msl.

**Railroad:**

The Soo Line Railroad may need to be raised at the following sites:

- Section 13, T 154 N, R 66 W.
- Section 14, T 154 N, R 66 W.
- Section 16, T 154 N, R 66 W.
- Section 17, T 154 N, R 66 W.
- Section 18, T 154 N, R 66 W.

From the data available it appears that the railroad may be at an elevation of 1439 feet msl in some areas. It may be necessary to hold the water lower, 1437 feet msl or less, to avoid backing water against or over the railroad embankment. Alternative 2 would not impact the railroad except in the area of the channel crossing. If the railroad is impacted by Alternative 1, it will probably be less costly to construct Alternative 2 than to raise the railroad.

**Structures Impacted:**

Buildings at the following locations may need to be protected or relocated. It is not known if these buildings are currently in use or abandoned.

- Southwest quarter, Section 1, T 152 N, R 66 W.
- Section 10, T 152 N, R 66 W.
- Northwest quarter, Section 16, T 152 N, R 66 W.

The television tower in Section 18, T 154 N, R 66 W may need to be protected if Alternative 1 is used. The base of the tower is approximately at elevation of 1440 feet msl. It may not be a concern. Alternative 2 would not impact this area.

The planned relocation of the United Power Association power line adjacent to Highways 19 and 281 may be impacted.

**Hydraulic Concerns:**

The Big Coulee gage in Section 12, T 154 N, R 67 W and the Little Coulee gage may be inundated by backwater and have to be relocated or abandoned.

The backwater caused by this plan would reach to Lake Irvine which may cause increased stages in the Chain of Lakes.

The effect of increasing the water level on Devils Lake on the adjacent water table elevation and the potential impacts of the possible increased water table elevation are not known.

**Fort Totten Indian Reservation Issues:**

It is our understanding that the Devils Lake Sioux Tribe would like a road across Ziebach's Pass to ensure access if Highway 57 and Highway 20 are inundated. The cost estimates in this report do not include a road across the structure or roads leading to the structure. However, the engineering aspects of a road would not be difficult.

Tribal land may be inundated by this plan. These lands are included in the estimate of land to be acquired.

### **Grahams Island State Park:**

The northern end of the structure across Ziebach's Pass would be located in Grahams Island State Park. The plan will impact the park. A Memo to Governor Schafer from Doug Prchal, Director North Dakota Parks and Recreation dated January 30, 1996 describes the impacts to the park. The following summarizes the memo, the memo is included as Appendix A.

Traffic flows, visitor access, and safety would all be compromised, requiring a new development plan to adjust use area access, visitor service, safety and administration. Park operations would be disrupted by the plan. The plan would obliterate a parking lot and access road other park roads would be impacted by construction activities.

The proposed embankment would obliterate the only boat ramp/harbor and bait shop on west bay. Construction cost for this development is \$500,000. Two ramps would be needed if the embankment is built to provide access to west bay and main bay. A contract concessionaire operates a bait shop and store. The memo from Parks and Recreation states that the project would close this business. Economic impact is loss of jobs (3 FTE summer and 1.75-FTE winter) and estimated business loss of \$36,463. The memo does not say why the business could not be relocated.

The Game and Fish/Fish and Wildlife section discusses the impact of the plan on the Devils Lake fishery. Any impact to the fishery would have a negative impact on park use and visitation.

It has been proposed that the dike be used as a road for access across the lake. The proposed alignment would route traffic through the park. Traffic through the park would have

many negative impacts on the park. As mentioned above, Parks and Recreation proposed an alternative dike alignment that would result in little disruption or impact to the park. The potential impact to the fishery would still occur with this alternative.

The park is managed by the state on behalf of the U.S. Bureau of Reclamation (USBR), the owner. All approvals, permits or authorizations to construct a dike would have to come from USBR. In addition, the USBR owns the lakebed so permits for construction must be issued by them.

#### **Cultural Resources:**

A number of areas containing cultural resources have been identified in the Ziebach's Pass area. These areas may complicate the design and construction of the proposed structure.

#### **Game and Fish/Fish and Wildlife Impacts:**

The plan may impact the National and State Waterfowl production areas on Pelican Lake and the Silver Lake National Wildlife Refuge. Alternative 2 would have less impact on the Pelican Lake area than Alternative 1.

The plan will impact the Devils Lake fishery. The Fisheries Division of the North Dakota Game and Fish Department provided comments on the plan. The following summarizes their comments, the entire text of the comments is provided in Appendix B.

Impacts of the project on the Devils Lake fishery will vary depending on duration of blockage at Ziebach's Pass. The impacts can range from drastic with a long term blockage to less damaging with a one year blockage. There will, however, be impacts under any scenario.

West Bay is a crucial area for all fish species as spawning and escape cover. The West Bay area has typically had expanses of upright emergent and submergent vegetation that provides excellent spawning habitat for perch, escape cover for young fish to avoid predation and substrate for aquatic invertebrates that are utilized as food items. This is particularly true for yellow perch since they require lower TDS levels (approximately 2,500 ppm or below) for successful reproduction, which occurs in the West Bay area. Any further blockage in the Ziebach Pass area could effectively diminish the perch population within 7 years, the normal life expectancy of perch in Devils Lake. Without access to adequate spawning and “grow out” areas, the population would not be replenished, causing a collapse in the recreational fishery.

Perch, and likely walleye, may be unable to pass through the openings in proposed structure because of the expected high velocity gradient. Perch are not powerful swimmers and will not be able to negotiate the current, effectively precluding them from entering the West Bay area. Perch stocking isn't considered a viable alternative to replace natural reproduction. Game and Fish attempted this in the early 1990's and met with very limited success.

General food production for Devils Lake would be reduced since the West Bay area is one of the most productive in the system. Loss of this productivity reduces carrying capacity of the entire system. Should reproduction occur in the West Bay area, primarily pike and possibly walleye, access of fry or fingerling to the area east of Ziebach Pass would be lowered due to the restriction.

The project would likely increase the salinity in the area east of Ziebach's Pass because less fresh water would enter the main lake. The increase in salinity would decrease the possibility of significant natural reproduction in the main lake.

Devils Lake is a major supply of walleye and northern pike eggs for distribution to statewide lakes. The project may impact this supply.

**Mitigation:**

Significant mitigation costs may be incurred by this plan.

**VI. COSTS**

These following cost estimates are based on the best information available at this time. The actual cost will be higher as items that were not considered in this preliminary review of the plan become apparent.

**Alternative 1 Cost Estimate**

**Structural and Land Acquisition Cost:**

Cost of Ziebach's Pass Structure	\$5,860,000
Land Acquisition	1,400,000

**Known Impacts:**

Highway Improvements	5,020,000
North South County Line Road	1,000,000
Subtotal	13,280,000

\*\*\*\* Other Impacts: (+/- 20%) \$2,720,000

Secondary Roads, railroad, structures,  
United Power Association Power Line,  
stream gages, Grahams Island State Park,  
mitigation of fish and wildlife impacts,  
and mitigation of cultural resources

Total Estimated Costs	\$16,000,000
Cost per acre-foot of storage	\$140

\*\*\*\* The other impacts are based on a contingency percentage because detailed estimates are not available at this time.

## Alternative 2 Cost Estimate

Structural and Land Acquisition Cost:	
Cost of Ziebach's Pass Structure	\$5,860,000
Land Acquisition	686,000
Control Structures and Channel	1,000,000
Known Impacts:	
Highway Improvements	5,020,000
North South County Line Road	1,000,000
Subtotal	13,566,000
**** Other Impacts: (+/- 15%)	
Secondary Roads, Structures, United Power Association Power Line, Stream Gages, Grahams Island State Park, Mitigation of Fish and Wildlife Impacts, Mitigation of Cultural Resources	1,934,000
Total Estimated Costs Identified to Date	\$15,500,000
Cost per acre-foot of storage	\$160

\*\*\*\* The other impacts are based on a contingency percentage because detailed estimates are not available at this time. Contingency percentage of 15% is lower than alternative 1 because railroad is protected.

## VII. PERMITS REQUIRED

A 404 permit from the Corps of Engineers is required to place fill in a wetland. A sovereign land permit and a construction permit, issued by the North Dakota State Engineer will be required. The Bureau of Reclamation owns the bed of Devils Lake. A special use permit from the Bureau will be required. A refuge compatibility statement from the U. S. Fish and Wildlife Services will be required if the plan impacts the Silver Lake National Wildlife Refuge or the National Waterfowl Production Area on Pelican Lake.

## VIII. SUMMARY

It has been proposed that a structure be constructed across Ziebach's Pass to hold water in the West Bay of Devils Lake. Alternative 1 would provide an estimated 114,000 acre feet of storage, reducing the elevation of the remainder of the lake approximately 18 inches.

Alternative 2 would provide approximately 98,600 acre feet of storage, reducing the elevation of the remainder of the lake approximately 16 inches. The cost of Alternative 1 is \$16,000,000 or \$140 per acre-foot of storage. The cost of Alternative 2 will exceed \$15,500,000 or \$160 per acre-foot of storage. The plan will not be able to capture runoff during the 1996 spring runoff. The plan would negatively impact the Devils Lake fishery and Grahams Island State Park.

# ***APPENDIX A***

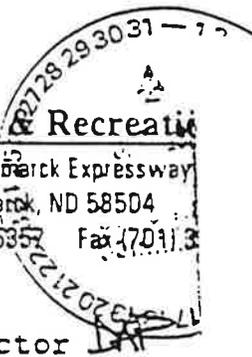


North Dakota Parks & Recreation

1835 Bismarck Expressway

Bismarck, ND 58504

Phone (701) 328-5357 Fax (701) 328-5358



MEMO TO: Governor Schafer  
FROM: Doug Prchal, Director  
SUBJECT: Ziebach Pass Dike Impacts  
DATE: January 30, 1996

Edward T. Schafer, Governor

Douglas A. Prchal, Director

West District Manager  
Don Underwood

East District Manager  
Brad Pazarsky  
72 Lake Metigoshe State Park  
Bottineau, ND 58318  
Ph. (701) 263-4054

Cross Ranch  
MC2, Box 152  
Sanger, ND 58567  
Ph. (701) 794-3731  
• Little Missouri-Killdeer

Devils Lake  
Rt. 1, Box 165  
Devils Lake, ND 58301  
Ph. (701) 766-4015  
• Black Tiger Bay  
• Grahams Island  
• The Narrows  
• Shelters Grove

Ft. Abraham Lincoln  
Rt. 2, Box 139  
Mandan, ND 58554  
Ph. (701) 663-9571  
• Sully Creek-Medora

Ft. Ransom  
5981 Wah Njelle Parkway  
Ft. Ransom, ND 58033  
Ph. (701) 875-4331  
• Beaver Lake-Nappoleon  
Ph. (701) 452-2752

Ft. Stevenson  
Rt. 1, Box 262  
Garrison, ND 58540  
Ph. (701) 337-5576

Islandic  
13571 Hwy. 5  
Cavalier, ND 58220  
Ph. (701) 265-4561

Lake Metigoshe  
72 Lake Metigoshe State Park  
Bottineau, ND 58318  
Ph. (701) 263-4651

Lake Sakakawea  
Box 732  
Riverdale, ND 58565  
Ph. (701) 487-3315

Lewis & Clark  
Rt. 1, Box 13A  
Epping, ND 58843  
Ph. (701) 859-3071

Turtle River  
Rt. 4, Box 9A  
Arlville, ND 58214  
Ph. (701) 594-4445

This assessment is based on an alternative presented by the State Water Commission on January 19, 1996 that suggested a dike alignment on the presently inundated Ziebach Pass roadbed. The listed impacts relate to that alignment and impacts to Grahams Island State Park.

- The park has been developed extensively in the Ziebach Pass area. Traffic flows, visitor access and safety all will be compromised greatly affecting the park's function as a recreation area. A new development plan would be necessary to adjust use area access, visitor services, safety and administration should a dike be built.
- The proposed embankment on the old road alignment, as suggested, would obliterate the only boat ramp/harbor and bait shop on west bay. Construction cost for this development is \$500,000. Two ramps would be needed if the dike is built to provide access to west bay and main bay.
- Construction of the dike to elevation 1445 would obliterate a parking lot and access road. Based on the elevations suggested on the dike, 10' of fill would cover the parking area.
- A contract concessionaire operates the bait shop and store. Construction of the dike would close this business. Economic impact is loss of jobs (3 FTE summer and 1.75-2 FTE winter) and estimated business loss of \$36,463.
- Construction of the dike would disrupt park operations at Grahams Island State Park. Annual visitation to the park is 90,000, 50-60% fish and boat. Loss of the ramp would impact visitation, minimally a 50% reduction, very likely higher. Economic impacts from direct expenditures by visitors, park revenues and tax revenues is estimated at \$2 million annually.
- High probability of impact to the fishery. Any impact to the fishery would have a negative impact on the park use and visitation. Game and Fish Department can speak to specific impacts.

- Park roads are not designed nor constructed for heavy traffic or heavy equipment (2" asphalt surface) and any construction travel would deteriorate the roads. No estimated impact, however, the roads would need resurfacing with 2" overlay plus preparation.
- At full storage elevation of 1439 behind the dike, a one mile section of the N-S access road to the park would be inundated. Raising the road is estimated to cost \$1 million.

#### ANCILLARY IMPACTS

- The potential exists to use the top of the dike for road access across the lake. The proposed alignment would route traffic through the park. This traffic has a high potential to disrupt park experience, increase risk, impact roads, bisect park use areas, reduce safety, increase park operation costs and decrease park revenues.
- Cultural Resources - The entire park has a rich cultural resource base, especially along the southern shore in the Ziebach Pass location. Mitigation would be required .
- The park is managed by the state on behalf of the USBR, the owner. All approvals, permits or authorizations to construct a dike would have to come from USBR. In addition, that agency owns the lakebed so permits for the construction must be issued by them.

#### ALTERNATIVE DIKE ALIGNMENT

Move the dike alignment west of the ramp and harbor. This alignment would connect to an existing section line allowing potential road access to the west connecting with the N-S park access road (attached plan). The road corridor should be controlled access with an underpass if road construction occurred. By relocating the dike, all facilities stay intact, little disruption or impact occurs in the park, use areas are minimally impacted and relocated road alignment bypasses park development.

The potential fishery impact should be recognized, no matter which alignment. When fishing opportunities diminish, so does park use.

#### Enclosures

c: Dave Sprynczynatyk  
 Dennis Brietzman, USBR  
 Dick Horner  
 Jesse Hanson  
 Brad Pozarnsky

# DEVILS LAKE STATE PARK SYSTEM

## GRAHAM'S ISLAND STATE PARK EXISTING CONDITIONS

PRE-STATE PARK DEVELOPMENT

PREPARED FOR:  
NORTH DAKOTA PARKS  
AND RECREATION DEPARTMENT

PREPARED BY:  
KEITH HOLDSWORTH

MARCH 1986

0 500 1000



Steep slopes  
Wetlands  
Slope information not  
available for Howard property

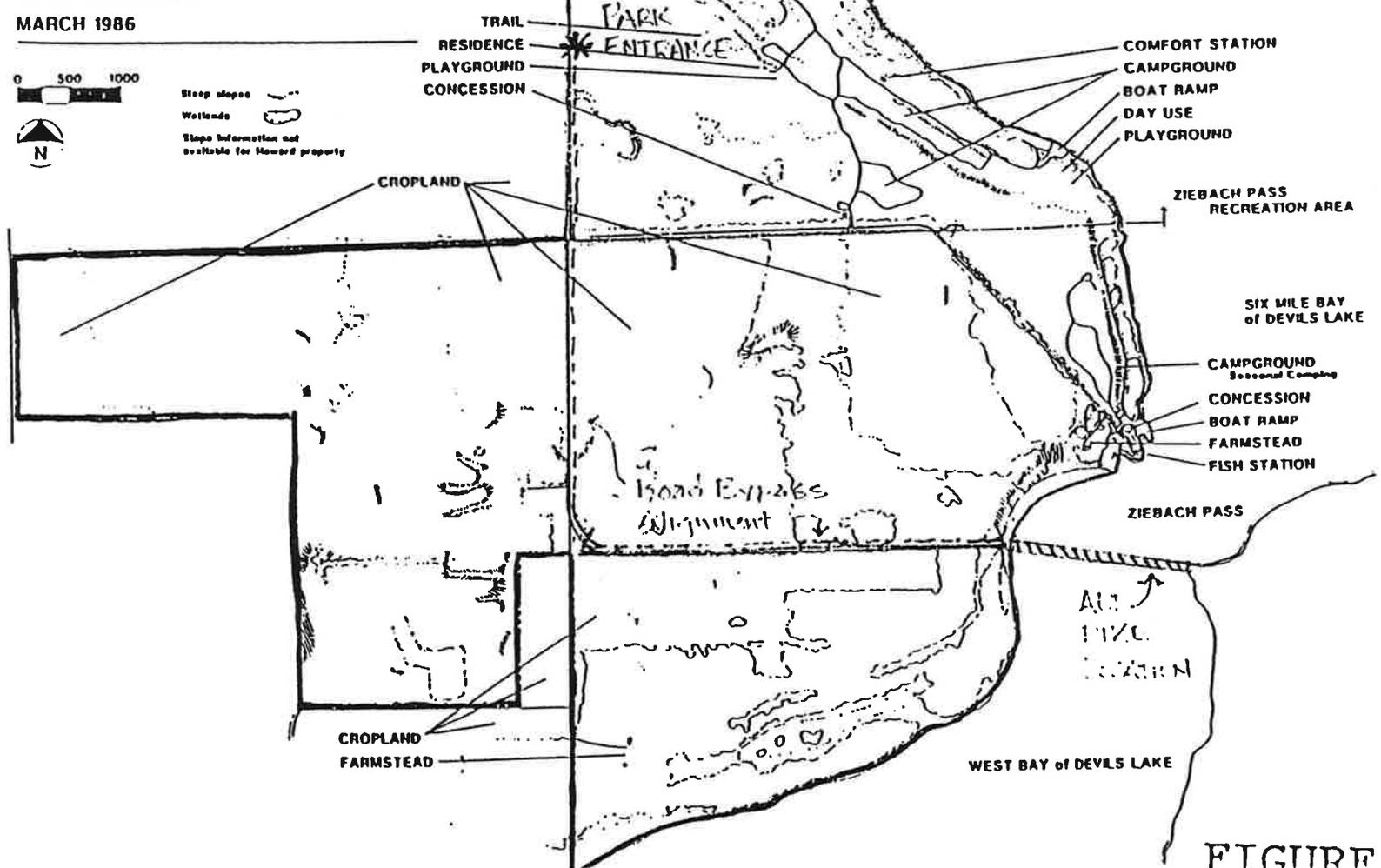


FIGURE 1



## ***APPENDIX B***

## FISHERY COMMENTS ON ZIEBACH PASS OPTION

1. West Bay (west of Ziebach Pass) is a crucial area for all fish species as spawning and escape cover. The West Bay area has typically had expanses of upright emergent and submergent vegetation that provides excellent spawning habitat for perch, escape cover for young fish to avoid predation and substrate for aquatic invertebrates that are utilized as food items. This is particularly true for yellow perch since they require lower TDS levels (approximately 2,500 ppm or below) for successful reproduction, which occurs in the West Bay area.
2. Any further blockage in the Ziebach Pass area could effectively diminish the perch population within 7 years, the normal life expectancy of perch in Devils Lake. Without access to adequate spawning and "grow out" areas, the population would not be replenished, causing a collapse in the recreational fishery.
3. Perch, and likely walleye, may be unable to pass through the openings in proposed structure because of the expected high velocity gradient. Perch are not powerful swimmers and will not be able to negotiate the current, effectively precluding them from entering the West Bay area.
4. Perch stocking isn't considered a viable alternative to replace natural reproduction. Game and Fish attempted this in the early 1990's and met with very limited success, i.e., not sufficient to maintain a perch fishery.
5. When the Minnewaukan road was built it effectively blocked the majority of fish passage to the north. When spawning operations were run on the Minnewaukan road, thousands of pike, walleye and perch were captured on the south side. Some pike and walleye were able to pass through 8 smaller culverts but perch were never found on the north side of the road. This provides evidence that any blockage, even though means for fish passage are provided, will effectively stop fish movement to good habitat areas.
6. Boat access would have to be provided to the West Bay area. There is currently no boating access west of Graham's Island State Park.
7. General food production for Devils Lake would be reduced since the West Bay area is one of the most productive in the system (because of information contained in item 1). Loss of this productivity reduces carrying capacity of the entire system.
8. Should reproduction occur in the West Bay area, primarily pike and possibly walleye, access of fry or fingerling to the area east of Ziebach Pass would be lowered due to the restriction.
9. Although salinity of water entering through Mauvais Coulee is

much less there is still an amount of sodium and sulfate ions contained in the runoff waters. If the water is held behind a Ziebach Pass structure for an entire summer with subsequent evaporation, the salinities are expected to increase to some degree. Whether or not this would be deleterious to the fishery resource is dependent upon the degree of evaporation, flux of salts from the bottom sediment and length of time the water is held. Salinities in the area east of Ziebach Pass would likely also increase because of less fresh water entering the main lake and evaporation. This decreases possibility of significant natural reproduction in the main lake.

10. Devils Lake is a major supply of walleye and northern pike eggs for distribution to statewide lakes. A structure at Ziebach Pass may concentrate them at the area for ease of trapping and subsequent spawn take assuming flows in the spring of the year coming through the structure and topography suited to trapping. Conversely, no flows will cause considerable dispersal and more difficulty in obtaining adequate eggs. Following are statistics related to the importance of egg take from Devils Lake:

Percent of Statewide Eggs From Devils Lake, 1982-95

	<u>Walleye</u>	<u>Northern Pike</u>
Range:	23-83.2%	11.3-92.7%
Mean:	53.2%	56.7%
Median:	42.5%	60.2%

11. Impacts to the fishery of Devils Lake will vary depending on duration of blockage at Ziebach Pass. They can range from drastic with a long term blockage to less damaging with a one year blockage. There will, however, be impacts under any scenario. For example, if the structure were built and hold back water for only one year we would expect to lose fish production in the West Bay area for that period of time. If the structure were to be opened and stay open after the first year impacts would be less. Northern pike would likely be able to negotiate the normal spring flow velocity created by the culverts but walleye are questionable and it is doubtful for perch. Walleye and perch could, and likely would, be able to pass through the structure under low or no flow conditions. If survival occurred in the West Bay area a fishery could still be available but limited to the fish in that portion of the system and water levels in West Bay.

Minnewaukan Road is analogous to this situation. Prior to building the road there was free movement of fish to the north of the current road. When the road was built, eight small (36"?) culverts were installed to allow water flow and theoretically fish passage. However, it soon became a good area to collect pike and walleye eggs since the fish movements were restricted through the culverts in any large numbers. This continued even

with the upgrade of the road and larger culverts. A similar situation can be expected at Ziebach Pass.