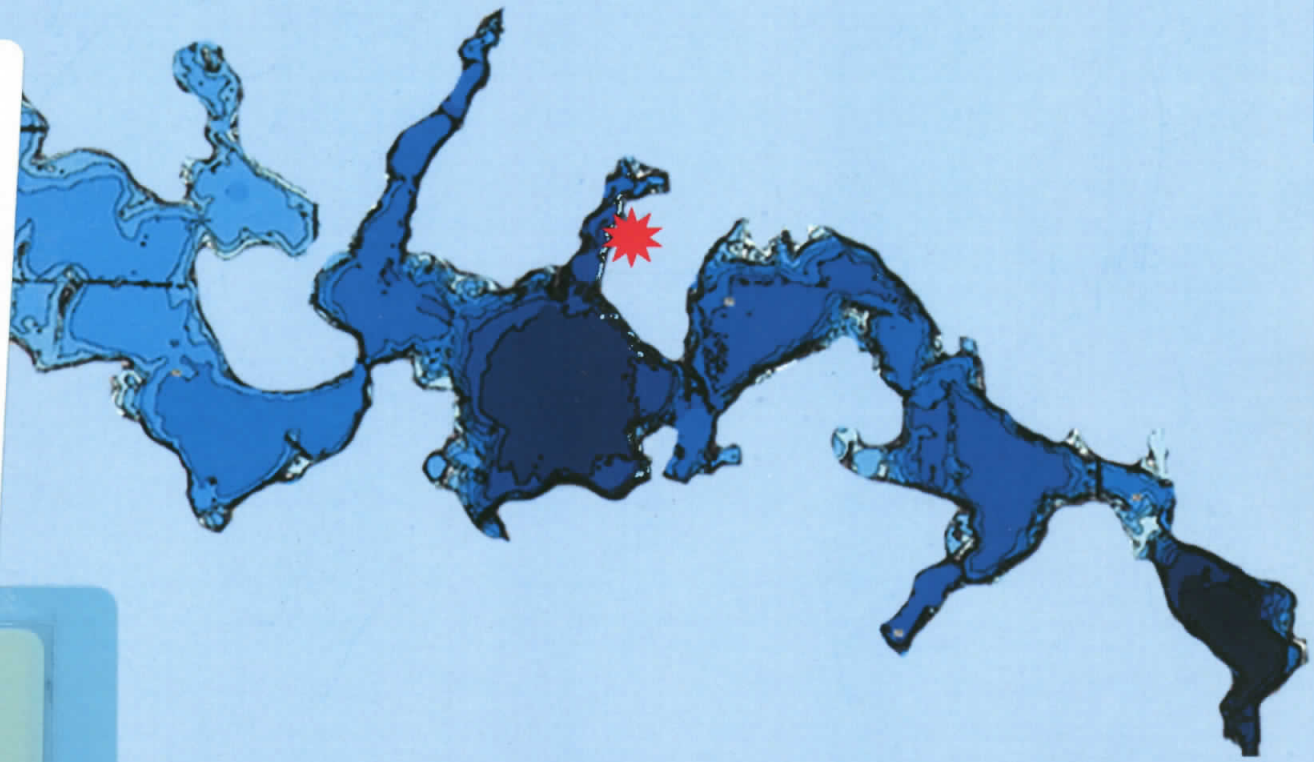
DEVILS LAKE
North Dakota

A New Devils Lake Waterfront

Reconnecting the Devils Lake Community to its Largest Natural Resource

By
Chad Zander



North Dakota State University
Department of Landscape Architecture
Design Thesis 2004-2005

A NEW DEVILS LAKE WATERFRONT

A Design Thesis Submitted to the
Department of Architecture and Landscape Architecture
of North Dakota State University

By

Chad Zander

In Partial Fulfillment of the Requirements
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[redacted]
Josh Walter, Primary Critic
Professor of Landscape Architecture

[redacted]
Catherine Wiley, Secondary Critic
Assistant Professor of Landscape Architecture

[redacted]
Angela Hanson, Blind Critic
Assistant Professor of Landscape Architecture

[redacted]
Don Faulkner, Thesis Committee Chair
Assistant Professor of Architecture

[redacted]
Paul Gleye, Department Chair
Chair of Landscape Architecture Department

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Abstract

Devils Lake is the largest natural lake in the state of North Dakota, it is also a closed basin lake, which helped contribute to its current flooding problem. In the future, when an outlet is created, the development of recreation areas tied to the lake will be an important amenity to the region. The reclamation of a more natural looking shoreline will again cause people to build along the lake and the lakeside population will start to grow. A public area along the lake that once flourished will again provide residents with the elements for an unforgettable experience. The design of a new waterfront will incorporate past precedents with modern design, to create an open space the city and area can be proud of. The design will primarily focus on the enhancement of human life on the site and the celebration of the areas unique history. The site will tie together the landmarks on the lake and increase the awareness and publicity of the development.

A New Devils Lake Waterfront

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A New Devils Lake Waterfront

Introduction

Project Location

Located in central North Dakota, the Devils Lake area provides a scenic escape from the surrounding farmland and prairie. Enclosed by gentle rolling hills and lush green forests, the lake is the largest natural body of water in the state. The settlement around the lake was first started in the 1880's and continues to flourish today. The region is known throughout the country for its outdoor opportunities, especially hunting and fishing. The lake has recently gone through a very dramatic and ongoing flood. Most of the development along its shores was devastated by the high water and has been removed. The current solution to the lakes flooding problem is to create an outlet to the south. When an outlet gets constructed and the lake level becomes stable, people will once again start developing along its edges. The need for a public recreation area will be one of the first priorities in creating a new waterfront. The following figure shows Devils Lake's location in the state of North Dakota.

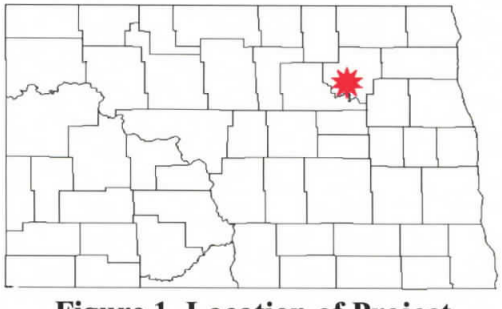


Figure 1. Location of Project

The adjacent locations that the design thesis will focus on include: the city of Devils Lake, Ramsey County and The Spirit Lake Reservation. The city of Devils Lake lies just a few miles to the north of the lake and provides the community with an economic base and leadership roles. The city of Devils Lake can be recognized for their rich history and cultural heritage as well as for their active water recreation and scenic beauty. The lake is located in southern Ramsey County and attracts residents from all the surrounding communities. The Spirit Lake Reservation lies to the south of the lake and provides a marina and casino to attract people to the area.

Project Introduction

In this thesis project the conflict between human settlement and natural systems will be studied and analyzed. Historical information will be used to help understand a lake with fluctuating water levels and changing shorelines. It will also explore the opportunities and constraints that affect the city of Devils Lake and the surrounding communities. The idea that the lake is the cornerstone of the entire Devils Lake community is accepted and must be upheld to provide future generations with similar visions. The new recreation area, combined with the cities many open spaces; will provide the area with a sense of pride in their outdoor opportunities.

Project Goals

The primary goal of the project will consist of the development of a recreational landscape, which will recreate the sense of place that surrounded the Devils Lake community during the early twentieth century. The revitalization of the waterfront will create a permanent link with the city of Devils Lake, which was lost due to the flooding that plagued the area for so long.

The personal goals that I hope to attain from this project include the practice and application of waterfront design. The ability to effectively and economically produce an important amenity for the city of Devils Lake.

Project Objectives

The objectives that I believe will create a successful design and waterfront include:

1. To increase waterfront access for users

   ▪Making better connections to the residents in the area.

   ▪Creating visual access and enhancement to the waterfront.

   ▪Linkages to the city expanded and improved.

2. Define the areas image as a lake-based community

   ▪Create a planning strategy for the Devils Lake waterfront. Examining the relationships between the waterfront and the city, as well as landmarks on the lake.

   ▪Integrating historical elements with modern design to enhance the site.

   ▪Including a management plan for addition of commercial spaces.

   ▪Increasing knowledge and publicity of the site.

   ▪Connections to other lake destinations and visited areas.

   ▪Permanent development that will last well into the future.

3. Design of pedestrian friendly circulation system

   ▪Improving safety for younger users.

   ▪Organization with the pedestrian in mind.

   ▪Safe and friendly water circulation paths and systems.

   ▪Spatial relationships among elements.

User Group

The purpose of the design is to attract residents from the city and regional area as well as tourists. With the recent decline in population the area has been working on attracting potential residents. The user group for the new development will include the following visitors:

1. **Residents**
   - Local families and residents of the city of Devils Lake.
   - Local families and residents of the regional area.
   - All those who are water enthusiasts.

2. **Tourists**
   - Tourists from neighboring states and the midwestern United States.
   - Ecotourists that travel from entire United States for excellent hunting and fishing opportunities.
   - Those passing through the area on way to other destinations.

3. **Special Interest Groups**
   - Outdoor enthusiasts groups or organizations.
   - Historical groups and societies that pursue traditional preservation.
   - Researchers and scientists that range from ND Game and Fish to high school science classes.
   - Water orientated sports such as water skiers, jet-skiers, swimmers and boaters.

Client Group

The development of the project would rely heavily on the ability of local government agencies to receive aid from state or federal programs. The area has been receiving federal aid and assistance for the cities protection from high lake levels for over a decade. The local community would also be able to contribute donations or fund raisers for some of the costs and funds. Other local organizations are willing to contribute to an enjoyable waterfront such as the bible school.

Local retail and commercial businesses would benefit from a larger tourist group and the economy would reflect that. The ability of small businesses to help in gathering donations and arousing interest from the public would be very beneficial.

Market & Budget

The market for the project would be best implemented after the construction of an outlet and the lake level is stable. The planning and design of such a project should be done in advance to have for when the community feels a need for it.

The budget for the project would rely highly on government support and the local funds that are available. The current projection of a final project cost is around three million dollars.

Program Elements

The ability of the project to be successful relies on the spatial relationships and characteristics of these important elements:

Marina: Includes docks and needs of boating clients as well as some retail opportunities. The marina will have connections to other water access points on the lake.

Public Beach: The critical element of design due to the fact that the water level fluctuates and the shoreline changes. Important part of any waterfront and includes relationships with other elements.

Lake Access Point: Access for boats in the summer and fisherman in the winter. The access point must be suitable for year round use and be scaled adequately for the number of users.

Public Open Space: An area that can used by all users and that can help provide linkages to all elements in the development. Pedestrian use will drive design and influence potential areas.

Parking: Important part of site circulation and overall ease of site for users. The parking must be flexible for all sizes of vehicles and transports.

Recreation Facilities: Those spaces that entertain and amuse users throughout most of the site. The scale and type changes from element to element and can include the following categories:

- Passive Uses: The ability of the site to address those who take a more relaxed approach at recreation. Examples include sunbathers, walkers, picnickers and runners.

- Active Uses: The ability of the site to address those who take a more energetic approach at recreation. Examples include swimmers, fisherman, sports enthusiasts and children.

Public Facilities: The type and scale of each public facility will be studied and related to its element. The user number and user type will affect decisions made in their design.

Connections: Land connections to the city and surrounding community as well as water connections to important destinations on the lake.

All the above elements relate to the overall satisfaction of the site by its users. The spatial relationships will reflect the multiple uses and scale of each element.

Regional History

The history of the Devils Lake Basin settlement has a unique and important part in the current layout of the region. The central location of the basin along with the constant availability of water, food, and game on the shores of Devils Lake provided a focal point for prehistoric and early inhabitants of North Dakota.

White explorers and traders first visited what is now north- central North Dakota in the early 1800's. At that time tribes of Sioux and Chippewa inhabited the area, primarily to the south of the lake. The first known white settler to inhabit the area was Captain Duncan Graham, a fur trader. He settled in what today is known as Graham's Island shortly after the War of 1812. In 1839 the area was explored by a federally sponsored expedition led by Lt. John C. Fremont and French scientist Jean Nicollet. Fremont wrote "Enchanted Waters is a beautiful sheet of water, the shores being broken into pleasing irregularity by promontories and many islands". Enchanted Waters came to be called Devils Lake, probably a misconception of the lake's Indian name, Minnewaukan, which referred to the brackishness of the water.

Settlers filtered into the area and by 1883 Graham's Island was permanently settled. Most of its settlers were of Irish and Scottish descent. In 1882 the city of Devils Lake was founded by H.M. Creel and was respectively called Creelsburgh. July of 1883 saw the arrival of the first passenger train to the city and the maiden voyage of the Minnie H, a large steamboat that hauled passengers and mail between towns on the lake. The following picture shows the Minnie H. in its peak use. (Holdsworth 1987)

Figure 2. The Minnie H. Steamboat

Following the expansion of the railroad and the use of the Minnie H, the U.S Land Office was opened up in town. All of these events helped launch an influx of settlers to the region, at that time the lake level was 1434 feet above sea level.

An 1898 brochure for the area called the lake a "picturesque inland sea". The lake supported a commercial fishery that helped economic activity in the area. Devils Lake was also very popular as a hunting area and resort lake and continues to be so today. (Pusc 1998)

Another important part of the areas settlement was the Fort Totten military fort. Although military expeditions had explored the basin earlier, the first permanent occupation did not occur until 1867. The fort was established on the south side of the lake and was abandoned by the military in 1890. The fort was converted to an Indian boarding school until 1960 when it was turned over to the state as a state historic site. The following picture shows the historic Fort Totten military fort.

Figure 3. Historic Fort Totten

The Devils Lake Indian Reservation was also formed in 1867 under provisions of a treaty signed that with the Sisseton and Wahpeton bands of the Sioux Indian Tribe. Agency buildings and structures soon began appearing in the early 1870's near the military post. The Devils Lake Indian Reservation still exists today and has played an important role in the area's tourism industry. It provides the area with a casino, marina, natural game preserve and many historic sites. (Ramsey County 2004)

Current Settlement

The historic settlements that helped the community form can still be seen today. The city of Devils Lake is the primary economic center and driving force of the community. Another large land use pattern that developed was the agricultural landscape, in which farms are dominant. Small towns and communities still thrive around the area and continue to expand their rural character.

The current settlement in relation to the lake is relatively similar. The major towns in the area include Devils Lake, Minnewaukan and Churches Fairy. The Devils Lake Indian Reservation also supports a number of small towns including Fort Totten, Saint Michael, Tokio and Warwick. Many smaller communities and housing developments surround the lake and hold a large number of residents. The following map shows the relationship of towns to the lake.

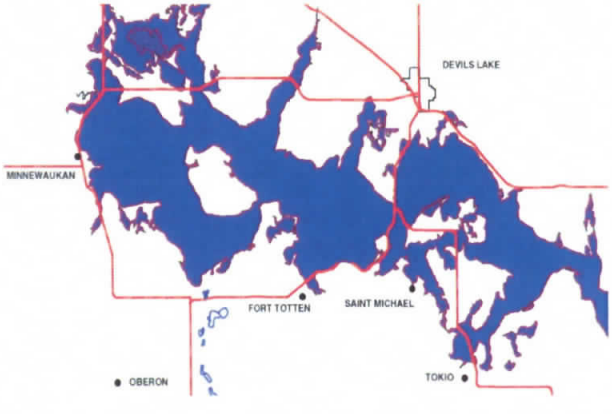


Figure 4. Map of towns around lake

Lake History

The region has developed a rich and unique history with human settlement. Another part of the story includes the history and constant change of the lake.

Devils Lake is the largest natural lake in the state of North Dakota. The lake was formed by glacial processes that took place over 12,000 years ago. The glacial process that is known to have caused the lake is called a thrust moraine. The process is common across the state and examples can be readily seen and studied. (Bluemle 2000)

One of the most common observations made of the lake over the past one hundred and fifty years has been its constantly changing water level. Water levels have fluctuated between about 1459 feet above mean sea level to 1398. The first recorded lake elevation level was 1446 msl taken in 1830. The original land surveys taken in 1887 indicate a level of 1441msl. After the turn of the century the lake level began to drop rapidly and the resort trade diminished. The lake reached it lowest recorded level in 1940 at which time it was only 1402 feet above sea level. Generally, lake levels rose from 1940 to 1956, declined from 1956 to 1968, rose and peaked at 1428 msl in 1983 until the current cycle. The current cycle started with a decline from 1987 to 1992 then started to rise to its current level of 1447 feet above sea level. (Special Problems 2004)

Along with the changing water levels the surface area has changed dramatically. At its lowest level, the surface area of the lake was around 6,400 square acres. It was reduced to small isolated pools surrounded by sterile alkaline flats. At its current level the lake takes up more than 130,000 square acres and has a current depth of 45 feet. (Bluemle 2000)

The historic and future water levels and changes of Devils Lake can be seen in the following graphs

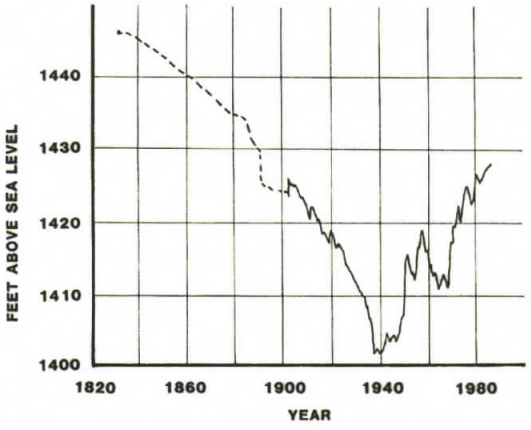


Figure 5. Historic Water Levels

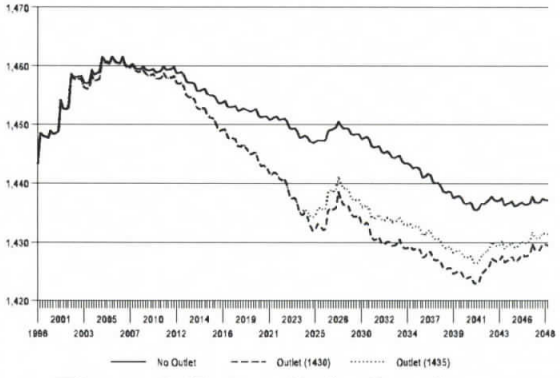


Figure 6. Future Lake Levels

Lake Changes

With the rising water levels come environmental changes. The high level of water in the lake affects water quality, aquatic life, recreation, transportation and development. The lake has freshened as it has risen, being a closed basin it has always contained high levels of salts and minerals. The decreasing salinity of the water has increased the productivity of aquatic plants and algae. Conditions for waterfowl and fish have also improved dramatically. Stocked sport fish have better chances of survival and improves recreation.

The past tens years of lake level increases has caused millions of dollars in damage and forced the community to create a large dike to protect the city. The current strategy to handle the flood is one that has been around for 40 years, create an outlet. Historically, low water levels have been more of a concern than high water levels. Past planners have seen the need for an outlet since the 1920's. The Dust Bowl years of the 1930's led to the formation of the Missouri River Diversion Association. The completion of the Garrison Dam in 1953 prompted Congress to authorize the Garrison Diversion project. The plan was to utilize the water backed up by the dam to help agricultural, municipal, industrial and recreational needs. Another part of the project included the stabilization of water levels and improvement of water quality in Devils Lake. (Pusc 1998)

Until some type of decision is made concerning man-made regulation of water levels, planning for the area needs to be flexible. In the recreation plan this means placing buildings above the flood line and being prepared for lake level changes.

Recreation

Recreation is an increasingly important part of the Devils Lake area. As the lake has risen, fishing and other forms of recreation on the lake expanded. The amount of anglers coming into the region has increased significantly due to the increased stocking and fishing opportunities. Boat use is also rapidly rising and becoming more popular of a past time. A water based recreation resource of this type and significance has not been available to the regions residents since the early 1900's. This recreation resource has resulted in a noticeable boost to the area's economy. The amount of money spent on lake related purchases increases every year. Also, an estimated 800 new jobs have been created in the area as a result of the growing recreation industry.

Many of the lakes past recreational land-marks have been destroyed by the current water levels.

Site Inventory

A New Devils Lake Waterfront

Landscape Architecture Design Thesis
2004-2005

Site Orientation

The proposed site for the design thesis is the Lakewood Beach area located along Creel Bay of Devils Lake. Located in Ramsey County just a few miles to the southwest of the city of Devils Lake, the site has been a historic access point for years. The site includes the lakefront and several hundred yards of greenspace.

The city of Devils Lake is located 90 miles to the west of Grand Forks and about 120 miles to the east of Minot on Highway 2. The area plays an important role in the recreational opportunities for central North Dakota.

The site has direct access from the town along County Highway 1. A connection to the town is already in place with a permanent pedestrian path to the site. Currently a small boat launch inhabits the site along with a few public facilities.

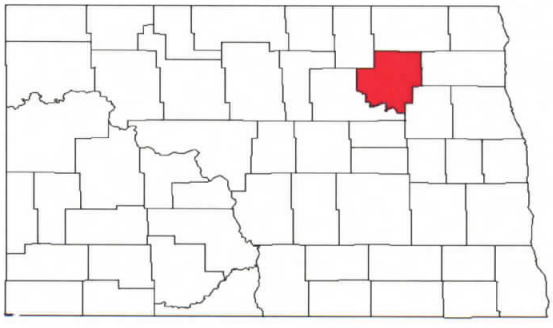


Figure 7. Location of Ramsey County in the state of North Dakota

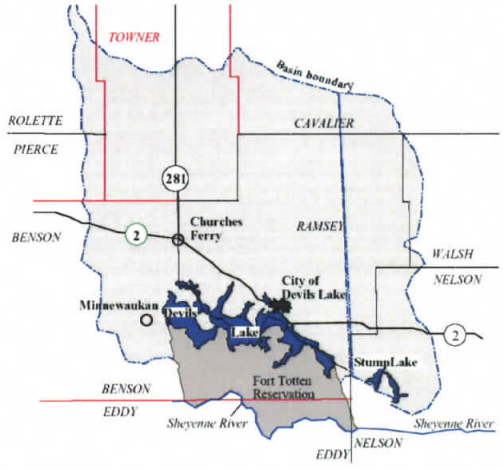


Figure 8. Regional Location

Figure 9. Location from Devils Lake (Upper Right)

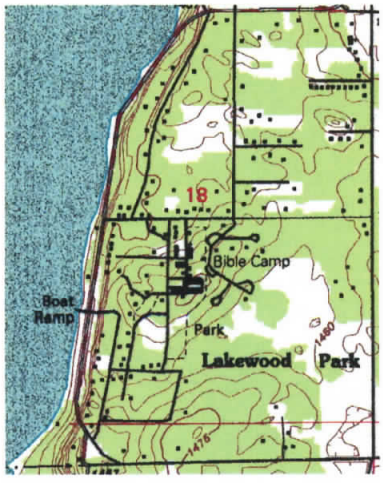


Figure 10. Site Location

Hydrology of Devils Lake

The Devils Lake Basin is a 3,810 square mile closed drainage basin located in central North Dakota. The basin is often referred to as a sub-basin of the Red River of the North Basin, due to the fact that scientific evidence suggests the two systems were connected several times in the past. Due to the fact that it is a closed basin and has been for the past 110 years, the amount of salts and other minerals in the water is relatively high. The Devils Lake Basin itself is broken into nine different sub-basins. All of which contain smaller lakes and rivers that ultimately drain into the lake.

Figure 11. Map of Devils Lake Basin and its sub-basins

The basin contains about 60,000 acres of wetlands that drain into the lake and about 252,000 acres that are intact and holding water. Recent years of flooding have provoked an argument as to where the majority of water is coming from. The fact that the basin is closed means that ultimately all water eventually ends up in the lake causing higher water levels. The failure of the Garrison Diversion Project to help steady the water levels of the lake has prompted the construction and planning of a new outlet. In 1998 the Army Corps of Engineers was instructed by Congress to carry out preconstruction and design for the proposed outlet to Devils Lake. (Pusc and Wiche 1994)

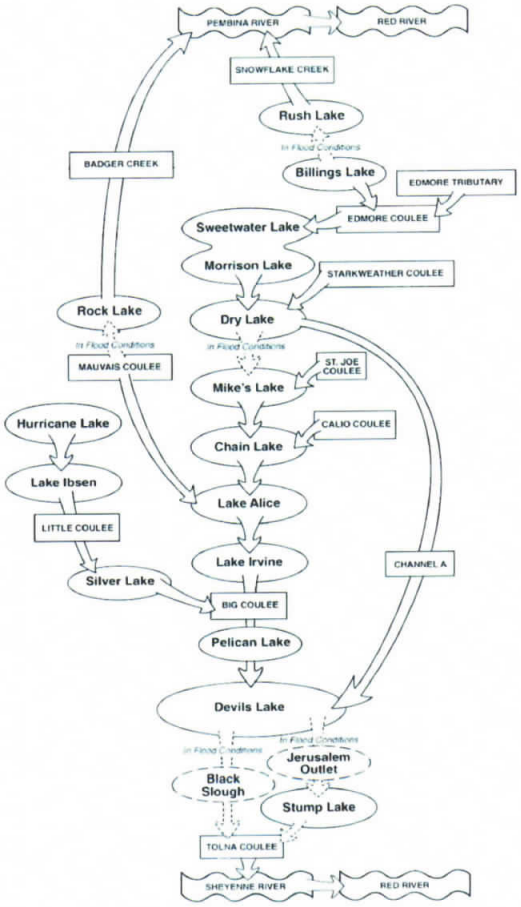


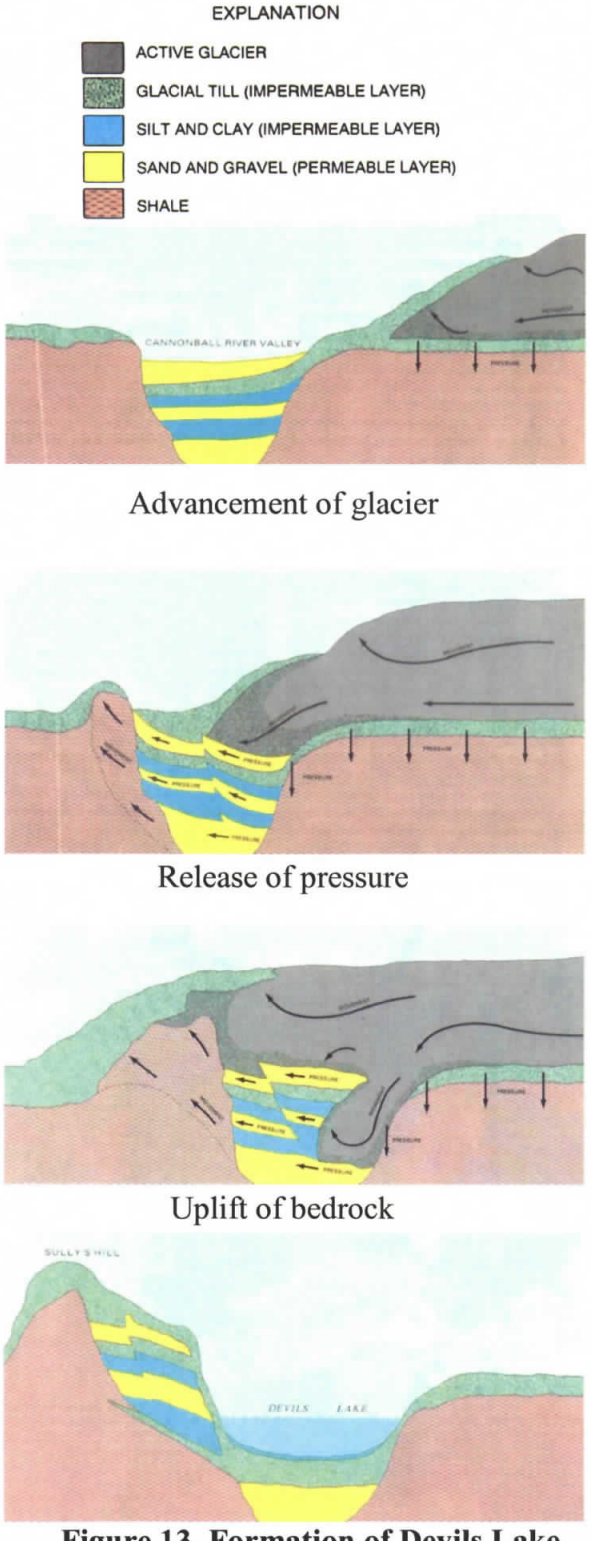
Figure 12. Flow Diagram for lake

Geologic History

The Devils Lake Basin was created in the last glacial advance in North America. Today we call the event the Wisconsinan glacial period. The basin is a classic example of what today is termed a thrust moraine. As the glacier advanced nearly straight south over the Devils Lake area it overrode the Spiritwood Aquifer. The aquifer was filled with already pressurized water and the heavy, moving glacier only added to it. As a result the high pressure forced the more porous materials up and into the way of the advancing glacier. The area to the south known as Sully's Hill is the remains of the large piece of land moved. (Pusc and Wiche 1994)

When the thrusting event occurred, the pressure in the groundwater was dissipated as large volumes of sediment rich water that escaped to the surface. The water escaped through cracks in the glaciers and deposited huge amounts of sand and gravel in perfectly cone shaped hills. (Pusc and Wiche 1994)

A unique glacial combination helped create the basin as we know it today. The ground being frozen before the glacier moved in, the glacial advance over a large pressurized aquifer and the fact that the glacier stopped immediately after creating the large thrust moraine all contributed to the formation and characteristics of the Devils Lake Basin.



Advancement of glacier

Release of pressure

Uplift of bedrock

Figure 13. Formation of Devils Lake

Soils

The soils of Ramsey County can greatly differ in short distances. Some soils are seasonally wet or subject to flooding and some are shallow and relatively close to the underlying bedrock. With the recent flood the water table is rather high and creates a situation where underground installation and construction of objects becomes difficult.

The glaciers and their outwash created a variety of soils around the lake. Farthest from the lake, glacial till is the dominant type of soil. Closer to the lake and including the town, clay and silt lake deposits compose most of the soil. To the south of the lake outwash deposits composed of sand and gravel are found.

Ramsey County lies in the Drift Prairie section of the Central Lowland Province. The western half of the county contains glacial lacustrine and outwash sediments closely intermingled in a complex pattern with glacial till. The eastern half is composed mainly of glacial till, but in some small areas soils were formed in glacial lacustrine material, in glacial outwash and in alluvium along drainage ways and coulees. (Soil Conservation 1986)

The soils on the site of this project are consistent with this pattern. Several different types are found on the site and they play a critical role in vegetation type and drainage.

The area is primarily composed of the Bottineau Association soil type. They consist of deep, well-drained, moderate slowly permeable soils on glacial till plains. Typically the surface layer of the Bottineau soils is black loam about nine inches thick. The subsoil is clay loam about twenty-one inches thick. The soil is black in the upper part, dark grayish brown under that and the lowest levels are grayish brown in color. The substratum, which runs about sixty inches deep, is grayish brown clay loam. The ph varies from 6.1 to 7.8 and increases as depth increases. The area has very alkaline soils that can cause trouble for vegetation and a decrease in water quality. (Soil Conservation 1986)

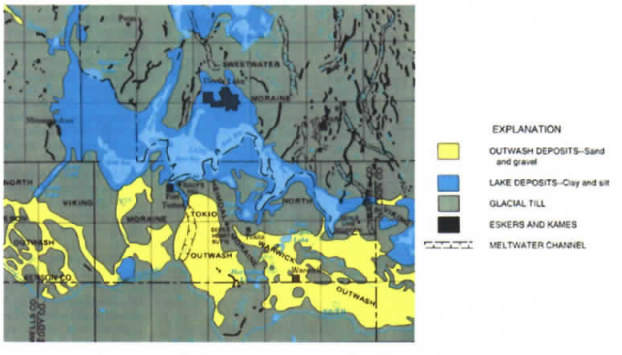


Figure 14. General Soil Types

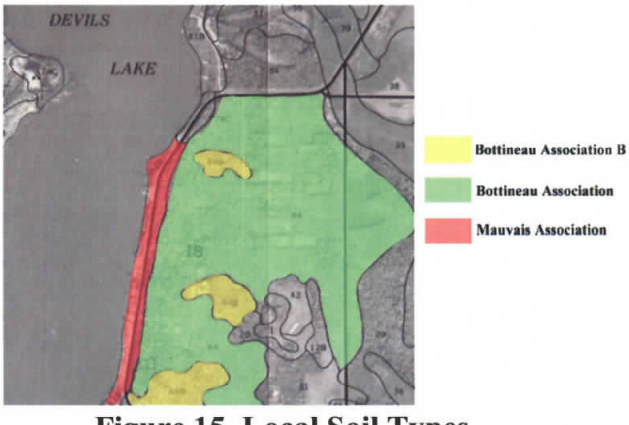


Figure 15. Local Soil Types

Topography

The project is located on a relatively flat part of the shoreline. There is some level change on the south end of the site, but it is only a slight elevation change of only a few feet. The slopes on the site range from three to six percent and present a minimal change in drainage. The site is primarily sloped towards the lake to the west and all drainage follows this slope. The site does have a somewhat important topography change along the shoreline, which was caused by wave action and rising water levels. The high water level has caused much of the shoreline to be eroded and in rough shape.

Another important part of the project includes the topography change at the bottom of the lake. Due to the fact that a marina is a large part of the project, the topography under the water plays an important role its design. For examining this the water depth along the shore was studied and noted.

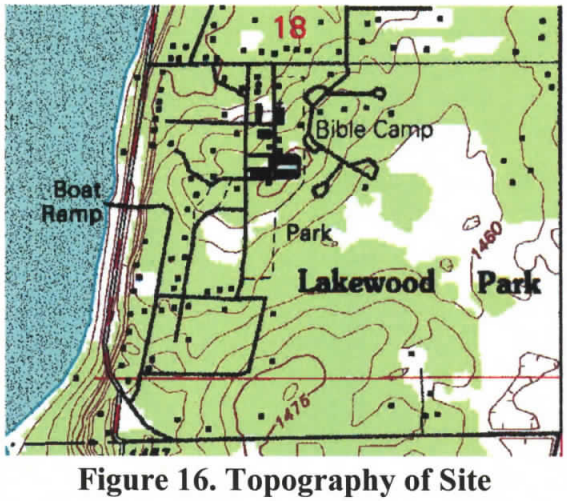


Figure 16. Topography of Site

Vegetation

The vegetation on the site does relatively well considering the cold climate. The shores of the lake are heavily vegetated and have a steady supply of water. Deciduous trees and shrubs are plentiful and evergreens also do fairly well. Some of the main types of vegetation include oak, ash and elm species. Some other species that are found but do not comprise a majority of the vegetation include aspen, lindens, dogwood and chokecherry. Cottonwood and willows dominate the beach and sandy areas, which are found closer to the waters edge. All species that grow in the region must be able to tolerate very cold, harsh winters and hot dry summers. (Holdsworth 1987)

Figure 17. USDA Plant Hardiness Map

The project is located in zone 3 of the USDA plant hardiness map. Some species from zone 4 can be used in a protected area, but generally will not do as well. The extreme temperature range in the region is the primary factor affecting vegetation. Another factor that affects vegetation is availability of water, which in this case is plentiful.

Climate

The climate in the Devils Lake region is characterized as a continental climate. A continental climate usually has long cold winters and short hot summers with minimal precipitation.

The temperature around Devils Lake has one of the largest ranges in the United States. Winter temperatures can get as cold as 40 to 50 degrees below zero and summer temperatures can reach 100 degrees Fahrenheit.

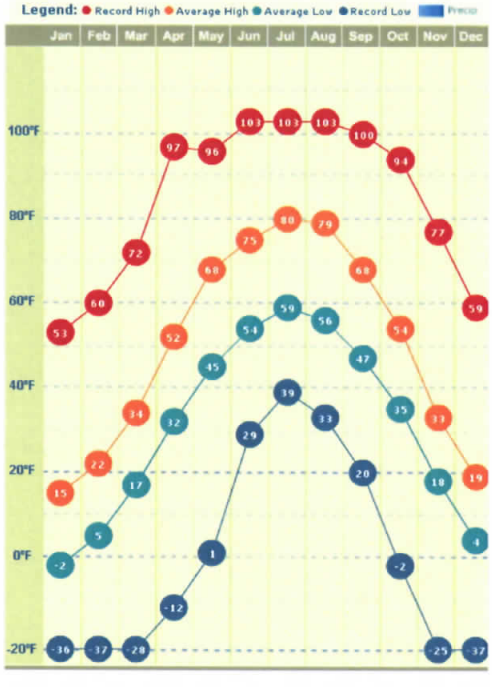


Figure 18. Temperature Chart

The Devils Lake annual seasons consist of four seasons, spring, summer, fall and winter. Winter is usually the longest and most limiting in terms of recreation. The summers are short and become the most active part of the year.

The precipitation in the region is relatively low and primarily falls between April and September. Annual averages range from between 17 to 22 inches per year. The Devils Lake Basin gets hit by thunderstorms and blizzards regularly, which can sometimes drop huge amounts of precipitation at one time.

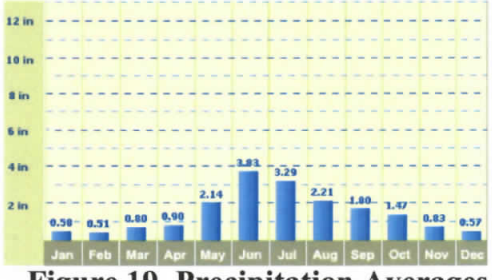


Figure 19. Precipitation Averages

The site for this project faces to the west and so it is usually shaded through most of the day. It receives most of its sunlight in late afternoon and evening. The sun drops to the south in winter and the site receives very little sunshine. (The Weather Channel 2004)
Another important part of the climate around the region is the wind speed and direction. The wind in the winter prevails from the northwest and can become very strong at times. In the summer the wind shifts and comes from the south. The wind plays an important role in the direction and strength of wave action as well.

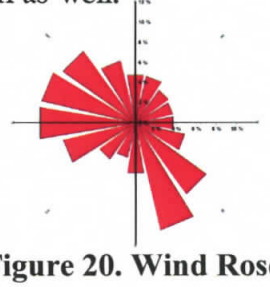


Figure 20. Wind Rose

Ecology

The ecology of the Devils Lake area plays a critical role to the regions tourism industry. The county contains approximately 6,840 acres of native woodland and provides the area with one of its most important ecotourism opportunities, hunting. Another key item in the county is fishing, which brings outdoorsman from all over the country. Devils Lake hosts several large fishing tournaments every year, several in the summer on open water and one large ice fishing tournament.

One of the key issues affecting the ecology of the basin is the lakes water quality. Due to the fact that the lake is a closed end basin, large amounts of salt and other materials get deposited regularly. With the recent flood the water quality has dramatically increased and created a healthier environment for aquatic life. In the early 1990's the lake contained lethal amounts of mercury in the fish and presented a problem for fisherman. This level has recently decreased again to the increased amount of water in the basin.

Some of the areas primary aquatic species include walleye, perch, northern pike, white bass and sunfish. Other species important to the area for hunting are white-tailed deer, geese and ducks. The Devils Lake basin is located in the central flyway and sees huge numbers of hunters every year.(Game and Fish 2004)

Figure 21. Summer Fishing

Figure 22. Winter Fishing

Figure 23. Waterfowl Hunting

Figure 24. Big Game Hunting

Demographics

The demographics in the city of Devils Lake and of the county will help determine some of the spatial and user requirements needed for a successful site design. The general population in the city is around 7,200 and in the county is around 12,000. The average family size in the city is around 2.8 and the counties averages around 3.0.

The city of Devils Lake is comprised primarily of white citizens, around 89.2 percent. A majority of the citizens have German or Norwegian heritage and some smaller groups of Scottish or Irish decent can be found. The county has a slightly higher rate at about 92.3 percent. The next largest citizen group consists of Native Americans at about 7.8 percent. A few of the other races represented in the city and the county include African Americans and Hispanics.

The average family income in the city averages around 39,000 dollars and the income per capita is around 17,700 dollars. There is a relatively high degree of those below the poverty level, it is around 11.2 percent. The percent of the population in the work force averages out to be around 63.3 percent and there are about 4,850 people in the city above the age of twenty-five. (Census 2000)

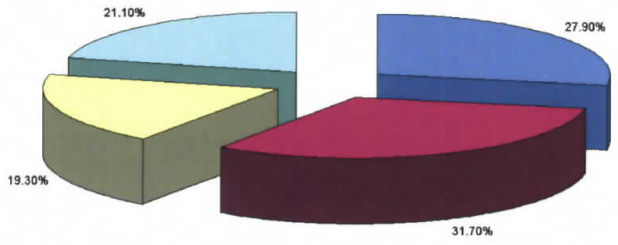


Figure 25. Devils Lake Age Groups

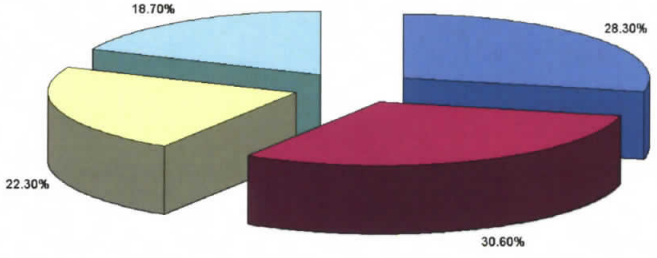


Figure 26. Ramsey County Age Groups

Existing Conditions

The project site currently has very little to offer its users. The site is a mess of unmarked roads and paths. Parking for users has no restrictions, so vehicles are often found parked on grass and in the way. Only one boat dock exists and it is often way to busy to effectively handle all of the users. The beach is a weedy, rocky and unattractive tiny area of sand. Currently a large ugly chain link fence delineates the beach from the rest of the site. The restrooms on the site are in horrible shape and are often vandalized or not cleaned. A fish cleaning station is in place but is very unattractive to look at and often smells of fish. The shoreline has no gentle slope into the water, just a sharp drop of a foot or more. The vegetation on the site is doing very well and provides the site with a nice green look and shade.

Figure 28. Beach Area

Figure 29. Shoreline

Figure 27. Boat Launch

Figure 30. Swimming Dock

Existing Conditions

Figure 31. Restrooms

Figure 34. Roadways

Figure 32. Fish Cleaning Station

Figure 35. Signage

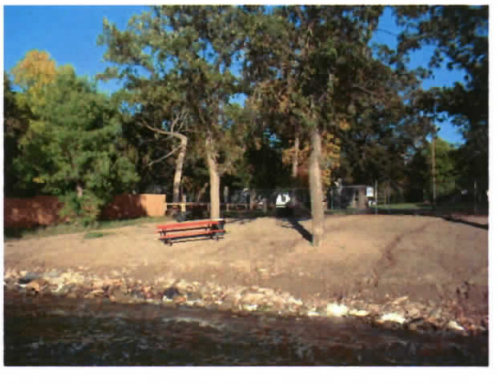


Figure 33. Beach Area

Figure 36. Grass Area

Lake Conditions

Devils Lake has been flooding for the past decade and has created a new and unstable shoreline. The flood has wiped out hundreds of homes and structures causing millions of dollars in damages. The increased amount of water has dramatically improved water quality, fishing and boating opportunities. It has decreased however, the amount of boat launches, recreation areas, lake lots and campsites. Currently the lake level is around 1447 msl and its area has quadrupled over the past decade. With the increased water the depth now reaches up to 50 feet and provides excellent aquatic habitat.

The rising water has had a terrible effect on the site for this project. One of the major roads to the site is now underwater and can no longer be used. Most of the vegetation has been flooded and some stumps and logs exist just off shore. The heavy wave action has eroded a large piece of the shoreline and rocks were used to try and stabilize it.

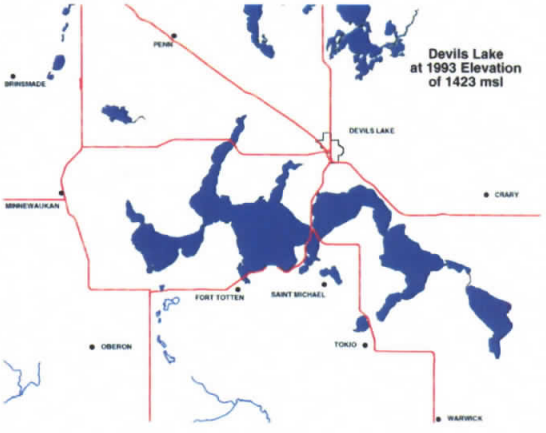


Figure 38. 1993 Elevation

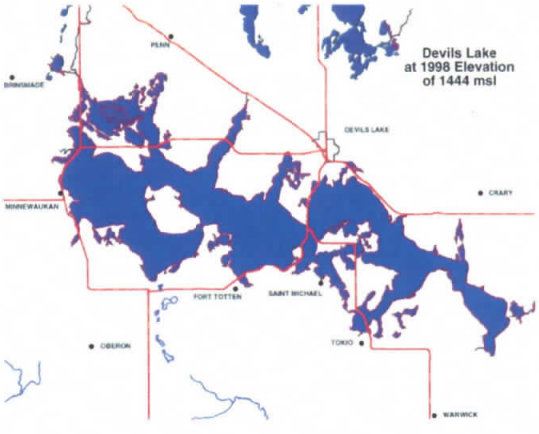


Figure 39. 1998 Elevation

Figure 37. Old Site Road

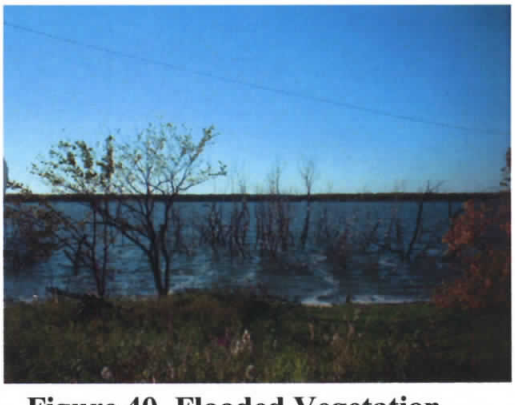


Figure 40. Flooded Vegetation

Landmarks

The landmarks that are important to the site include various state parks, campgrounds and tourist hotspots. There are currently two state parks located on the shores of Devils Lake. Graham's Island State Park is located on the western part of the lake. There is a campground, boat launch and public facilities located there currently. Shelvers Grove State park is a smaller and more quite park located on the eastern part of the lake. The Spirit Lake Casino and Marina is located on the main bay and provides a new lake access point. The casino contains a hotel and events center that draws in thousands of tourists each year. The Devils Lake Golf Course is located just to the north of the site and includes an eighteen-hole golf course and clubhouse. Sully's Hill is a natural game preserve that is located by Fort Totten on the south side of the lake. The preserve includes buffalo, elk, deer, prairie dog town and a lake with all forms of reptiles and small mammals. There is currently two private campgrounds on the lake. Woodland Resort is a large campground with cabins, restaurant and a boat launch. It also provides fishing and hunting guides and is in operation year round. It is located on the opposite shore of Creel Bay. The second campground is relatively new and is located on East Bay of Devils Lake. It provides a campground and public facilities for users. (Chamber of Commerce 2004)

Figure 41. Woodland Resort

Figure 42. Spirit Lake Marina

Figure 43. Devils Lake County Club

Figure 44. Sully's Hill

Site Access

Access to the site is possible by three different transportation types. First the primary and largest site access is by vehicular traffic. The site is located about 5 miles to the southwest of the city of Devils Lake. Heading south on Highway 20, out of Devils Lake, and then to County Highway 1 provides direct access to the Lakewood area.

The second biggest group of users will connect to the site from the water, in boats. The project is located just off the main bay and is known as a frequent stopping point for boaters.

The third and smallest type of site access is pedestrian traffic. Currently a nice bike path has a direct connection from town to the beach area and is heavily used by residents in the area.

The site has two vehicular entrances and exits, located on the north and south ends of the site. The boat launch and dock is located on the west edge towards the water. The pedestrian traffic enters and exits the site from the north and connects to Lakewood Park to the east.

Winter access is strictly vehicular with the exception of some four wheelers and snowmobiles. The launch plays an important part the lakes ice fishing access through November to March.

Figure 45. Vehicular Access

Figure 46. Pedestrian Access

Figure 47. Bike Path to Site

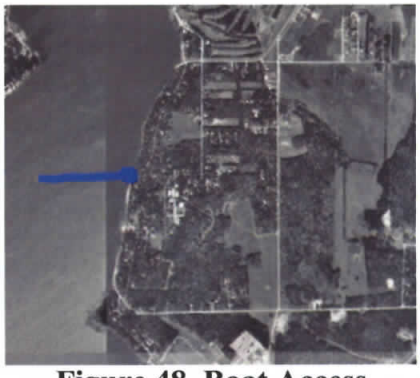


Figure 48. Boat Access

Site Analysis

A New Devils Lake Waterfront

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Opportunities

- For the site to be used year round and provide lake access in summer and in winter months.
- To connect the project site to other important lake destinations and provide a means of getting to them.
- To connect the project site to the city of Devils Lake and raise awareness of its existence and construction.
- To provide critical lake amenities that are available to the public and not just restricted to a private resort.
- To incorporate the regions rich and unique history into modern design.
- To protect and restore the shoreline from erosion and wave action.
- To provide recreation facilities that incorporate outdoor enjoyment as there driving factor.
- To provide an unforgettable outdoor experience for all those who visit.

Constraints

- The changing water level and the issues dealing with it.
- The international politics involved with creating an outlet whose water will cross international borders.
- The ability of the community to raise enough funds necessary for such a project.
- The horrible condition the flood has left the shoreline in and the high water table.
- Designing the site for snow removal which plays a key role in the sites winter use.
- Finding a business to incorporate in the site, along with the marina and a possible retail store.
- The high amount of salts in the water and the alkaline soils around the lake.
- Directing users through a residential community to the site with not upsetting residents.

Programmatic Requirements

One of the most important parts of the project includes the spatial relationships between the major program elements. The relationships were studied and the following figure shows the results.

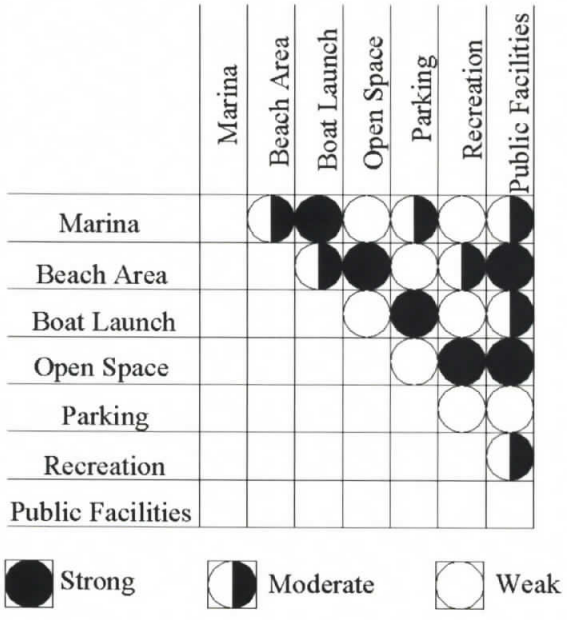


Figure 49. Spatial Relationship Chart

The spatial chart that was created used several key items in determining the spatial requirements. First whether the two items being compared had similar function or usage. Second whether or not the items complement each other. The last thing used to compare the spaces was whether or not the users from one element would use or need one of the other elements.

The following information is the preliminary spatial needs of each of the program elements.

Marina - The marina's strongest requirement is the number of docks and the size of their spaces. A need of around 10 to 15 permanent docks with at least 5 temporary storage is necessary. The average dimension of a boat on Devils Lake is around 30 feet long by 20 feet wide and each docking space should be at least this big.

Another element of the marina that is key in its design is the size needed for an office and base of operations, including a small supply and tackle shop. A space with at least 1500 square feet would meet the criteria for such a space.

One key element to a marina is the ability to provide fuel for boats. The project will include such a amenity and will require a building close to the waters edge with at least 100 square feet of room.

The last spatial needs for the marina include the dock width and lake depth needed for a successful plan. A minimum width of 6 feet and a maximum of 10 feet would create a safe walking width and a railing of at least 3 feet to protect users. The lake depth needed to accomplish the needs of the marina must be at least 4 feet deep and some areas with more depth for larger boats.

Beach Area - The beach area has no set specific size or dimension. The size that would successfully handle fifty users is around 1800 square feet and that is about the maximum number of users expected to use the site at once.

The sand depth will be another requirement that has a huge affect on the cost of the project. The minimum amount of sand depth needed to accommodate its users is around one foot with the option to go deeper, depending on cost.

Boat Launch - The boat launch has very large spatial needs and can be incorporated as part of the marina. The site needs at least three different launching ramps to accommodate its users. The launch should have a minimum backing up distance of 80 feet with one launch with a larger distance for larger boats and sailboats.

The launch will also contain a dock for its users. Again the minimum dock width should be 6 feet with a maximum of 10 feet with at least 3-foot railings.

Open Space - The open space dimensions have no set value and will depend on available space on the site. The open space will have walking paths that should have a minimum width of 6 feet to accommodate bikers and runners and will follow code on draining and slope percent.

Parking - The parking on the site has to be able to accommodate a wide range of vehicles. The parking lot will have 20 average parking spaces whose dimensions are 18 feet long by 9 feet wide. The parking lot will also need to have at least 15 oversized parking spaces for vehicles with boat trailers measuring 40 feet long and 12 feet wide.

Recreation - The types and sizes of the recreation on the site will be determined and noted in the future. The type and size will depend on the amount of available space after critical elements are designed.

Public Facilities - There are several different types of public facilities that will be included on the site.

The first and most important facility is the restrooms for users. The current facility is too small and uncomfortable for a large amount of users. The new design will contain a restroom of at least 800 square feet, which leaves 400 for men and 400 for women. The facility is also going to include a shower that adds to its size.

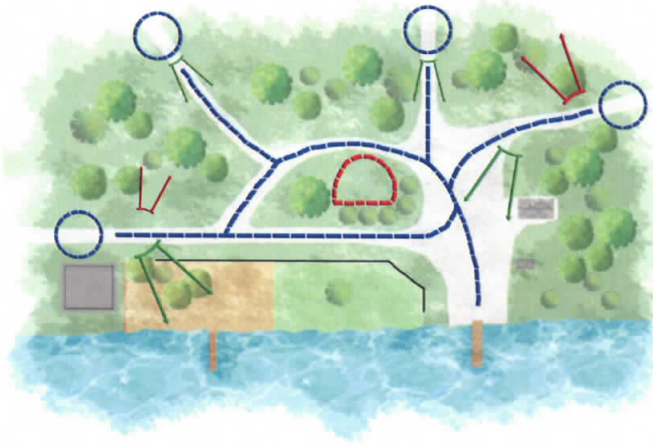
The second public facility will include a fish cleaning station and washroom for fisherman. The minimum size required for this space must be at least 500 square feet and the fish cleaning station is to be open and exposed to wind to help eliminate odors.

Site Analysis

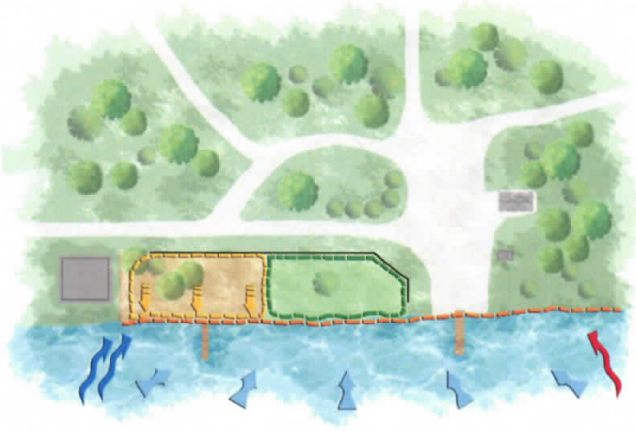
The current site has very little to offer its users. The circulation is unorganized and dangerous and there is no pedestrian paths or circulation system. The lakeshore has a small and rocky beach area that does not get used and is eroding away. The shoreline right next to the beach is overgrown by weeds and is very unattractive to look at. The parking is currently where ever you wish, but most people tend to park on the grass in the middle of the site. The main focal point currently is the boat launch area, it is a two sided launch that is way to small for the number of users. Right beside the boat launch is a small restroom that is locked half the time and in pretty rough shape.

Just to the east of the restroom lies the fish cleaning station, this is a somewhat new facility that provides fisherman not from the area with a place to clean fish. The station is open to wind which helps keep odors from accumulating. The site has four access points, one of which leads to Lakewood Park and another one that leads to town. The other two site entries lead into the Lakewood development residential areas and to the bible camp. The wind drives the wave action into the site from the west and is also the direction of most winds into the site. The main views into the site are from each entry point and are directed towards the lake.

Cultural Analysis



Physical Analysis



Case Studies

A New Devils Lake Waterfront

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Ziebach Pass, Devils Lake

The present 274-acre Ziebach Pass Recreation Area was opened in 1974 and had been developed for camping, boating and picnicking. The project is located south of Graham's Island on Devils Lake and was planned to be a state park until the recent flood. Plans were developed and in place when they were suddenly halted by the rising water.

The plans were divided into four main groups, a marina and waterfront development, recreation improvement, visitor's center and day use area and finally a camping area. The camping is divided into five areas: an upper loop, a tent camping area, a modern area, a north area with an open field and some sites on the lakeshore.

The picnic ground at Ziebach Pass is adjacent to the boat ramp area and contained grills, benches, picnic tables and porch swings. Views to the lake were restricted by brush and mounds of dirt created by its past construction. The area also contained several playgrounds for smaller children.

The past boat ramp was constructed of concrete slabs chained together. The ramp was uneven and descended sharply into the water. Erosion was undermining it and the use of the ramp was tough with northerly or easterly winds. Two removable docks were provided as a makeshift fish cleaning station.

The plans to improve the recreation area were designed and brought up by North Dakota Parks and Recreation in 1987. The project never got started but the ideas and designed spaces are similar to this project. (Holdsworth 1987)

Relevance to Project

The main relevance to this project includes some problems that are consistent with the Ziebach Pass area. First a poor circulation system that caused confusion and misuse of roads. Second poorly constructed pedestrian areas that were unused and dangerous. Third, a deteriorating boating facility that caused problems and was to small for the amount of use. The last major problem that the two sites share is a marshy shoreline and poor beach areas. The development plan for Ziebach Pass improved and designed a better, safer environment for its users. The plan addressed the needs of its users and helped create a more pedestrian orientated space that would have dramatically improved the quality of the site.

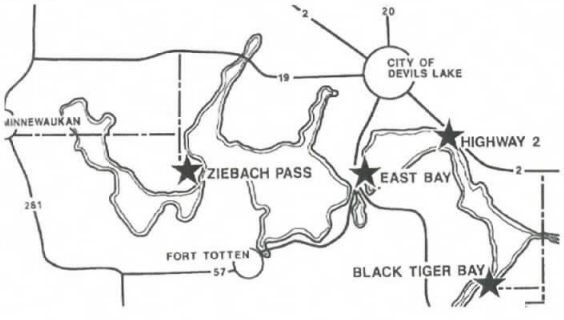

Figure 51. Location of Ziebach Pass

Ziebach Pass, Devils Lake

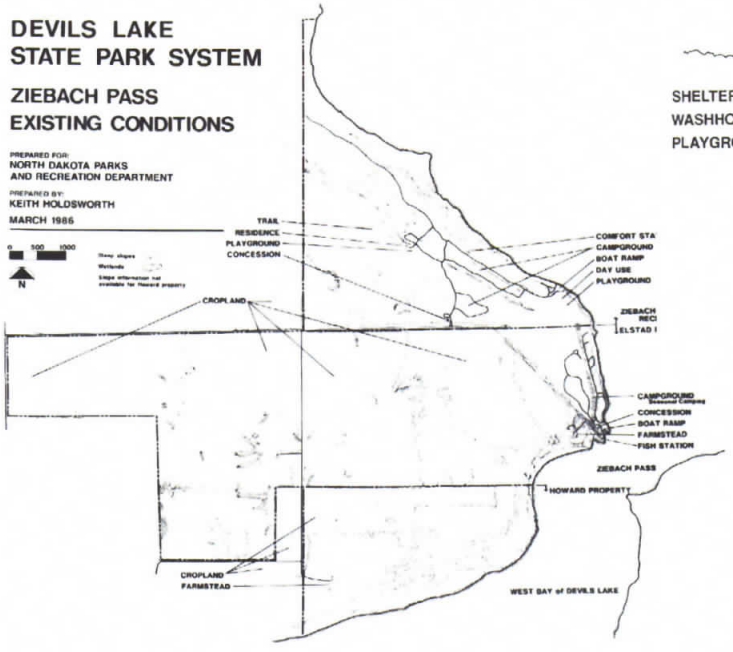

Figure 52. Existing Conditions

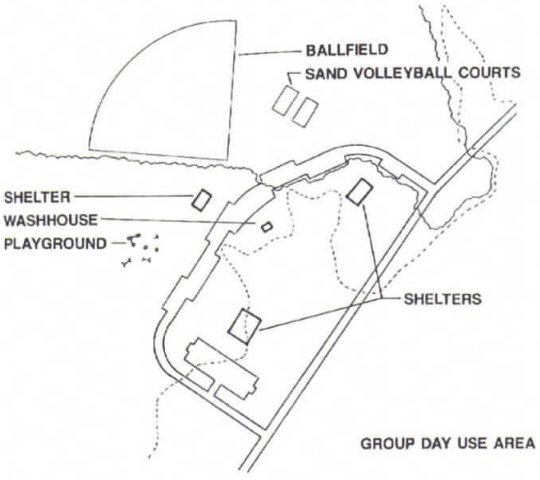

Figure 54. Day Use Area

Figure 55. Dock Improvements

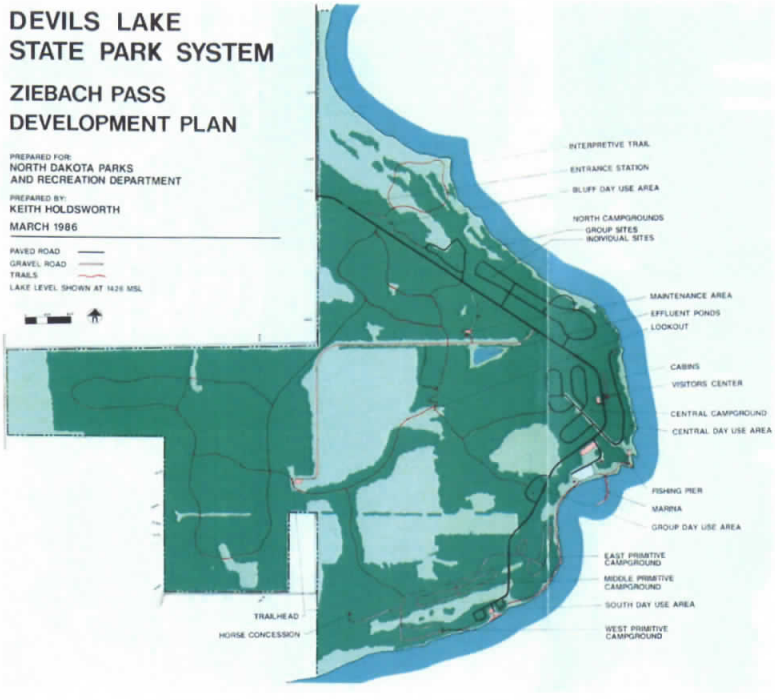

Figure 53. Development Plan

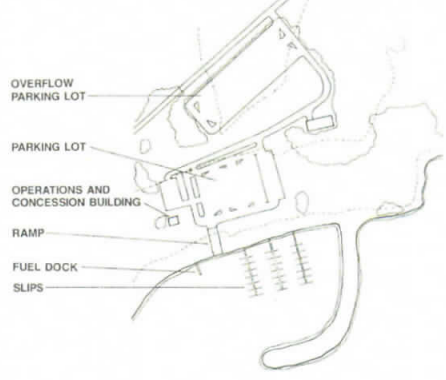

Figure 56. Marina Design

Forest Park, Illinois

The Forest Park project included the protection, restoration and recreational development of a beach shoreline in Lake Forest, Illinois. The project mainly consisted of transforming a dismal, diminishing shoreline beach into a multi-use recreation facility.

The city of Forest Lake on Lake Michigan is located just to the north of Chicago. It was in danger of losing its public lakefront beach and park to erosion. Continued high water levels, as well as wave and storm damage, had taken a severe toll on the beach, roadways and site access.

In 1984, a 23 member Shoreline Restoration Advisory Committee began oversight of a plan process for the protection and restoration of 3400 linear feet of shoreline. Besides protecting the beach resource itself, the community wanted a usable park that incorporated the natural beauty of the area.

Confident that the shoreline erosion is under control, the community rescued a doomed beach and transformed the entire area into a very attractive community multi-use recreational facility. The diversity of environments: a sandy beach, lakeside promenade, a walking path through trees, lawns of the old park, picnicking areas and play spaces all add to the quality and high use of the site.

Visitors to this 29-acre park located on Lake Road at the far east end of Deerpath can enjoy the large beach and grass areas, swimming or other water activities. Open year round, park amenities include sheltered pavilions, grills, a fishing pier, boat launching ramp and storage area, walking paths and a concession stand during the summer months. (Forest Park 2004)

Figure 57. Forest Park

Relevance to Project

The Forest Park project is very similar to this design thesis. Both projects had erosion issues and shoreline protection needs. The addition of recreational spaces to an already heavily used site for pedestrian comfort is important. The fact that the site was located on a large body of water and wave action continually pounded the shore is consistent with this project. The creation of a profitable business is also a key issue that has to do with this thesis project. The construction of its beach is unique and provides and engineering solution at the same time, such an idea is what I would like to include for my design.

Forest Park, Illinois

Figure 58. Aerial Image of Forest Park

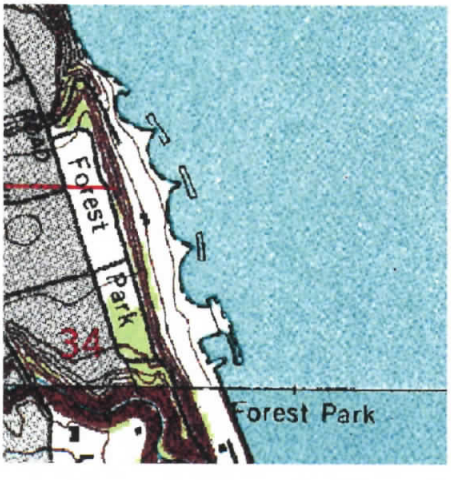

Figure 59. Forest Park, Illinois

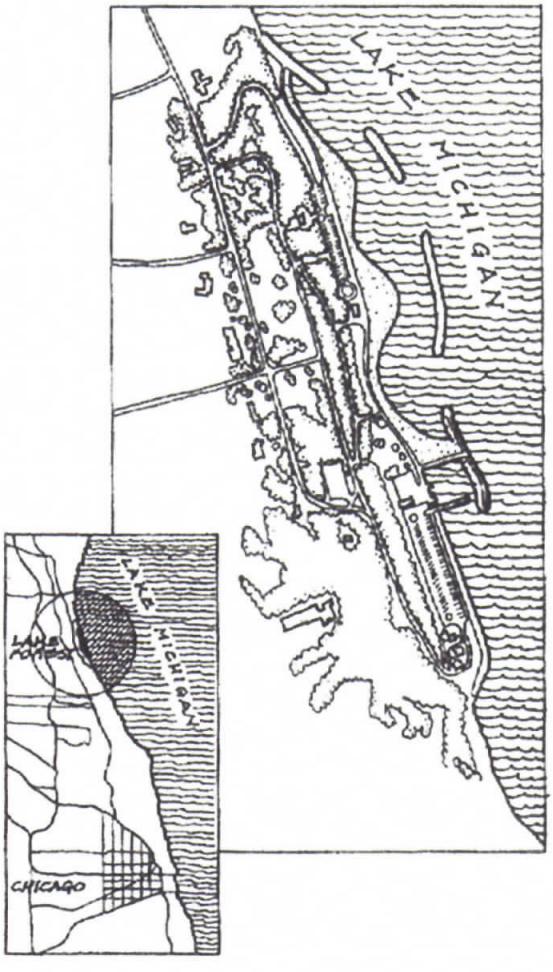

Figure 60. Plan of Forest Park

River Parks, Tulsa

Cooperation among public agencies, private citizens and the business community has created Tulsa's River Parks. The project was a 138-acre area on both sides of the Arkansas River and was completed in 1990. The project included picnic areas, hike and bike trails, playgrounds, an exercise trail and several other attractions.

The three-phase development included a two-mile lake, a planetarium, a marina and a variety of commercial businesses. The cost for the completion of the project is between 30 and 40 million dollars in public and private investments. Tulsa began its waterfront revitalization with a number of recreation components and has used these to attract support for the additional expensive developments.

Recognizing that simply providing facilities was not enough, a series of activities was planned to raise public awareness of the waterfront and help build the support necessary for the completion of the project.

The business community played a key role in raising money. Local radio stations helped sponsor two very popular annual events that helped the community receive funds, the sandcastle contest and the river romp. Other fund raising events were soon added, such as oktoberfests, kite flies, square dances, bike rides and fireworks. (Glazer 1980)

The business community's role in the River Parks was not just limited to support building. When a link between the east and west bank developments along the river was needed, the Missouri-Pacific Railroad donated the bridge to the city. Twenty thousand dollars was raised when Tulsans were given the opportunity to "purchase" an inch of the bridge for $5.50. The *Tulsa Tribune* was important in the encouraging support for the bridge's conversion.

A large volume of soil was needed to reshape the riverbank. Three hundred and eighty thousand cubic yards from downtown construction sites were given for this purpose. Students from a vocational school moved one half million cubic yards for 300,00 dollars. A contract for the same work would have cost twice that amount. Under the leadership of a community organization, private nurseries donated approximately 500 plants and trees valued at 5000 dollars to help with the landscaping. (Tulsa River Parks 2004)

Figure 61. View of Bike Trail

River Parks, Tulsa

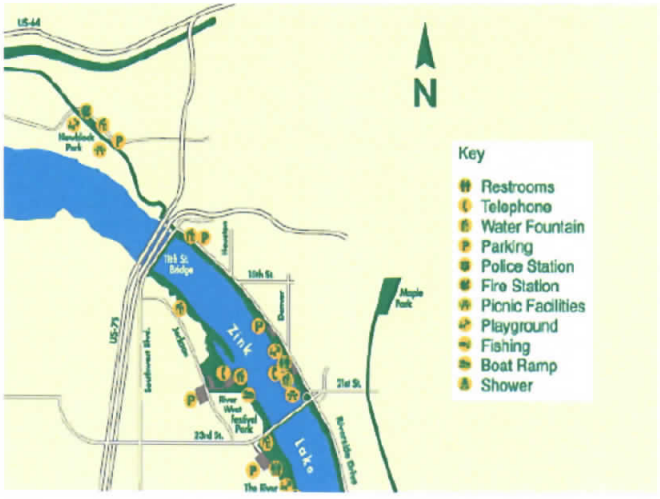

Figure 62. Plan of River Parks

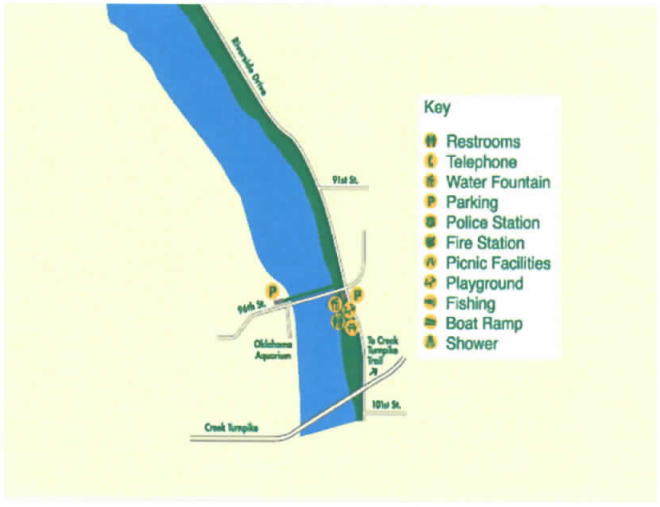

Figure 63. Plan of River Parks

Relevance to Project

The River Parks in Tulsa created a unique and important park with the help of the community. This kind of community involvement is what will be needed to get this project started and help pay for its costs.

The ability of the community to come together and use their available resources in creating a unique and manageable waterfront is necessary. The way that the Tulsa River Parks used the available vocational school and donations from other small businesses is a wonderful idea that should be incorporated in this project.

The erosion control that was used in Tulsa is also relevant to this project. The donation of soil and time for hauling it was a key issue to the start of construction. Also the donation of plants to help stabilize soils and aid in the landscaping dramatically helped with cost.

The business principles that were used also helped with the managing and implementation of an economic resource. The ability of the project to generate income and help pay some of the construction costs is unique and can be implemented in this project.

Presentation Boards

A New Devils Lake Waterfront

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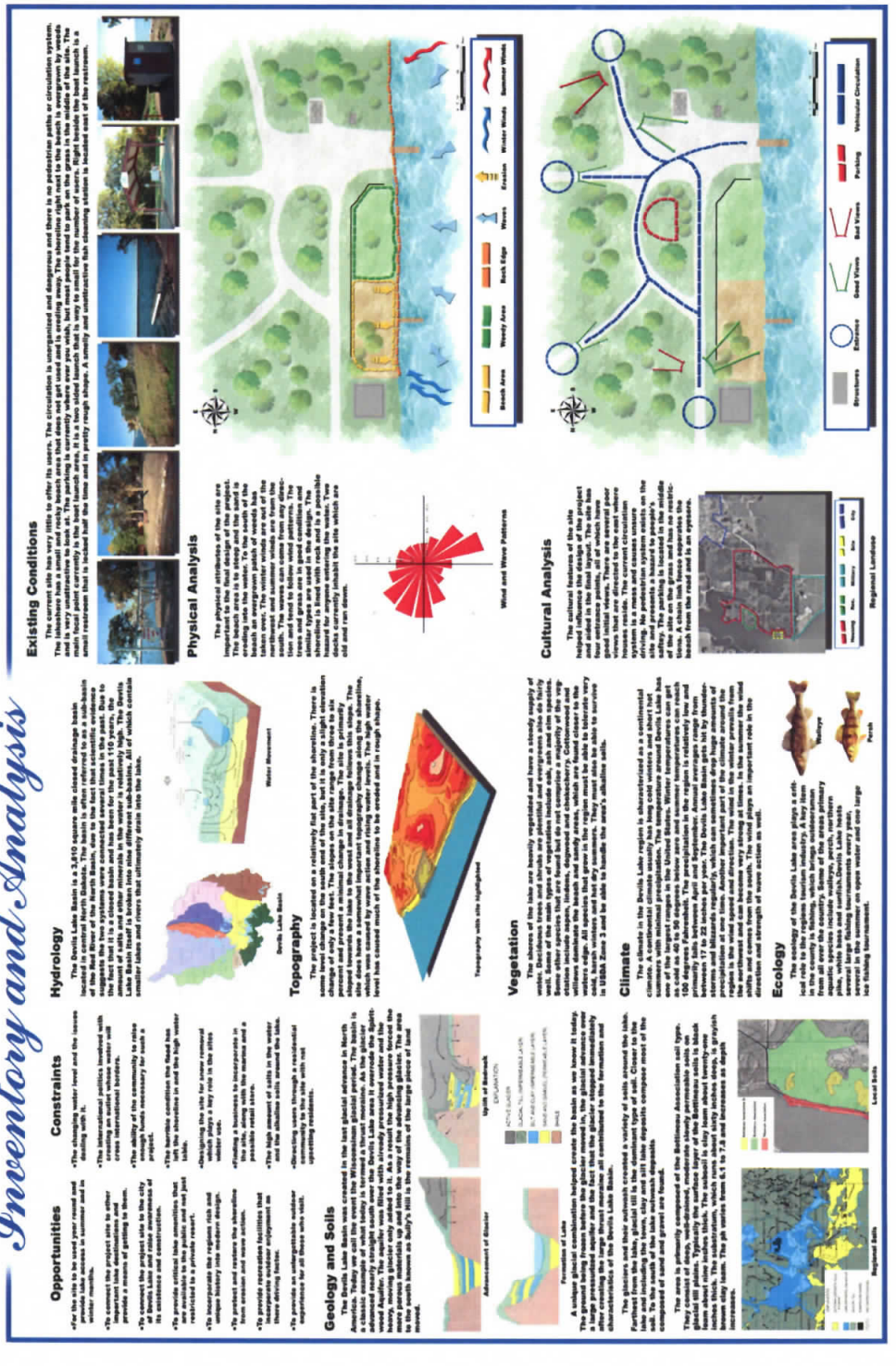
Project Introduction
Project Location
Location of Ramsey County
Devils Lake Region
Site location from town
Site location
Project Description
Built Environment
Natural Disasters
Advanced Planning
Historical Overview
Early Hunters
Early Recreation
Historic Devils Lake
The Illinois H.
Historic Fort Totten
Devils Lake
Devils Lake in 1993
Devils Lake in 1998
DEVILS LAKE
Current Lake Depth and Surrounding Area

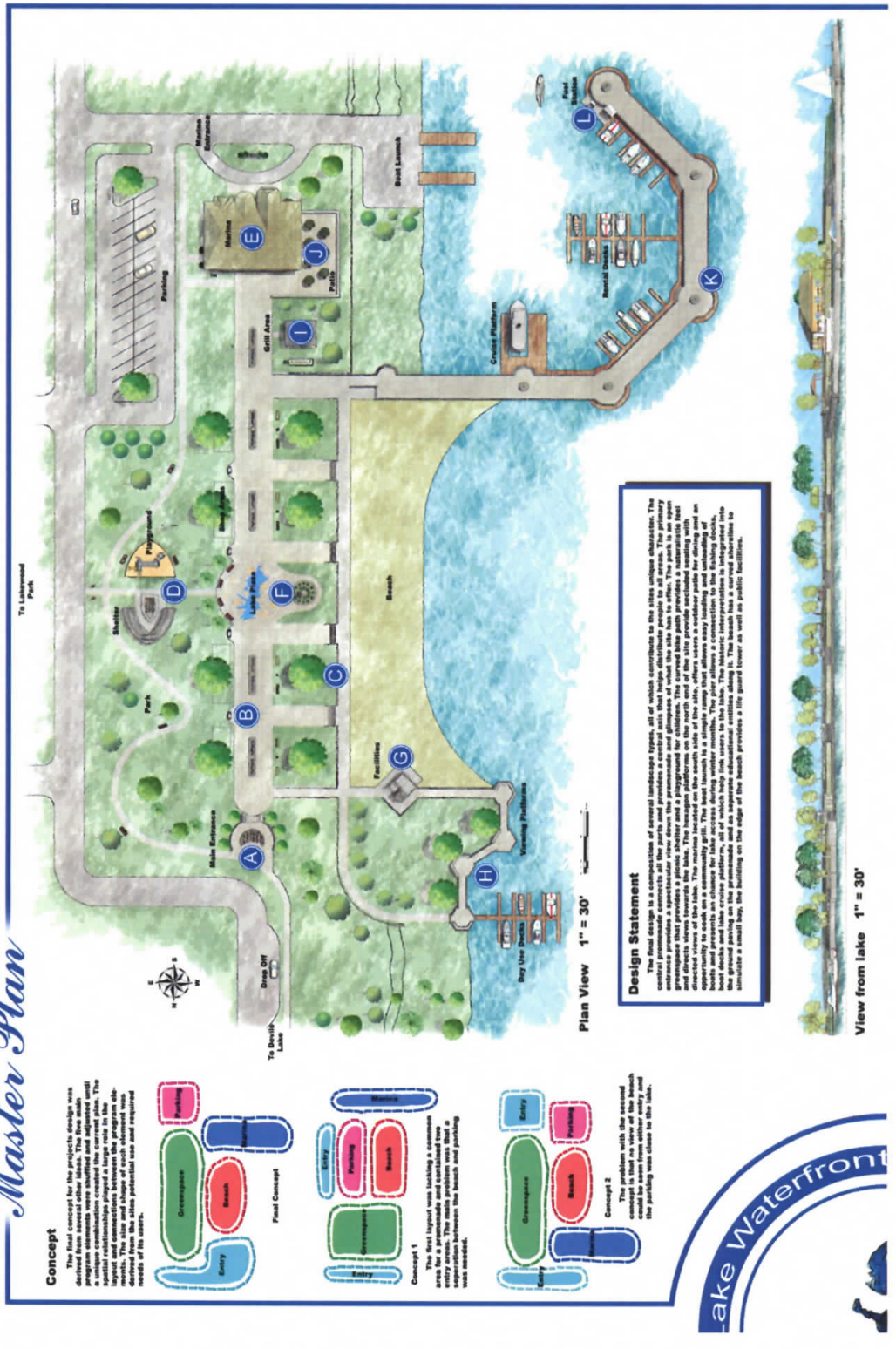
Board 2 of 6


Inventory and Analysis
Existing Conditions
Physical Analysis
Cultural Analysis
Opportunities
Constraints
Hydrology
Topography
Vegetation
Geology and Soils
Climate
Ecology
Wind and Wave Patterns
Regional Landuse

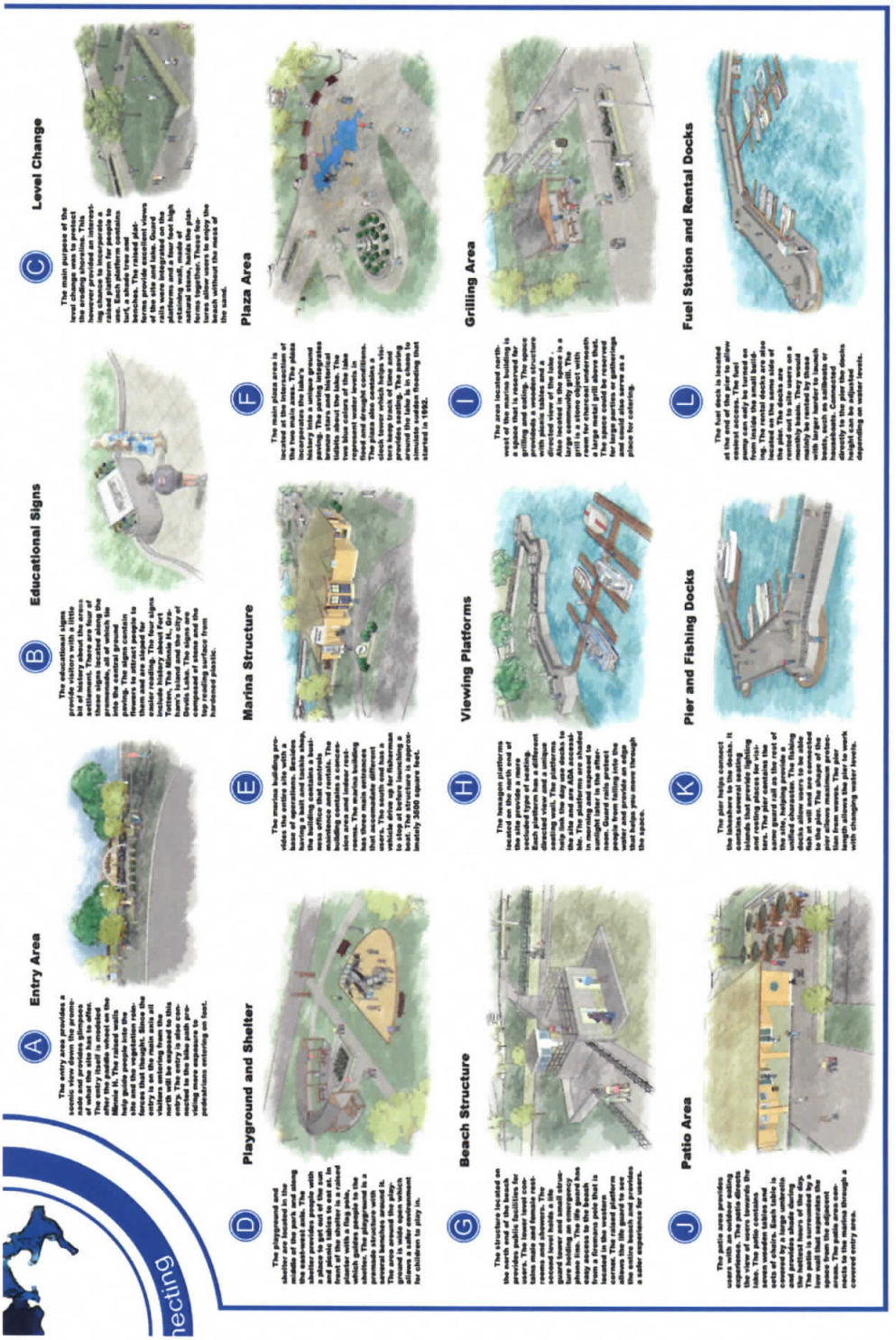
Board 3 of 6


Connections
Lake Connections
Residential Connections
Pedestrian Connections
Municipal Connections
Woodland Resort
Graham's Island
Spirit Lake Casino
Lake Cruise Route
Booking Area at Lakewood
Sample Time Schedule
Lakewood
Freeson Addition
Existing View of Bike Path
Existing and Proposed Paths
Proposed Bike Path Extension
Current Vehicular Access
The City of Devils Lake
Signage
The first sign is located at the intersection of Hwy 20 and County Hwy 1
The second sign is located at the intersection of Hwy 20 and Camp Grafton Road
The third sign is located at the intersection of County Hwy 1 and the Lakewood turn

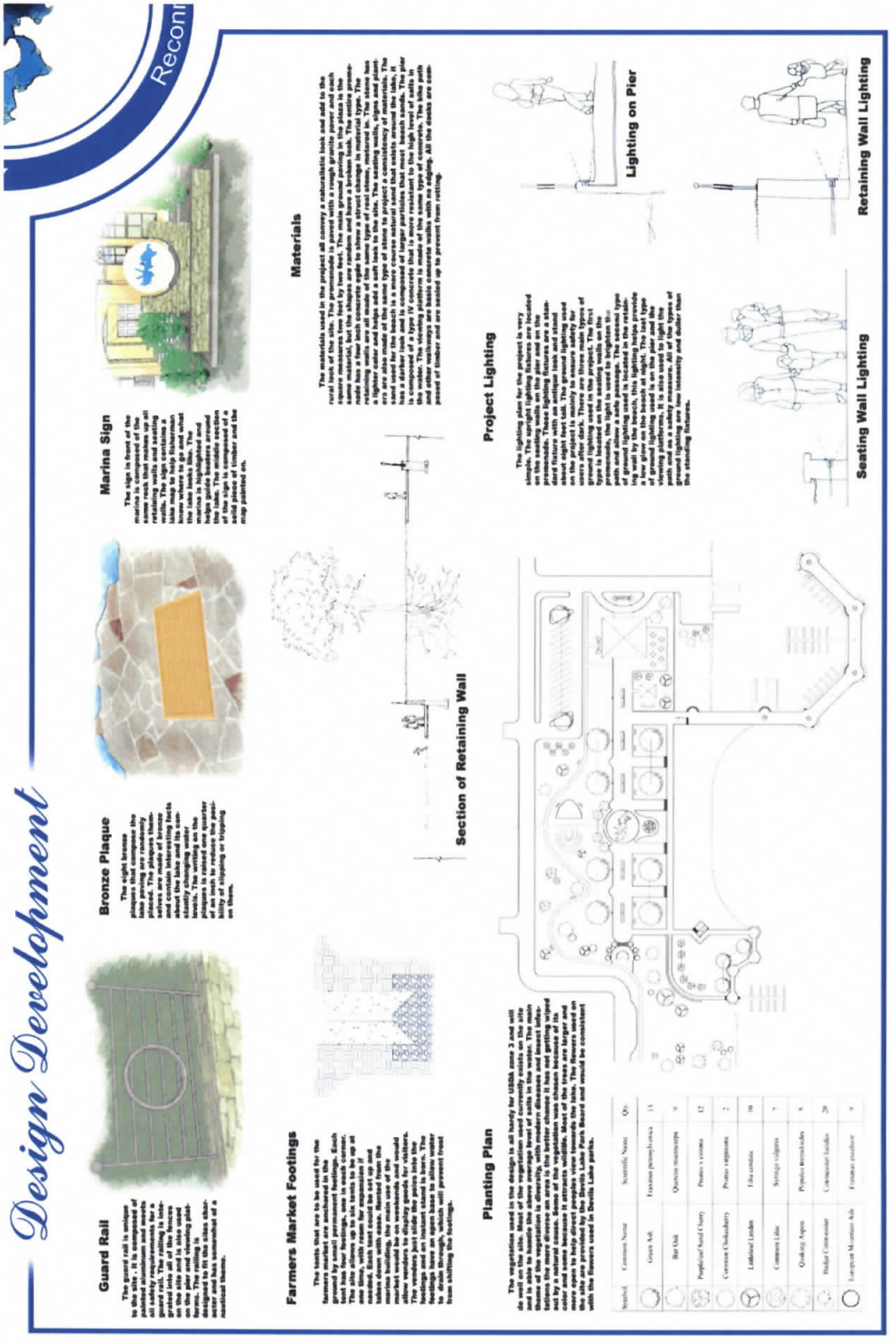
Board 4 of 6


Master Plan
Concept
Final Concept
Concept 1
Concept 2
Plan View 1" = 30'
View from lake 1" = 30'
Design Statement
Lake Waterfront

Board 5 of 6


A Entry Area
The entry area provides a scenic view down the promenade and provides glimpses of what the site has to offer. The entry itself is marked with a large sculpture of the Minnie H. The raised walls help guide people into the entry. The entry is also connected to the bike path providing pedestrians entering on foot.
B Educational Signs
The educational signs provide visitors with a little history about Devils Lake and its settlement. There are four of these signs located along the promenade, two of which tie into the central ground paving. The signs contain historical photographs of the area and are sloped for easier reading. The four signs include History about Fort Totten, Spirit Lake Nation, Sullivan's Island and the city of Devils Lake. The signs are mounted on a concrete slab leg resting surface from hardened plastic.
C Level Change
The main purpose of the level change was to protect the marina from storm surge, however provided an interesting chance to incorporate a couple of elements for people to utilize. Each platform is level, a shade tree and benches. The raised platforms are located at the corners of the site and like. Guard rails were integrated on the platforms for safety and high retaining wall, made of natural stone, holds the platforms together. There has been a slight change to the beach without the mess of the sand.
D Playground and Shelter
The playground and shelter are located in the middle of the park and along the east-most side. The shelter provides people with a place to get out of the sun and picnic tables to eat at. In front of the shelter is a raised area that is covered by a shade sail which guides people to the shelter. The playground is a central location within the site. The area around the play ground is also open which helps to make it a safe environment for children to play in.
E Marina Structure
The marina building provides the site with a number of operations. Besides having a bait and tackle shop, there is also a restaurant that offers food and drinks. The building also contains a maintenance and rentals. The building consists of concrete block walls and a wood roof system. The marina building has three main entrances/exits. The north and south entrances are for customers. The east entrance is for a vehicle drive up for fishermen to bring their catches in to be sold. The structure is roughly approximately 3000 square feet.
F Plaza Area
The main plaza area is located at the center of the two main axes. The plaza incorporates the lake's historical water levels in the paving. The paving integrates bronze stars and historical tidbits about the lake. The stars are placed at levels that represent water levels in the lake's history. The plaza also has a 50 foot tower which helps visitors keep track of time and provides a focal point around the lake's history. To emphasize sudden flooding that started in 1992.
G Beach Structure
The structure located on the north end of the beach provides public facilities for the beach. The facilities include toilet and female restrooms and showers. The second level includes an observation deck with an interpretive holding an emergency phone link. The life guard has a small office on the north side of the structure. The structure allows the life guard to see the entire beach and provides a safer experience for users.
H Viewing Platforms
The hangout platforms located on the north end of the site provide a more secluded type of seating. Each platform has different directed views and a unique seating unit. The platforms are located at the north end of the site and are ADA accessible. The platforms are shaded in small areas to provide a refuge from the sun at noon. Guard rails protect people from falling into the water and a railing system that helps you move through the space.
I Grilling Area
The area located northwest of the marina building is a space that is reserved for grilling and eating. The area is provided with picnic tables and a directed view of the lake. The grill is a stone object with a large commonly grill. The grill is a stone object with a large metal grill above that. The space could be reserved for large groups of people and could also serve as a place for coloring.
J Patio Area
The patio area provides users with an outdoor eating area that provides them with the view of users towards the lake. The patio contains tables and chairs with a variety of seats of chairs. Each table is covered by a large umbrella that provides shade during the hot summer months. The patio is surrounded by a low wall that compliments the stone work throughout the area. The patio area connects to the marina through a covered entry area.
K Pier and Fishing Docks
The pier helps connect the islanders to the docks. It also provides access to the islands that provide lighting and resting places for visitors. The pier is also a fishing area. The rail on the rest of the site, helping provide a unified character. The fishing docks are located on the east side of the pier. The docks are approximately 30 feet and a variety of lengths. They would mainly be rented by those who have a boat docked at the marina. Each are connected to the pier by a ramp system with a variety of lengths, which are determined by the number of houseboats. Connected directly to the pier the docks are also floating docks depending on water levels.
L Fuel Station and Rental Docks
The fuel dock is located at the end of the pier. The fuel pump can only be turned on from inside the small building located on the pier. The docks are approximately 30 feet and a variety of lengths. They would mainly be rented by those who have a boat docked at the marina. Each are connected to the pier by a ramp system with a variety of lengths, which are determined by the number of houseboats. Connected directly to the pier the docks are also floating docks depending on water levels.
necting

Board 6 of 6


Design Development
Guard Rail
Bronze Plaque
Marina Sign
Farmers Market Footings
Section of Retaining Wall
Materials
Project Lighting
Lighting on Pier
Planting Plan
Seating Wall Lighting
Retaining Wall Lighting

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List of Figures

Figure 1. Created by Chad Zander

Figure 2. Taken from Hydrology of Devils Lake Area page 4

Figure 3. Taken from Hydrology of Devils Lake Area page 3

Figure 4. Taken from Special Problems: Devils Lake website

Figure 5. Taken from Devils Lake, Master Plan page 7

Figure 6. Taken from Special Problems: Devils Lake website

Figure 7. Created by Chad Zander

Figure 8. Taken from Special Problems: Devils Lake website

Figure 9. Taken from Terra Server USA website

Figure 10. Taken from Geospatial Data Gateway website

Figure 11. Taken from Hydrology of Devils Lake Area page 11

Figure 12. Taken from Special Problems: Devils Lake website

Figure 13. Taken from Hydrology of Devils Lake Area page 8-9

Figure 14. Taken from Hydrology of Devils Lake Area page 5

Figure 15. Taken from Ramsey County Soil Survey

Figure 16. Taken from Geospatial Data Gateway website

Figure 17. Created by Chad Zander

Figure 18. Taken from The Weather Channel website

Figure 19. Taken from The Weather Channel website

Figure 20. Taken from The Weather Channel website

Figure 21. Taken from Woodland Resort website

Figure 22. Taken from Woodland Resort website

Figure 23. Taken from Woodland Resort website

Figure 24. Taken from Woodland Resort website

Figure 25. Created by Chad Zander

Figure 26. Created by Chad Zander

Figure 27. Created by Chad Zander

Figure 28. Created by Chad Zander

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Figure 57. Taken from Forest Park website

Figure 58. Taken from Terra Server USA website

Figure 59. Taken from Terra Server USA website

Figure 60. Taken from Forest Park website

Figure 61. Taken from Tulsa River Parks website

Figure 62. Taken from Tulsa River Parks website

Figure 63. Taken from Tulsa River Parks website

Appendix

A New Devils Lake Waterfront

Landscape Architecture Design Thesis
2004-2005

Statement of Intent

A New Devils Lake Waterfront

Devils Lake, North Dakota is a town built up around one of the states largest natural lakes. Its origin dates back to the late 1800's when settlers first started inhabiting the area. The lake is known for its fishing and numerous outdoor activities which people have enjoyed for many years. The area around the lake was heavily populated and provided housing for hundreds of families. The construction of the lakefront and most of the recreational facilities along it were completed when the lake level was relatively stable. Many housing developments and smaller communities were begun and flourished until the 1990's when the lake began rising.

Devils Lake has risen a remarkable 24.5 feet from 1993 to 2003. The volume of water in the lake has quadrupled and now covers more then 129,000 acres. Since 1993, more than $450 million in damages have occurred as a result of the flooding. The lake consumed hundreds of houses and all the development around them. The main public waterfront was one of the first things lost and has not been replaced. The flood has destroyed more than just houses and property; it destroyed a way of life and the aesthetic quality of the lakefront.

The primary focus of my thesis project is to reestablish a waterfront that will prosper into the future. The local, state, and federal governments are currently in the process of creating an outlet to help stabilize the water level of the lake. With the lake level stable the development of its waterfront will once again be set in motion. With careful design the development of this large public recreation area will take place and be of tremendous value to the community. The lake is now not far from the towns edge and hence has the potential to easily serve many of the residents in the area with an enjoyable amenity.

The site for the new waterfront is located in the historic Lakewood development along the lake. It has easy access to and from town and currently is the site of a few houses that survived the flood. The site is currently home to a main access point on the lake and has the potential to be a very gracious and thoughtful development. The main area of research that the thesis will focus on will be waterfront developments and their relationship to natural systems. I will also take an in-depth look at past developments along the lake and some historical precedents. The state park system currently in place along the lake will also be analyzed and addressed.

The underlying premise of this project is that a better understanding of the relationship between patterns of human settlement and hydrological systems will help us improve the quality of waterfront design.

The underlying attraction of the movement of water and sand is biological.
If we look more deeply we can see it as the basis of an abstract idea
linking ourselves with the limitless mechanics of the universe.
- Sir Geoffrey Jellicoe

THESIS PROPOSAL
A NEW DEVILS LAKE WATERFRONT
OCTOBER 7, 2004 CHAD ZANDER

A. TITLE

A New Devils Lake Waterfront

B. LOCATION

The project is located in Ramsey County of North Dakota. The area that the project will focus on is located in the southwestern part of the county. It includes the Devils Lake Basin and the city of Devils Lake as well as those areas adjacent to the sites. The chosen site of the development is located in the Lakewood area along Creel Bay of Devils Lake.

C. USER / CLIENT DESCRIPTION

The composition of its users is very large and very diverse, it includes the city of Devils Lake and the general public of the county. The primary users include boaters, fisherman, vacationers and the local population in the area. The use of the site occurs year round with water access in the summer and ice access in the winter. Each group has a specific set of needs and requirements expected:

- Boaters compose a large percentage of the summer use on the lake. Some of the issues concerning this user group include boat access, load/unload time, parking and temporary docking. The largest category includes families and boat owners.

- Fisherman makeup a user group that has year round needs for the site. The daily use of the facilities tend to be early morning and evening hours during the summer and winter. The issues that concern this user group are consistent with boaters, but with the addition of a fish cleaning station and restrooms.

- Vacationers compose another user group whose primary activity is during summer months. There is some winter and off season users, but they occupy a small percentage. Vacationers require the same needs as boaters and fisherman with the addition of site seeing, history and facilities for children.

- The local population is another major user group of the site including families, teenagers, a bible school, city users and outdoor enthusiasts. Their primary needs include those of the boaters and fisherman, along with a beach for recreation, a general store, shelter, cooking facilities and open recreation space.

Overall the variety and composition of the users creates a facility that needs to be dynamic and willing to address a wide range of use.

D. MAJOR PROJECT ELEMENTS

The major project elements are facilities that address the needs of the users and improve the enjoyment of the site. Each major element has different design components and requires a different set of parameters to be looked at. The function and seasonal usage, along with the users will be discussed:

Lake Access Point – access to the lake in winter and summer, used by all user groups, includes boat ramp and launch, design and construction techniques along with number of users.

Public Beach – summer usage, sand waterfront beach, used by all user groups, design and construction techniques along with number of users.

Marina – warm season usage, includes docks and boat storage, used by all user groups, aquatic construction and design, marina sales and functions.

Public Open Space –warm season usage, includes pedestrian orientated space, used by all user groups, design and components.

Parking –year round use, location and number of spaces, used by all user groups, design and layout techniques, type of material and scale.

Recreation Facilities –warm season usage, possible types and use of activities, used by most user groups, location and design issues.

Public Facilities –year round usage, location and type of facilities, used by all user groups, restrooms and water access.

Connections –land connections include the city, bible school and golf course. water connections include Spirit Lake Casino, Woodland Resort and Grahams Island State Park.

E. SITE INFORMATION

The site of the waterfront development is located along Devils Lake in the Lakewood development. The site lies on the eastern edge of Creel Bay and has a direct connection to the main bay. Devils Lake is located in Ramsey County in central North Dakota. The site has been the location of past waterfront developments that were destroyed when the lake recently flooded.

Economy and Demographics

The city of Devils Lake is the only community in the region that serves as trade center for the county. The city contains retail sales, services, government and industry that drive the economy. The city of Devils Lake has a population of 7300 with a number of smaller developments located just outside the city limits.

History

In 1882 the city of Devils Lake was founded by H.M. Creel and was respectively named Creelsburgh. July of 1883 saw the arrival of the first passenger train to the city and the maiden voyage of the Minnie H, a large steamboat that hauled passengers and mail to towns on the lake. The first surge of white settlement began around that time and today much of the original settlement patterns remain. The opening of the Devils Lake Indian Reservation in 1904 completed the settlement around the lake. Today the historic settlements remain occupied and help keep a rich historic record of its development.

Environmental Issues and Hydrology

The main concern of the region in recent years has been the raising water level of the lake and the trouble it has been causing. The Devils Lake Basin is a 3,810 sq mile closed drainage basin, it is a terminal lake in which all the drainage in the basin ends up. The rising of the lake has affected water quality, aquatic life, recreation, transportation and development. The lake has freshened as it has risen, although as part of a closed basin, it will always have relatively high levels of salts and minerals. The water level has risen a remarkable 24.5 feet from 1993 to 2003 and has quadrupled in size.

Site Topography and Landmarks

The site for the waterfront development is located on a relatively flat plain to the east of the lake. There is some slight elevation changes along the lakeshore and to the south of the site. Some of the noticeable landmarks in the area include Sully's Hill, the heavily forested hilly terrain to south. Another is the actual lake itself creating its own identity through fishing and recreation.

Vegetation

Ramsey County has approximately 6,840 acres of native woodland and most of these woodlands are adjacent to Devils Lake. Native trees also grow in the beach areas around the lake. The upland forest type is made up of bur oak, green ash and American elm. Other less common species include quacking aspen, basswood, hackberry, dogwood and chokecherry. The dominant species in the beach areas include cottonwood, willow and elm.

Geology and Soils

The Devils Lake Basin was created by the last advance of the continental ice sheets in North Dakota. Devils Lake and the range of hills just south of the lake are a classic example of a large thrust moraine. The glaciers and their outwash created a variety of soils around the lake. Farthest from the lake, glacial till is the dominant type of soil. Closer to the lake and including the town, clay and silt lake deposits compose most of the soil. To the south of the lake outwash deposits composed of sand and gravel are found.

Climate
Devils Lake has a continental climate characterized by relatively warm short summers and long cold winters. Precipitation averages about 17 inches per year, most of which falls between April and September. The winter snowfall level is around 36 inches per year and the prevailing winds are from the northwest in the winter and the southeast in the summer.

Views and Orientation
The views into the site are from the several entrances and from the lake. They include vehicles on roads and boats on water. The shoreline runs north and south so the site opens up to water in the west and moderate tree cover in the east. The region has a lowered sun angle in the winter as it shifts lower in the southern sky.

Transportation Linkages
The site is located 7 miles to the southwest of the city of Devils Lake. Access to the site is possible on south Hwy 20 and then to county Hwy 1. A bike path also connects the development to the city. Water access is also available from Spirit Lake Casino's Marina, Woodland Resort and Grahams Island State Park.

F. PROJECT EMPHASIS

The primary focus in the project will consider several things. First, the ability to be dynamic and flexible due to the changing water level. Second, to be designed and constructed to a high quality, giving it longer potential use. And third, to accommodate a wide range of users throughout the year.

The changing water level will be one of the largest concerns influencing the design. The ability of the site to accommodate wet and dry precipitation patterns is critical to its future use. The region is also prone to flash flooding and at times the lake level changes quickly.

The quality of the design and construction plays another major role in the sites future use. The ability of the constructed objects to stand against the heavy water erosion is a important characteristic.

The wide range of users and the season of their use will greatly affect how the site is designed. There is a heavy need for the site to be used year round, which will have an affect on design decisions. The ability of the site to be used by all age groups is equally important, creating an enjoyable public space for recreation.

G. DESIGN METHODOLOGY

Using case studies and researching available aquatic construction techniques will influence some of my later research and direction. The concepts that apply to waterfront developments will also have an influence on my design, by understanding some case studies I will be able to see factors influenced previous

designs. Through the use of environmental studies and a series of case studies, a well designed and enjoyable waterfront is the solution. The factors affecting that solution will be taken into consideration before the design can begin. The idea of design development will play a key role in the outcome of the site. To be able to show how construction of the site will occur and how it will actually work as a whole will be addressed. The largest and most driving feature to document will be the influence that the lake has on the site. For this, the history of the lake will be documented and the hydrology taken into account.

H. SCHEDULE

Day	Date	Importance	Type of Work
R	October 7	Thesis Proposal Due Cover Page Due Abstract Due	Writing
M-F	October 11-15	Site Research	Research
M-F R	October 18-22 October 21	Waterfront Design Critics Announced	Case Studies
M-F R	October 25-29 October 28	Construction Design Last Day of LA 561	Research
M-F	November 1-5	Site Research	Research
M-F R	November 8-12 November 11	Site Graphics Veterans Day (no class)	Graphics
M-F F	November 15-19 November 19	Site Research Last Day of LA 571	Program Work
M-F W RF	November 22-26 November 24 November 25-26	Site Research Draft Program Due Thanksgiving Break	Program Work
M-F	Nov 29- Dec 3	Site Research	Program Work
M-F R	December 6-10 December 9	Editing Program Program Due (critic)	Program Work

M-F	December 13-17	Finals Week	Editing/Correcting
R	December 16	Program Due (instructor)	
End of Fall Semester			
T-F	January 11-14	Schematics w/ reviews	Design
T	January 11	Spring Classes Begin	
M-F	January 17-21	Schematic w/ reviews	Design
M	January 17	MLK Jr. (no class)	
M-F	January 24-28	Schematic Drawings	Drawings
M-F	Jan 31-Feb 4	Design Development	Design
M-F	February 7-11	Design Development	Design
M-F	February 14-18	Design Development	Design
M-F	February 21-25	Design Implication	Applied
M	February 21	President Day (no class)	
M-F	Feb 28-March 4	Prepare For Review	
M-F	March 7-11	Thesis Reviews	
M-F	March 14-18	Spring Break (no class)	None
M-F	March 21-25	Start Final Presentation	Graphic/Text
F-M	March 25-28	Easter Break (no class)	
T-F	March 29-April 1	Presentation	Graphic/Text
M-F	April 5-9	Presentation	Graphic/Text
M-F	April 11-15	Presentation	Graphic/Text
M-F	April 18-22	Finalize Presentation	Finish
M-F	April 25-29	Finalize Presentation	Finish
M	April 25	Thesis Project due	
T-W	April 26-27	Thesis Exhibit	
F	April 29	Thesis Document Due (critic)	
R-R	April 28-May 5	Thesis Reviews	Prepare

M-F	May 2-6	Last Week of Class	
M-F	May 9-13	Finals Week	Finalizing
R	May12	Thesis Document Due (office)	
F	May 13	Graduation at Fargodome	

I. DOCUMENTATION OF THE DESIGN PROCESS

The documentation of the thesis process will occur through a series of sketch-books and drawings. Most of the documentation of the drawings will be incorporated into the program. The other important information will be complied for later use on a presentation board.

J. PREVIOUS STUDIO EXPERIENCE

Year	**Fall**	**Spring**
2nd Year	Tim Kennedy -Ideal Landscape -Precedents Study -Six Pack Design -Plains Art Museum Terrace	Dennis Colliton -Camp Wilderness Amphitheatre -Devils Lake Open Space -NDSU Fountain Plaza
3rd Year	Josh Walter -Car Park -Sheyenne National Grasslands Campground	Tim Kennedy -Pool Perspective -Camp Cormorant -Upper Landing Housing Dev. -Masonry Competition (NDSU)
4th Year	Josh Walter, Mark Barnhouse Cindy Urness -Urban Design, Fargo Downtown	Angela Hansen -Broadway Square Design -Ft Totten Historic Preservation -Babbit Mine Reclamation
5th Year	Josh Walter -Fergus Falls Riverwalk	

K. REFERENCE LIST / RESOURCES

Books

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Glazer, Michael. Improving Your Waterfront: A Practical Guide. Washington D.C. U.S. Government Printing Office.1980.

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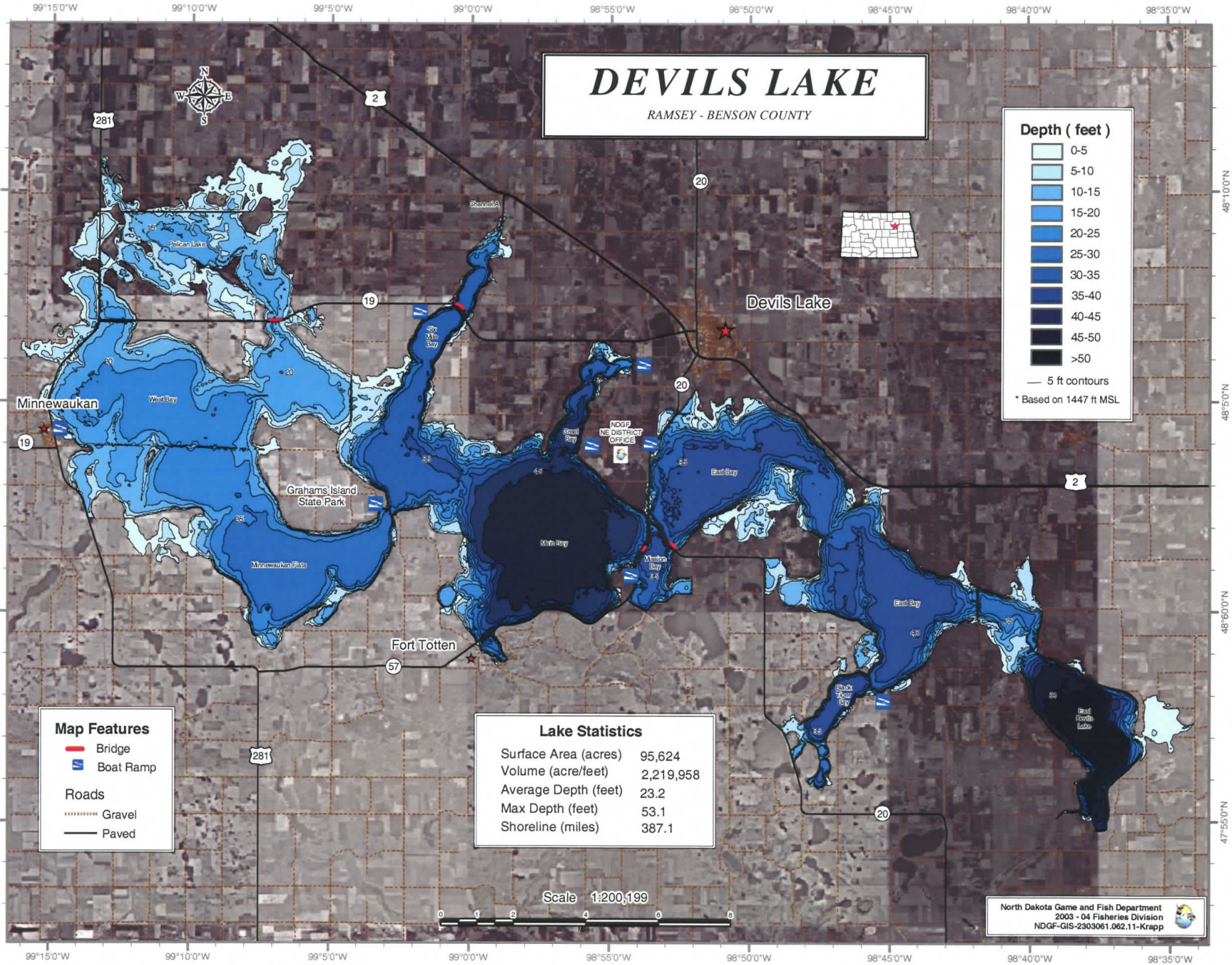
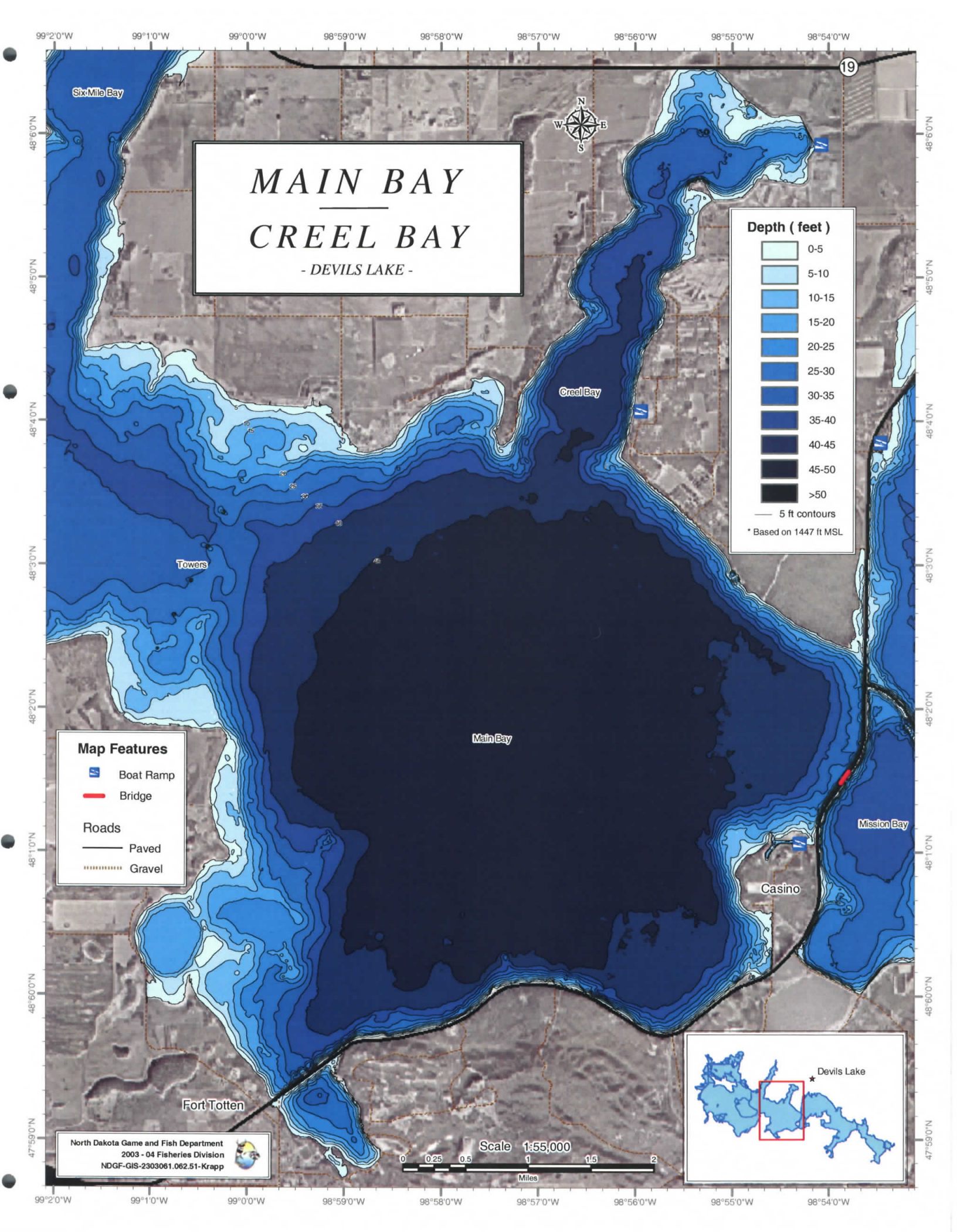

DEVILS LAKE
RAMSEY - BENSON COUNTY
Depth (feet)
0-5
5-10
10-15
15-20
20-25
25-30
30-35
35-40
40-45
45-50
>50
5 ft contours
* Based on 1447 ft MSL
Map Features
Bridge
Boat Ramp
Roads
Gravel
Paved
Lake Statistics
Surface Area (acres) 95,624
Volume (acre/feet) 2,219,958
Average Depth (feet) 23.2
Max Depth (feet) 53.1
Shoreline (miles) 387.1
Scale 1:200,199
North Dakota Game and Fish Department
2003 - 04 Fisheries Division
NDGF-GIS-2303061.062.11-Krapp
Devils Lake
Minnewaukan
Fort Totten
Grahams Island State Park
Pelican Lake
West Bay
Minnewaukan Flats
Channel A
Six Mile Bay
Small Bay
NDGF NE DISTRICT OFFICE
Main Bay
Mission Bay
East Bay
Black Tiger Bay
East Devils Lake
99°15'0"W
99°10'0"W
99°5'0"W
99°0'0"W
98°55'0"W
98°50'0"W
98°45'0"W
98°40'0"W
98°35'0"W
48°10'0"N
48°5'0"N
48°0'0"N
47°55'0"N


MAIN BAY
CREEL BAY
- DEVILS LAKE -
Depth (feet)
0-5
5-10
10-15
15-20
20-25
25-30
30-35
35-40
40-45
45-50
>50
5 ft contours
* Based on 1447 ft MSL
Map Features
Boat Ramp
Bridge
Roads
Paved
Gravel
Six Mile Bay
Creel Bay
Towers
Main Bay
Mission Bay
Casino
Fort Totten
Devils Lake
19
N
S
E
W
Scale 1:55,000
0 0.25 0.5 1 1.5 2
Miles
North Dakota Game and Fish Department
2003 - 04 Fisheries Division
NDGF-GIS-2303061.062.51-Krapp
99°2'0"W
99°1'0"W
99°0'0"W
98°59'0"W
98°58'0"W
98°57'0"W
98°56'0"W
98°55'0"W
98°54'0"W
48°6'0"N
48°5'0"N
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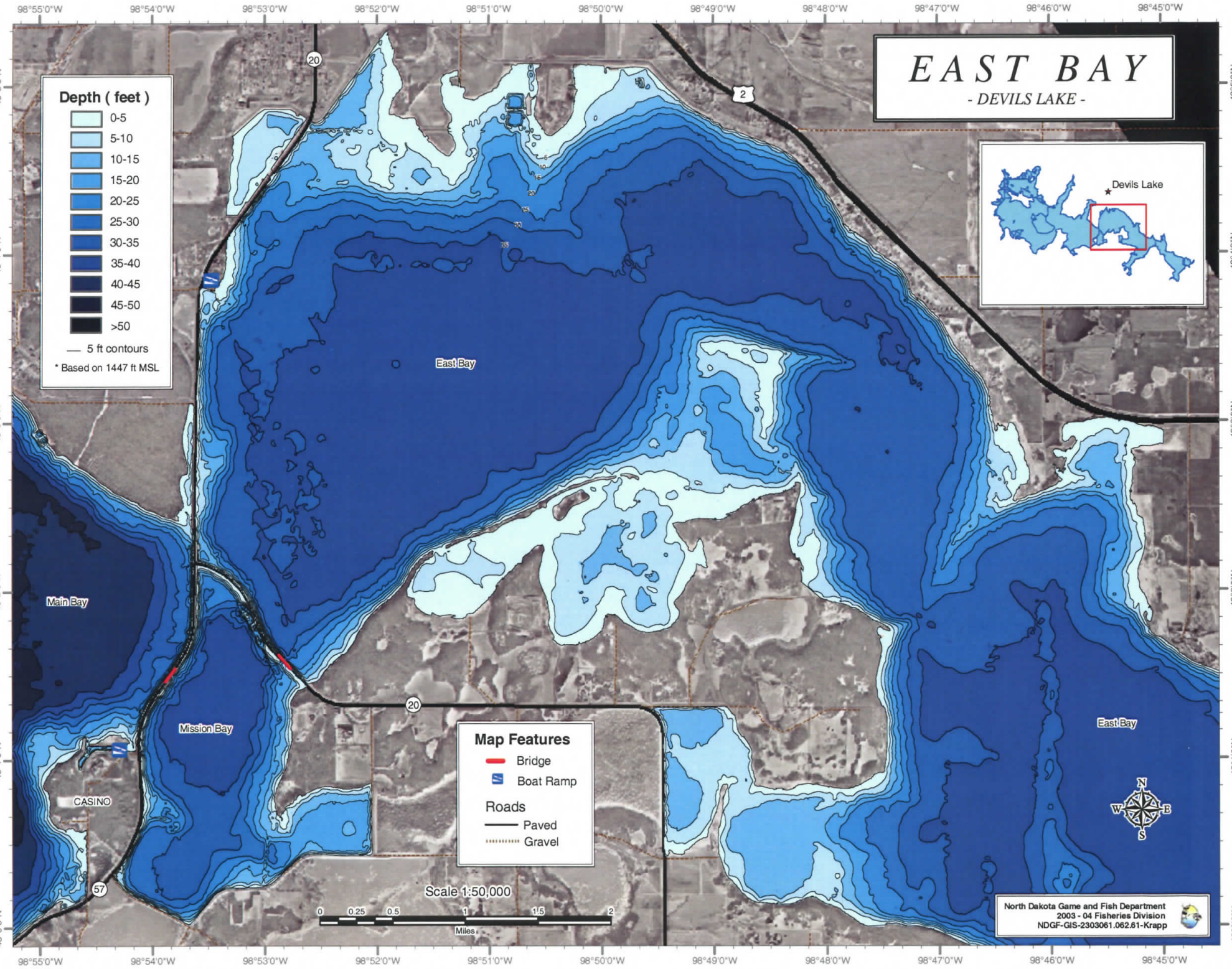
48°3'0"N
48°2'0"N
48°1'0"N
48°0'0"N
47°59'0"N


EAST BAY
- DEVILS LAKE -
Depth (feet)
0-5
5-10
10-15
15-20
20-25
25-30
30-35
35-40
40-45
45-50
>50
5 ft contours
* Based on 1447 ft MSL
Devils Lake
East Bay
Main Bay
Mission Bay
CASINO
East Bay
20
2
20
57
Map Features
Bridge
Boat Ramp
Roads
Paved
Gravel
Scale 1:50,000
0 0.25 0.5 1 1.5 2
Miles
N
W
E
S
North Dakota Game and Fish Department
2003 - 04 Fisheries Division
NDGF-GIS-2303061.062.61-Krapp
98°55'0"W
98°54'0"W
98°53'0"W
98°52'0"W
98°51'0"W
98°50'0"W
98°49'0"W
98°48'0"W
98°47'0"W
98°46'0"W
98°45'0"W
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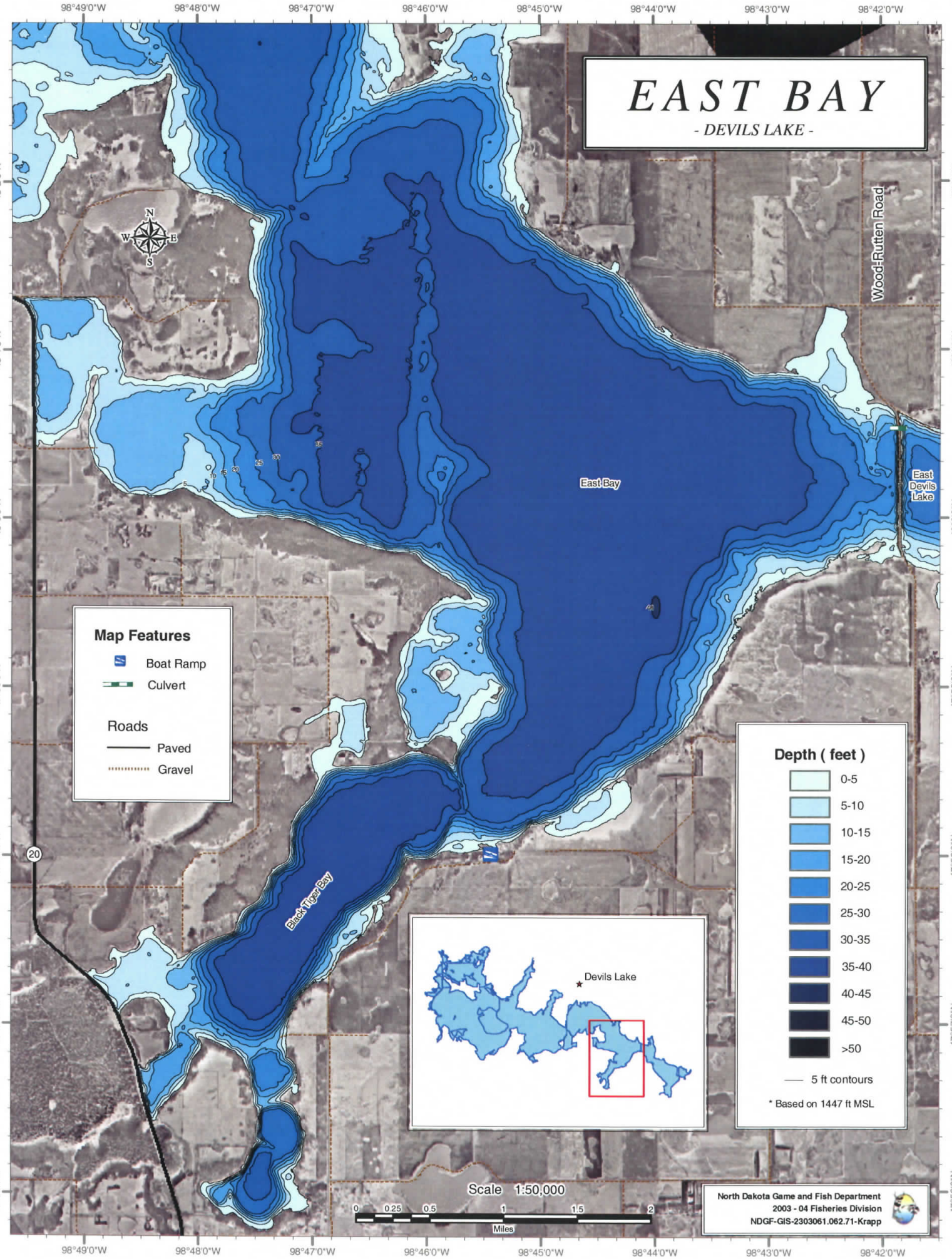
48°4'0"N
48°3'0"N
48°2'0"N
48°1'0"N
48°0'0"N


EAST BAY
- DEVILS LAKE -
Wood-Rutten Road
East Bay
East Devils Lake
Black Tiger Bay
Map Features
Boat Ramp
Culvert
Roads
Paved
Gravel
Depth (feet)
0-5
5-10
10-15
15-20
20-25
25-30
30-35
35-40
40-45
45-50
>50
5 ft contours
* Based on 1447 ft MSL
Devils Lake
Scale 1:50,000
0 0.25 0.5 1 1.5 2
Miles
North Dakota Game and Fish Department
2003 - 04 Fisheries Division
NDGF-GIS-2303061.062.71-Krapp
98°49'0"W
98°48'0"W
98°47'0"W
98°46'0"W
98°45'0"W
98°44'0"W
98°43'0"W
98°42'0"W
48°2'0"N
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47°59'0"N
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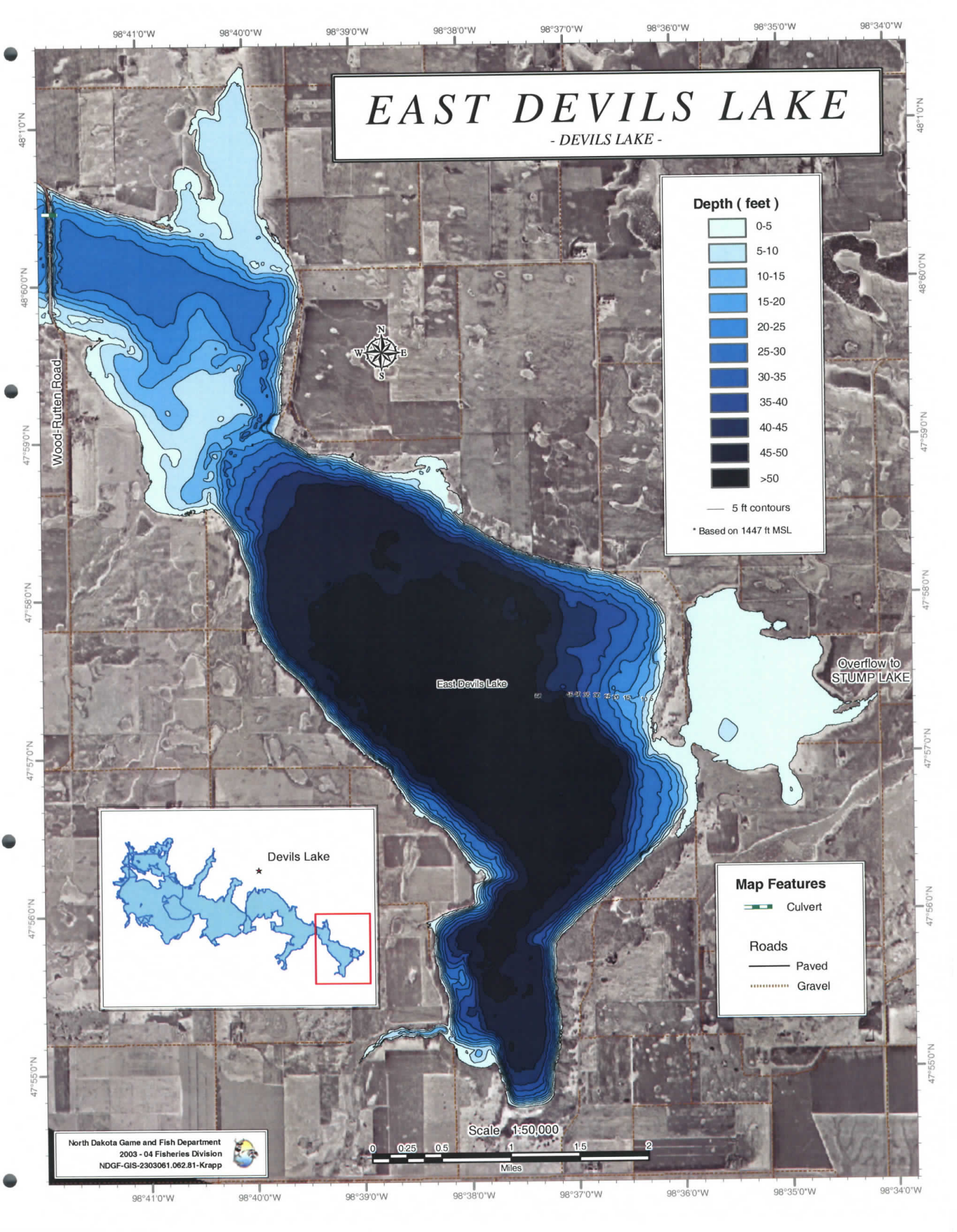
47°56'0"N


EAST DEVILS LAKE
- DEVILS LAKE -
Depth (feet)
0-5
5-10
10-15
15-20
20-25
25-30
30-35
35-40
40-45
45-50
>50
5 ft contours
* Based on 1447 ft MSL
Wood-Rutten Road
East Devils Lake
Overflow to STUMP LAKE
Devils Lake
Map Features
Culvert
Roads
Paved
Gravel
Scale 1:50,000
0 0.25 0.5 1 1.5 2
Miles
North Dakota Game and Fish Department
2003 - 04 Fisheries Division
NDGF-GIS-2303061.062.81-Krapp
98°41'0"W
98°40'0"W
98°39'0"W
98°38'0"W
98°37'0"W
98°36'0"W
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98°34'0"W
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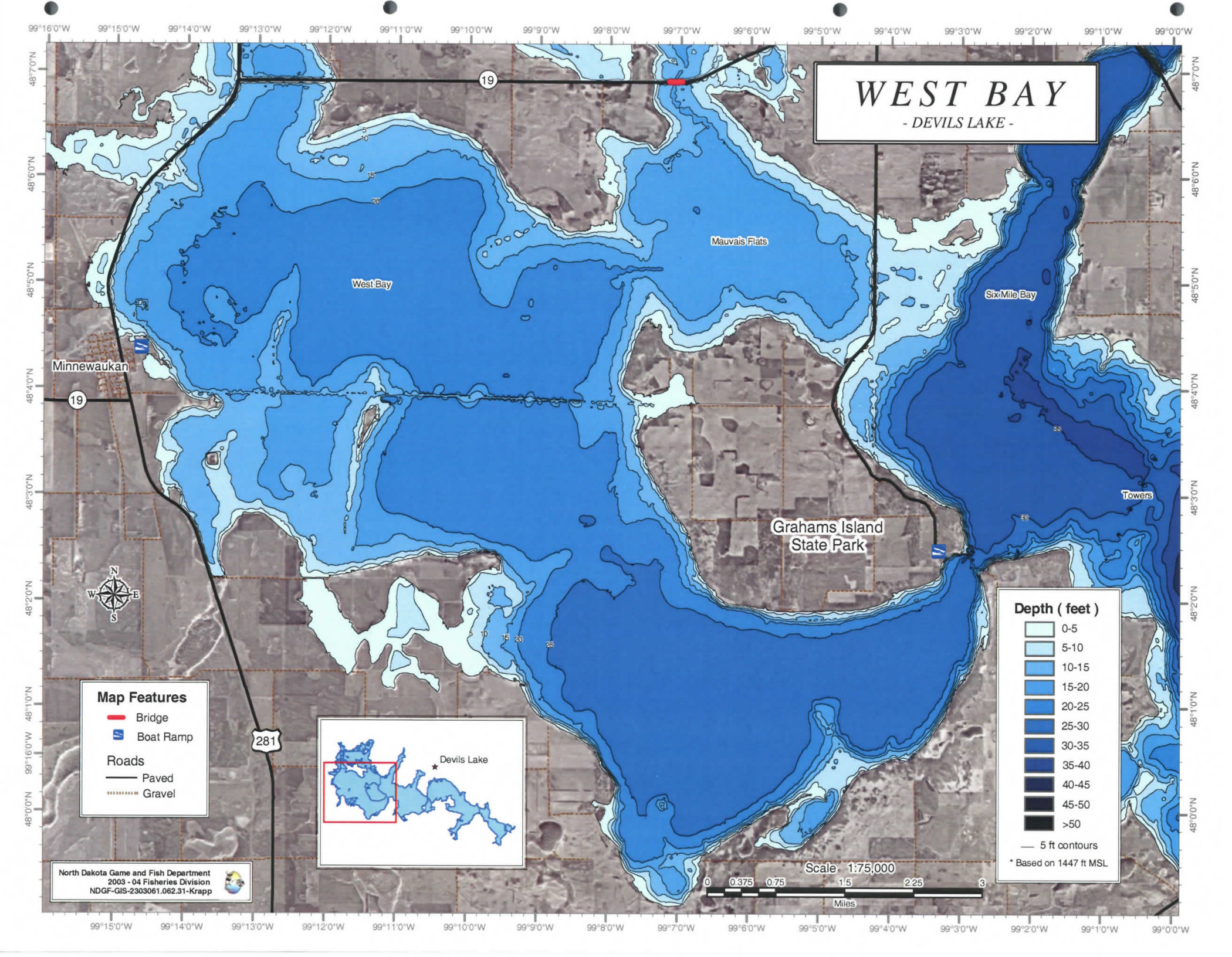
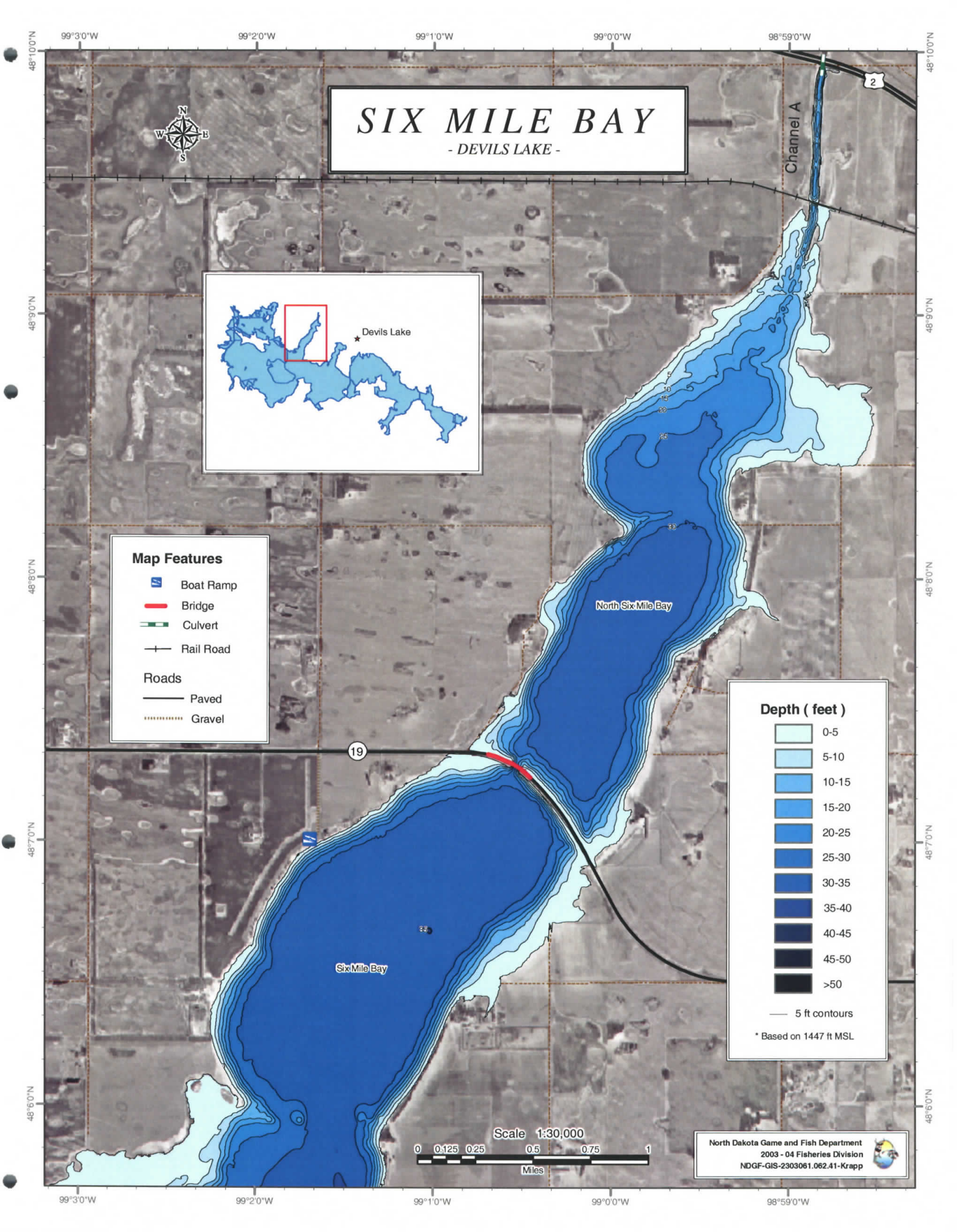
47°56'0"N
47°55'0"N


WEST BAY
- DEVILS LAKE -
West Bay
Mauvais Flats
Six Mile Bay
Towers
Minnewaukan
Grahams Island
State Park
19
281
Devils Lake
Map Features
Bridge
Boat Ramp
Roads
Paved
Gravel
Depth (feet)
0-5
5-10
10-15
15-20
20-25
25-30
30-35
35-40
40-45
45-50
>50
5 ft contours
* Based on 1447 ft MSL
Scale 1:75,000
0 0.375 0.75 1.5 2.25 3
Miles
North Dakota Game and Fish Department
2003 - 04 Fisheries Division
NDGF-GIS-2303061.062.31-Krapp


SIX MILE BAY
- DEVILS LAKE -
Channel A
Devils Lake
North Six Mile Bay
Six Mile Bay
Map Features
Boat Ramp
Bridge
Culvert
Rail Road
Roads
Paved
Gravel
Depth (feet)
0-5
5-10
10-15
15-20
20-25
25-30
30-35
35-40
40-45
45-50
>50
5 ft contours
* Based on 1447 ft MSL
Scale 1:30,000
0 0.125 0.25 0.5 0.75 1
Miles
North Dakota Game and Fish Department
2003 - 04 Fisheries Division
NDGF-GIS-2303061.062.41-Krapp
99°3'0"W
99°2'0"W
99°1'0"W
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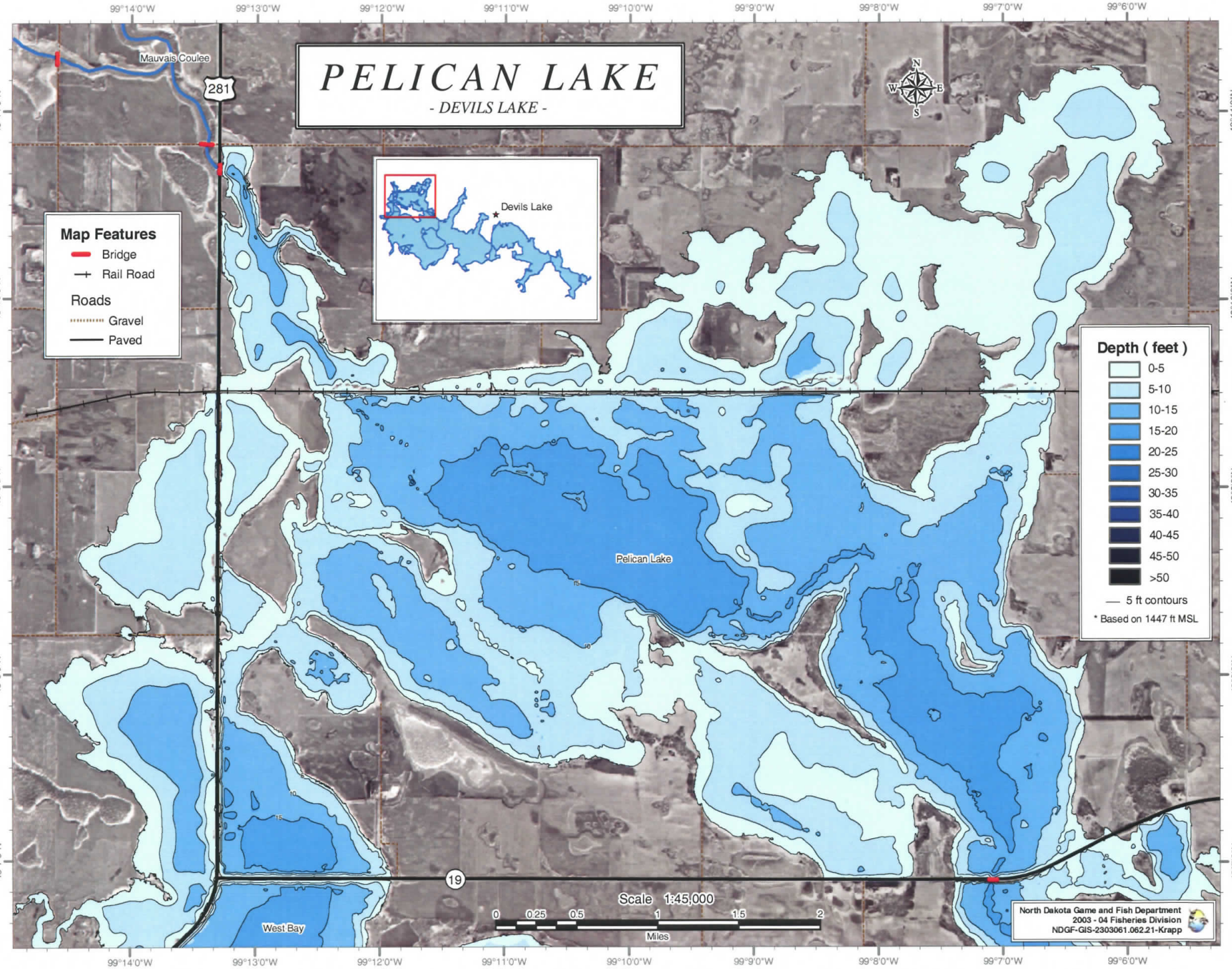
48°9'0"N
48°8'0"N
48°7'0"N
48°6'0"N


PELICAN LAKE
- DEVILS LAKE -
Mauvais Coulee
281
Devils Lake
Map Features
Bridge
Rail Road
Roads
Gravel
Paved
Depth (feet)
0-5
5-10
10-15
15-20
20-25
25-30
30-35
35-40
40-45
45-50
>50
5 ft contours
* Based on 1447 ft MSL
Pelican Lake
West Bay
19
Scale 1:45,000
0 0.25 0.5 1 1.5 2
Miles
North Dakota Game and Fish Department
2003 - 04 Fisheries Division
NDGF-GIS-2303061.062.21-Krapp
99°14'0"W
99°13'0"W
99°12'0"W
99°11'0"W
99°10'0"W
99°9'0"W
99°8'0"W
99°7'0"W
99°6'0"W
48°11'0"N
48°10'0"N
48°9'0"N
48°8'0"N
48°7'0"N

The Devils Lake North Dakota Flood Story

Devils Lake North Dakota is a "closed basin" lake (one with no river inlet or outlet) within the Red River-Hudson Bay drainage system. The region's surface runoff flows through many small coulees and lakes and is collected by Devils Lake and adjacent Stump Lake. There it remains until it evaporates or enters the ground water table.

Current elevation: 1447.89

The State Water Commission has information about Devils Lake on their web site. If you visit their web site, you will see information about the background, study reports, flood control efforts, flooding status, maps, images and much more on Devils Lake, please visit their web site at: **www.swc.state.nd.us/projects/devilslake.html**

THE HISTORY OF DEVILS LAKE

Since its inception during the glacier period, Devils Lake has been either rising or falling over the last 10,000 years. Geologic evidence shows that the water level in Devils Lake has fluctuated widely from completely dry (about 1400 feet mean sea level (ftmsl)) to overflowing into the Sheyenne River (about 1459 feet msl). The level of Devils Lake dropped significantly through the great drought of the 1930's and finally reached a historical low of about 1402 feet (only 2 feet deep) in 1940. Since that time the lake has been rising in a somewhat erratic fashion, with years of decline and increase.

Even though long-term variations in the climate are ultimately the reason Devils Lake rises or falls, the short term fluctuations do not always appear to correlate well with obvious climatic trends. One reason for this may relate to the runoff pattern. Several smaller lakes are found immediately upstream from Devils Lake and these lakes serve to delay runoff to Devils Lake.

Another Reason may relate to interaction with the groundwater system. It was first suggested in the late 1970's that groundwater flows may account for much of the water entering or leaving Devils Lake. If the Spiritwood Aquifer, which directly underlies Devils Lake, is in contact with the floor of the lake, water can move from the aquifer to the lake or vice versa.

Although the drainage of wetlands certainly affects the modern landscape, these and other cultural practices are thought to be insignificant with respect to the overall changes in the level of Devils Lake.

THE DILEMMA FOR DEVILS LAKE

Since settlement of the Basin in the mid 1800's, the ultimate desire of the residents has been to stabilize the water level in Devils Lake. A lack of stabilization has meant a loss of commercial navigation, recreation, and fish kills during low lake levels, as well as damage to roads, infrastructure, residential and commercial buildings, and agriculture production during high levels.

Inlet-outlet stabilization projects have been proposed but never built for Devils Lake. This has been due primarily to legal, financial, environmental, international treaty, and water quality constraints, along with the inability of the projects to meet the U.S. Army Corp. of Engineers' required standards of cost effectiveness, traditionally applied to river systems.

Water quality and quantity have been the main issues related to moving water out of Devils Lake through an outlet. The amount of dissolved solids (minerals) in Devils Lake is high compared to the Sheyenne and Red River Systems.

In addition, there is concern that the release of water from Devils Lake would increase spring flooding and cause erosion of the river banks. Fortunately, these issues can be resolved. The outlet structure could be operated in such a way as to limit the maximum flow and prevent major erosion. Furthermore, water could be released from Devils Lake during times when the Sheyenne could accept it, July-February as an example.

On an International level, the Canadian Government is concerned about the introduction of non-native fish species and biota that may damage their fishing industry. They are especially concerned about the striped bass which the ND Game & Fish Dept. introduced into Devils Lake in the early 1980's. Subsequent netting studies, however, have shown that the striped bass were not able to reproduce in Devils Lake's conditions and have died out. In addition, the transfer water out of Devils Lake through a manmade structure would have to comply with the Boundary Waters Treaty Act of 1909.

THE FUTURE OF DEVILS LAKE

Above average fall rains in 1993 and heavy spring snowfall in 1994 caused Devils Lake to rise 5 feet in only six months. The lake has steadily risen each year since, over 24 feet in total. 81,000 acres of adjacent land, much of it privately owned, has been flooded and the lake now covers 120,000 -125,000 acres.

Geologists that have studied the history of Devils Lake predict that the current wet weather pattern could last as long as another 100 years. If nothing is done to move water out of the Devils Lake basin, the Lake Region can expect the following chronological impacts.

1447 ftmsl Lake Level as of August 1999

1447.5 ftmsl East Bay water begins to seep into Stump Lake

1452 ftmsl Equalization of water between the two lakes raises Stump Lake 40ft.

- Causes the loss of another 58,000 acres of land
- Moves an additional 200 homes and businesses
- Destroys 1.6 million trees or 5,800 acres of forest
- Inundates a national refuge with nesting habitat
- Floods ND Highways 1, 2, 19, 20 and the Woods-Rutten Road

1460 ftmsl Stump Lake will naturally overflow and spill out uncontrolled into the Sheyenne River. At this point, total surface area of Devils Lake will be approximately 300,000 acres.

The Lake Region will have lost:

- 118,000 acres of more land
- Millions of trees
- All transportation routes into and out of Devils Lake by highway and rail
- More than 1,000 structures
- Protection of the City unless the dike is raised an additional 10-15 feet

Should Devils Lake reach its natural outlet, water will flow down the Sheyenne River at a rate of up to 12,500 cubic feet per second (cfs) depending on the conditions. This is 20 times the capacity of the river channel at its most restricted areas and comparable to the worst flood flows in the spring. Needless to say, this could have a devastating impact on the communities downstream.

THE SOLUTION FOR DEVILS LAKE

The community of Devils Lake supports the "three-legged stool" approach being pursued by both Federal and State leaders.

#1. The first leg of the stool is to provide for, through government incentives, the storage of water in the upper basin. ND Wetland Trust is helping finance wetland restorations on Conservation Reserve Program tracts through incentive payments to landowners. Similarly, the ND State Water Commission runs the Available Storage Acres Program (ASAP). Further, the US Fish & Wildlife Service has completed in the past few years, ten wetland development projects in the upper basin. Both of these programs are helping to reduce the amount of inflow to Devils Lake and thereby slowing its rise.

#2. The second leg of the stool consists of raising and rebuilding the local infrastructure. To date, about 40 miles of road have been raised, the levee protecting the city has been lengthened and widened three separate times, and 220 homes and/or businesses have been moved away from the lake and relocated to higher property. In total, from 1993-1998 better than 300 million dollars has been spent on infrastructure raises and flood recovery efforts in the Devils Lake area.

#3. The third and final leg of the stool is to construct an emergency outlet for Devils Lake. Several alternative locations for such an outlet have been proposed, each with their pros and cons.

Devils Lake knows it faces significant financial, legal, and political hurdles to get an outlet. However, for the long-term future of our community and the health of the state's economy as a whole, it is essential that a timely and permanent solution be found to the Devils Lake flooding situation.

Produced by:
Devils Lake Area Chamber of Commerce
Tourism Committee

The Story of The Minnie H Steamboat on Devils Lake North Dakota

Minnie H was product of Caption E.E. Heerman's Will

By Heerman J. Naugle

Reprinted in the Benson County Farmers Press
Minnewaukan, ND
May 3, 1995

The story of the "Minnie H" property starts with the birth of her owner & operator. Edward Edson Heerman was born in Salem Pond, Orleans County, Vt., April 18, 1834. His parents were farm people and as were most farmers of that day, they were self-sufficient on their farm. They raised their own sheep, carded & spun the wool into thread & wove it into cloth. Raising their own food, making their clothes, shoes & many of their utensils & tools developed self reliance & initiative in the children.

While Captain Heerman was yet a young boy, the family moved to Pennsylvania and later to Iowa, settling near what is now Burlington. From this home, at the age of 16, Captain Heerman started out on his own. Carrying all of his worldly possessions in a small bundle & with but a few cents in his pocket, he started for the shores of the Mississippi river, for he had decided to seek his fortune on the river.

At the age of 19, he was in command of his own steamboat on the river. The first of a fleet of 13 steamboats which he owned and operated on the Mississippi and Chippewa rivers. Almost all of his boats were named in one way or another for his only daughter, Minnietta Heerman, later Mrs. Minnie H. Naugle of Devils Lake. For nearly 30 years his business prospered. Then progress brought the railroads into the transportation picture and their entry spelled doom for the river traffic.

An opportunity to bid on transporting a load of freight to Ft. Benton, Montana opened up and thinking of the possibility of finding a new location to transfer his steamboat activities, Captain Heerman made what became the successful bid for the contract. On April 27, 1880, he sailed from St. Paul down the Mississippi river to St. Louis, then up the Missouri river to Ft. Benton. He arrived there with his load of freight on July 4, 1880--a distance of nearly 4200 miles. This was the longest continuous trip ever made on inland waters by steamboat.

The trip did not result in finding a new location, however and the captain returned to his operations on the Mississippi and Chippewa rivers, until 1882 he made a trip to Devils Lake, Dakota territory. This was his second trip into Dakota, as in 1858 he and five associates had become interest in steamboat navigation on the Red River and had established a town site called East Burlington, seven miles south of Fargo. During the Indian massacred of 1862 the settlement was burned and wiped out.

In the meantime, the coming of the railroads was the beginning of the end of steamboat passenger traffic on the Mississippi. "On July 16, 1882, commercial steam boating on the Chippewa was a thing of the past," Caption Heerman wrote in his memoirs. Continuing his search for a new location, Captain Heerman, then 48 came to the Lake Region when it was practically a wilderness, arriving at Odessa on November 3, 1882. The following story of the building of the "Minnie H" is taken in part from Captain Heerman's own memoirs and bears the title "Tales of Hardships."

"There was a stopping place at Odessa at the eastern end of the lake. Plenty of town lots were available. The lake had been partly frozen out from the shore and the ice was about 4 inches thick, I think. The next day, I came further up the lake, where a town called Devils Lake City had been laid out about 1 mile north of the lake and about 2 miles east of where the city of Devils Lake is now situated.

On November 5, the snow all disappeared, I spent 5 days in all at the lake. Devils Lake was a beautiful body of water fringed with timber and the locality was dotted with other beautiful lakes. I examined the soil and believed I had found an empire of undeveloped resources. The shores generally were not far from the timber line and the lake extended nearly to where the depot of the city of Devils Lake now is. On November 8, I returned to my home at Reads Landing, Minnesota, sold everything I had and on November 27, made a contract for the making of the frame of the steamer "Minnie H," to be operated on Devils Lake.

There was, at that time, not many settlers near the lake, but there was a number of town sites. The Dana & Simmeral families had claims southeast of Devils Lake city, on the lakeshore. Major Benham ran the hotel at Devils Lake city. Creelsburg was prospective; Colonel Creel & Colonel Uline were there. George Moore and Frank Pitcher had claims near town. Major Stansbury was here. The Pools, the LaRues, Mr. Lafe Palmer and Captain Jesse Palmer had claims in the timber on Rock Island. Three companies, I think, were stationed at Fort Totten, on the south sides of the lake, with Colonel Conrad in command. Frank Palmer was Indian Storekeeper and Mr. Peck was post trader. Many others could be added if I could think of their names. There was quite a strife about a town site for the lake. Nothing was settled until Mr. J.J.Hill came out in the winter, some time I think, in February 1883.

"I remained in Minnesota until everything was underway. My first shipments of boat materials were made in November 1882. The total registered 14 carloads. At that time the end of the track was beyond Larimore and the railroad construction company was pushing grade on to Bartlett."

"The first 3 carloads to arrive at Larimore contained the machinery and the sawmill. We left Larimore, December 12, 1882 in a snowstorm, attempting to get the first 3 carloads on to Bartlett. We had to shovel snow all night to keep the engine alive. I lost an overshoe and had town men shovel in my place at $1.00 an hour. The engine had to go back for a snow plow, which came from Grand Forks. I walked on to the end of the track, hungry, on the night of December 16, reaching Osburn's for the night. The engine got to the end of the track at the same time. Five days were consumed in moving the train from Larimore to Bartlett.

The construction crew pulled off and the 11 remaining carloads were left at Larimore, which was 35 or 40 miles from where I built the Steamer "Minnie H." All of this material was hauled later by team, at great expense, to the boatyard, in what is now Lakewood on the shores of Devils Lake. The first ton of hay I bought cost $45.00; oats were $1.00 per bushel; other things were in proportion.

"After getting the 3 cars to Bartlett, I improvised a storage place and commenced to haul. Great quantities of snow fell. There were no railroad roads; we just drove out over the great prairie and we made slow progress getting to the lake."

"Purchasing a claim, I commenced to build a living place on the banks of the lake. I must say that was the coldest job I ever got into. The wind blew a gale nearly everyday, making it very hard and dreary. At times in building, it took 3 men to fasten on a board; one to hold the board, one to hold the nail and one to pound the nail." The snow drifted, piling up in great drifts and making it almost impossible to do much. We finally had a place to get

into and that was a happy night. We all suffered great hardships, more than most folks will ever know. I was here 2 months without one letter getting through from home.

"On January 13, at Bartlett we loaded the Minnie H boiler, which had been built in Cincinnati and shipped here entirely new. January 15 we started out with the boiler. We increased our horsepower to nine span of horses and used sticks under the runners. For the first 2 days we made a distance of 10 miles and the teams had to scatter over the prairie for shelter or stable room. Many teams gave out . . . One evening I guided the teams in the dark until we got to Steven's. The little home was already crowded, but they made room for us. The horses were crowded into the barn. During the night, the wind blew so hard through the tiny cracks and crevices in the barn, that by morning the snow had drifted 3 feet deep inside."

"The Pat Murphys took us in one night and sheltered us. Two Teams turned back and only three were left."

On January 17, we arrived at Rock Island, but without the boiler; we found it impossible to haul it in the deep snow and drifts. I then built a big stone bone, that would not turn over the big drifts. The result of this was that the teams could not pull it that way. I was finally able to procure a pair of logging sleds. I transferred the load in the big sleds and I finally found 4 teams sufficient to haul it to the place of building. We arrived there January 23, consuming 11 days in moving the boiler 20 miles by team.

"On one of these days of hardship the thermometer at the Fort was said to register 50 degrees below zero, I wish to add right here that while I have seen lots of hard winters, this was the worst that I ever experienced."

"It took most of the winter to haul all of the carloads left at Larimore. We would unload the material the best we could and on our return would not find it until we had shoveled it out of the snow. One sled load was never found. I waited and picked my time and did much better with the rest of the material than I had with the boiler."

"I soon had the sawmill in operation. Everything sawed in the shape of slab or board was soon carried off. The most of my good building lumber was shipped in from the Chippewa river country. Some of the shorter lengths, I found in the timber here. I sold a lot of lumber for claim shacks. We sawed all day, but at night there were no boards for anyone, although people were standing around wanting lumber. I found the sawmill a great convenience in building a steamboat in such a country as this was then, only a great prairie wilderness, opened to white settlement, just one year previous, in 1881."

"About January 29, we had a living place where we could cook and eat and sleep. It seemed very much different. We could then accomplish something more satisfactory."

I had procured a good crew of caulkers from Milwaukee and ship carpenters from Minnesota. The Minnie H was finished in the late spring of 1883. Her dimensions were 110 feet over all; beam 20 feet 6 inches; depth, 8 feet at the bow, and 7 1/2 feet at the stern; 150 ton burden and she drew 3 1/2 feet of water. She could and did accommodate freight, U.S. mail, and passengers from Devils Lake to all points on the lake. She made 2 successful trial trips on July 2 & 3, 1883.

From the commencement of the building of the steamer, one might say in advance of any settlement, the newspapers and railroads did their part to boost the settlement along.

There were the hardships of my first settlement in Devils Lake. As I said before, this was a wilderness and I was sinking $35,000 in it. The boats were one of the best things for this

country. The railroad had been extended to Devils Lake and a fine dock build not far from the depot at Devils Lake, with a railroad track out to and alongside the steamboats, so that freight could be unloaded from the cars to the boats. A fine dock was also built at Minnewaukan, where the Northern Pacific connected at the other end of the lake.

The first passenger train (on what is now the Great Northern Railroad) met the Minnie H on the Fourth of July 1883 and brought an excursion including railroad men, editors and commercial men from points in Dakota territory and from St. Paul. They had a fine day and a fine trip which was enjoyed by all on board. Mr. Brown of the St. Paul firm of Brown & Tracy was on board. The fact that this was a new country to be settled made it more enjoyable than it would have been otherwise. Many a good write-up for the lake and the country came out of that trip. Many similar trips were made later on in the same interest, to bring people into this new wilderness.

For nearly 30 years, I kept a record of the lake's water level. With the exception of a few years, the water level steadily fell. In the fall of 1889 the boats made their last trip to Devils Lake. The water had receded so much that the boats thereafter had to land at the narrows of the bay, about 1 1/2 miles from Devils Lake and were never able to get back to town again.

The boats had done quite a business. Realizing the loss of water and landing, I undertook to see if it was not possible to torn the Mouse and Sheyenne rivers into Devils Lake in order to save the lake. A preliminary survey was made later, but because there was not sufficient business to justify the expense the matter was dropped.

The time card for the Minnie H states here scheduled trips were as follows:

Leave Devils Lake, for Fort Totten, daily at 9:00 a.m.
Leave Fort Totten, for Devils Lake, daily at 2:00 p.m.
Leave Devils Lake for West End & Minnewaukan at 4:00 p.m., Tuesdays, Thursdays and Saturdays
Returning-Leave Minnewaukan for Devils Lake at 4:00 a.m. on Wednesdays, Fridays and Sundays

For years, during the 2 weeks of Chautauqua season, she often carried as much as 1,400 tons of freight and 3000 passengers to Fort Totten and other points of interest on the lake. Over the period many excursions were made, some gratuitous, in the interest of various organizations. Such were the Devils Lake Cornet Band excursions of May 31, 1885 and August 25, 1885 and for the benefit of the M.E. Church, August 13, 1885 to name just a few.

Many important personages visiting this area traveled on the Minnie H. When General William T. Sherman came to visit Fort Totten in August of 1884, he, his 2 daughters & several friends traveled from Devils Lake to Fort Totten on the Minnie H.

The Minnie H was in operation on Devils Lake every summer from July 4, 1883 until the fall of 1908. The water level of the lake dropped steadily during this time with a corresponding decrease in the volume of business. In the spring of 1909, because of low water level and small income from passenger traffic. Captain Heerman, after careful consideration, decided to leave the boats permanently in dry dock. The process of dismantling them then began. The pilot house of the Minnie H was moved to the yard of his home in Devils Lake, where it provided a fine playhouse for his grandchildren and in later years fro his great-grandchildren. The flagstaff was placed in the yard in front of the house, where it stood many years. At present it is in the yard of the Pioneer Daughters Museum cabins at Fort Totten. The pilot wheel is in the State Historical Society building in Bismarck. The whistle is still in use and blows many times a day, from the State School for the Deaf in Devils Lake. Most of the wood of the rudder has been made into gavels. Of special

historical interest is the fact that this rudder was made of native North Dakota oak. The reason for this was that the sled load of materials which was lost and never recovered had contained the lumber for the rudder. So, since it was lost, Captain Heerman went into the woods at what is now Lakewood and selected a native oak tree from which he fashioned timbers for the rudder.

And from this rudder of native oak-many years later-Captain Heerman had a gavel made, to be presented to the first native North Dakotan to be elected Governor of North Dakota, George Shafer. In the Governor's Mansion at Camp Grafton are furnishings made in part or in full from timbers taken from the hull of the Minnie H.

Diversion of river water into Devils Lake, was project conceived by Captain Heerman when the water level, first, began to fall. In his later years, the 1920's with revival interest in this project, Captain Heerman had gavels made out of this same native oak rudder and through the kind efforts of Sivert W. Thompson of Devils Lake, had them presented to the President of the United States and to the Speakers of the House and the Senate. In December, 1956, a gavel was presented to retiring Gov. Norman Brunsdale at a banquet in Devils Lake, honoring him for his work in furthering water conservation and diversion in North Dakota.

Captain Heerman passed away in October 1989, at the age of 95. It was indeed a satisfaction to him, that his boats attracted tourist and settlers, helped them find locations, provided many of them with means of earning a living and were a great aid in opening up the Lake Region to settlement. In a total of 59 years of steam boating, Caption Heerman's record shows no serious injury to passengers and not one loss of life. His story is one of hardship and endurance, ingenuity and skill, courage and faith; it exemplifies the type of man that settled this country and helped immeasurably to make it what it is today.

Personal Page

Born and raised in Devils Lake, ND I grew up enjoying everything the outdoors had to offer. Hunting, fishing, tennis, golf, wrestling and football are some of my favorite hobbies. After high school graduation I decided to come to NDSU and join the Landscape Architecture program, which I believe to be one of the colleges best degrees.

The secret to creativity is knowing how to hide your sources.
Albert Einstein (1879 - 1955)

Acknowledgments

I would first like to thank all of the professors in the Landscape Architecture Department for the wisdom and knowledge they shared with me. Second I would like to thank my parents and family for the guidance they showed me throughout life. Lastly I would like to thank all the students that graduated from the Landscape Architecture program in 2005.

[redacted] Class of '05'