

**DRAFT – ENVIRONMENTAL ASSESSMENT
WARROAD HARBOR
MAINTENANCE DREDGING, 2007
WARROAD, MINNESOTA**



Department of the Army
Corps of Engineers
St. Paul District
190 Fifth Street East
St, Paul, MN 55101-1638



Draft Report
December 2006

DRAFT - FINDING OF NO SIGNIFICANT IMPACT

In accordance with the National Environmental Policy Act of 1969, the St. Paul District, Corps of Engineers, has assessed the environmental impacts of the following proposed project:

Warroad Harbor Maintenance Dredging Warroad, Minnesota

The proposed work involves mechanically dredging through the ice the approach channel to the harbor and on-land placement of the dredged material. The dredged material will be placed at two upland sites near Lake of the Woods on the northwest side of Warroad. Continued maintenance of the Warroad Harbor project will prevent adverse navigation safety, economic, and social impacts that would result from shoaling of the access channel to Warroad Harbor.

This Finding of No Significant Impact is based on the following factors: the proposed project would have no long-term adverse impacts on wildlife and fishery resources including federally threatened and endangered species, the project would have no long-term impacts on the aesthetic/recreation environment, the project would have no adverse impacts on water quality in Lake of the Woods, and the project would have no impacts on the cultural environment. Moreover, actions will be taken to ensure any short-term social or safety issues that could arise during project construction would stay below significant levels.

Based on information presented in the Environmental Assessment, Warroad Harbor Maintenance Dredging, 2007, Warroad, Minnesota, I have determined that the proposed action would not be a major Federal action significantly affecting the quality of the human environment. An environmental impact statement will therefore not be prepared.

Date

Michael F. Pfenning
Colonel, Corps of Engineers
District Engineer

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SUMMARY, MAJOR CONCLUSIONS, AND FINDINGS

Maintenance dredging of the approach channel in Lake of the Woods to Warroad Harbor is needed because the channel has shoaled and its effective width and depth have narrowed. Maintenance dredging is needed to maintain safe navigation conditions at the rock jetty, 2,900 feet out into Lake of the Woods. Channel conditions in the inner harbor are not considered critical to continued navigation and use of the harbor, although minor sedimentation has occurred within the inner harbor. The approach channel will be dredged to approximately 7 feet below low water datum (to bottom elevation 1049.0 feet above mean sea level [msl]) and 100 feet wide. Approximately 35,000 cubic yards (cy) of material will be dredged mechanically through the ice and discharged at two on-land sites on the northwest side of Warroad. Winter mechanical spot dredging through the ice has been shown to be the most cost effective and environmentally acceptable alternative for maintenance dredging of Warroad Harbor.

The advantage of winter dredging is using the ice, which is formed to the channel bottom, to provide a solid surface for mechanical excavation of semisolid sediment while providing the least disturbance to the adjacent channel areas and aquatic habitat. Adverse impacts associated with the proposed work will be minor and temporary and will primarily involve water quality and benthic organisms. No federally threatened or endangered species or their habitats will be affected. Adverse effects on fish and wildlife are not anticipated. Physical and chemical analyses of the sediments to be dredged indicate that long-term impacts of the proposed dredging on the aquatic environment and human health would be negligible. A possible short-term effect of placing the material may be a temporary ponding of the groundwater under the site during and after the material thaws, but this ponding is not foreseen as a human health or environmental concern. Adverse effects on groundwater quality are not expected. The dredging activity may impose minor inconvenience to Warroad residents and users of the harbor and municipal park from increased truck traffic on city streets and heavy equipment staging. No adverse impacts on historic properties or cultural resources are expected from the dredging, transport, and disposal of the dredged material proposed for 2007. The same dredging and disposal areas used for the 1996 dredging are proposed for this project.

1.0 PROJECT PURPOSE AND NEED FOR ACTION

1.1 Project Location

The Warroad Harbor project (Figure 1-1) is located at the city of Warroad in Roseau County, Minnesota, where the Warroad River enters Lake of the Woods.



Figure 1-1. Warroad Harbor

1.2 Project Authorization

Congress first authorized Warroad Harbor in 1899. Seven subsequent authorizations have provided for project modification or new work. Portions of the project considered unnecessary for navigational requirements were deauthorized on August 5, 1977, under Section 12 of Public Law 93-251.

1.3 Project Purpose

The Warroad Harbor project was authorized to provide a harbor of refuge for navigation safety and an inland harbor with access to Lake of the Woods for commerce and recreation. More recently, the use of the harbor has been identified as being critical for homeland security operations.

1.4 Description of the Warroad Harbor Project

Warroad Harbor is located in the city of Warroad (see Figure 1-1). The U.S. Army Corps of Engineers constructed and maintains the existing project. Construction of Warroad Harbor began in 1904 and was completed in 1915. The harbor consists of a dredged channel and turning basin with a rock jetty that extends parallel to the channel 457 feet from the shore lakeward. The U.S. Coast Guard maintains aids to navigation (range markers, lights, and buoys). The project guidelines allow an access channel and harbor to a depth of 8 feet below low water datum of 1,056 feet msl. The channel is approximately 9,200 feet long, extending from the railroad bridge over the Warroad River in the inner harbor out to deep water in Lake of the Woods and varies in width from 100 feet to 300 feet. However, maintenance dredging has been limited to a depth of 7 feet and a width of 100 feet. Maintenance has taken place since 1904 generally on a 6- to 7-year cycle. More recent Corps of Engineers records show that maintenance dredging was done in 1975 (65,000 cubic yards), 1983 (43,000 cubic yards), and 1996 (65,568 cubic yards).

1.5 Need for Dredging

The project was last dredged in 1996. Since then, shoreline drift has contributed to a buildup of sediment near the mouth of the harbor. Flash flooding in summer 2002 may have exacerbated the problem. Depth soundings taken in February 2005 show that the approach channel has shoaled and the effective width of the channel has decreased.

Soundings of the harbor portion of the channel (Warroad River portion of the project inside the jetty) found adequate depths for navigation, although some shoaling has occurred within the authorized project limits.

Harbor access is partly dependent on the water levels of the lake. The low water datum of 1056.0 feet msl for Lake of the Woods (established by treaty between the U.S. and Canada in 1925) is only rarely attained. Water levels on Lake of the Woods tend to be lowest in late winter, increase to 1059 feet msl or higher by midsummer, and then decline during fall and winter. Wind set-up (seiche) can temporarily change the lake elevation at Warroad by up to 2 feet. Table 1-1 shows the probability of the lake pool elevation being below a certain level.

Maintaining adequate depth in the approach channel to Warroad Harbor is needed for navigation safety. Winds from the north and east on Lake of the Woods have a long (more than 25 miles) fetch and can generate waves higher than 3 feet that break as they reach shallow water about 3,000 feet from shore. Adequate approach channel depth and width is needed to avoid grounding of boats riding in wave troughs.

Table 1-1. Lake pool elevation probabilities

Lake Pool Elevation (feet)	Probability
Less than 1,058	7.4%
Less than 1,058.5	23.3%
Less than 1,059	38.6%
Less than 1,059.5	56.1%
Less than 1,060	74.6%
Less than 1,060.5	87.6%
Less than 1,061	95.5%

1.6 Need for Continued Maintenance of the Warroad Harbor Project

The proposed dredging of the Warroad Harbor Project can be considered routine maintenance of the existing project. Warroad Harbor is one of the main access points for the south side of Lake of the Woods. The harbor is almost exclusively used for recreational fishing, and to a lesser degree recreational boating with approximately 90 percent of visitor trips on the lake classified as fishing while 10 percent could be classified as recreation boating. The local economy is closely connected with the harbor and the tourism dollars that it brings to the area. Many businesses in Warroad rely directly or indirectly on tourism and the harbor for a significant portion of their revenue (URS Group, Inc., 2005). The number of business establishments providing goods and services to fishermen and recreational boaters demonstrates the harbor's economic significance.

An economic analysis of the small-boat harbors of Lake of the Woods prepared for the St. Paul District Corps of Engineers projected future recreational boating and fishing will increase in the number of visitors to Warroad Harbor (URS Group, Inc. 2005). The study predicts that angler hours will increase at an average annual rate of 1.3 percent. According to a study conducted by the Minnesota Department of Natural Resources, the number of annual hours of participation is expected to decrease 0.6 percent for the State of Minnesota (Kelly, 2005). The discrepancy in statewide versus Lake of the Woods projections could be attributed to the fact that the Lake of the Woods fishery is regarded by many as having some of the best walleye fishing opportunities in the world. It is a unique resource and may explain the increased demand.

Out of all visitors to the Lake of the Woods region, 83 percent were repeat visitors and more than half (59.5 percent) traveled between 100 and 300 miles to visit the area (URS Group, Inc., 2005). The long distances traveled further support the idea that the Lake of the Woods and the recreational opportunities it offers are unique to the State and the region. Visitors surveyed spent an average of \$163.57 per day; the greatest portion (\$62.86) was spent on lodging followed by food and beverages (URS Group, Inc., 2005).

Lake of the Woods is located on an international border with Canada. In recent years, homeland security issues have gained greater attention in the U.S. Therefore, attention to securing the border has increased. Homeland security operations that use Lake of the Woods

harbors are important to the communities, the region, and the country. Both the U.S. Border Patrol and U.S. Coast Guard operate out of the Warroad Harbor. The Border Patrol uses Warroad as a base of operations for the area and currently docks one 26-foot boat at the harbor. They have two additional boats available for various operations. The Coast Guard recently obtained a new 26-foot patrol boat to be based out of Warroad. Both of these Federal agencies expect an increase in future operations (URS Group, Inc., 2005), highlighting the importance of continued harbor maintenance.

Lake of the Woods is a large lake that can be very dangerous during certain weather conditions. In the case of an unexpected storm, boaters must find refuge quickly. Lake of the Woods has a limited number of locations that can be considered harbors of refuge, which provide protection from the elements. The harbors at Warroad, Zippel Bay, and Angle Inlet are considered harbors of refuge on Lake of the Woods because they are accessible during rough weather conditions and provide basic services that can aid stranded boaters.

2.0 PROPOSED ACTION

2.1 Preliminary Considerations

Methods of dredging and material disposal at the Warroad project are limited by engineering feasibility, cost, and availability of placement sites. When the project was dredged in 1983, no on-land placement sites were available for use. The approach channel was dredged hydraulically and the dredged material was discharged into Lake of the Woods to form an island (Corps of Engineers, 1982; Corps of Engineers, 1985). In 1996, on-land placement sites were available for use at no cost to the Federal government. Under Section 404 of the Clean Water Act, dredged or fill material cannot be placed into waters of the U.S. if a practicable alternative is available. Therefore, on-land placement was used in 1996. For the 2007 proposed dredging, these same sites will be used for placement of dredged material.

In 1983 and 1996, material was removed hydraulically and pumped to the placement sites. In this case, a more cost effective, environmentally acceptable, and recently proven alternative (URS Group, Inc., 2005) of mechanically dredging through the ice during winter and trucking the material to the previously used placement sites has been proposed.

2.2 Proposed Dredge Cut

The St. Paul District proposes to dredge the approach channel from the harbor entrance out into Lake of the Woods (Figure 2-1). The dredge cut will be 2,900 feet long and 100 feet wide. The cut will be dredged to a target of 7.0 feet below low water datum to a target bottom elevation of 1049.0 feet msl throughout. Excavation in the identified area will be to an average yield of 6 feet after settling. It is assumed that the finished bottom section of the channel will be somewhat varied in actual depth, but spot checks during dredging will be conducted to maintain the desired channel depth.

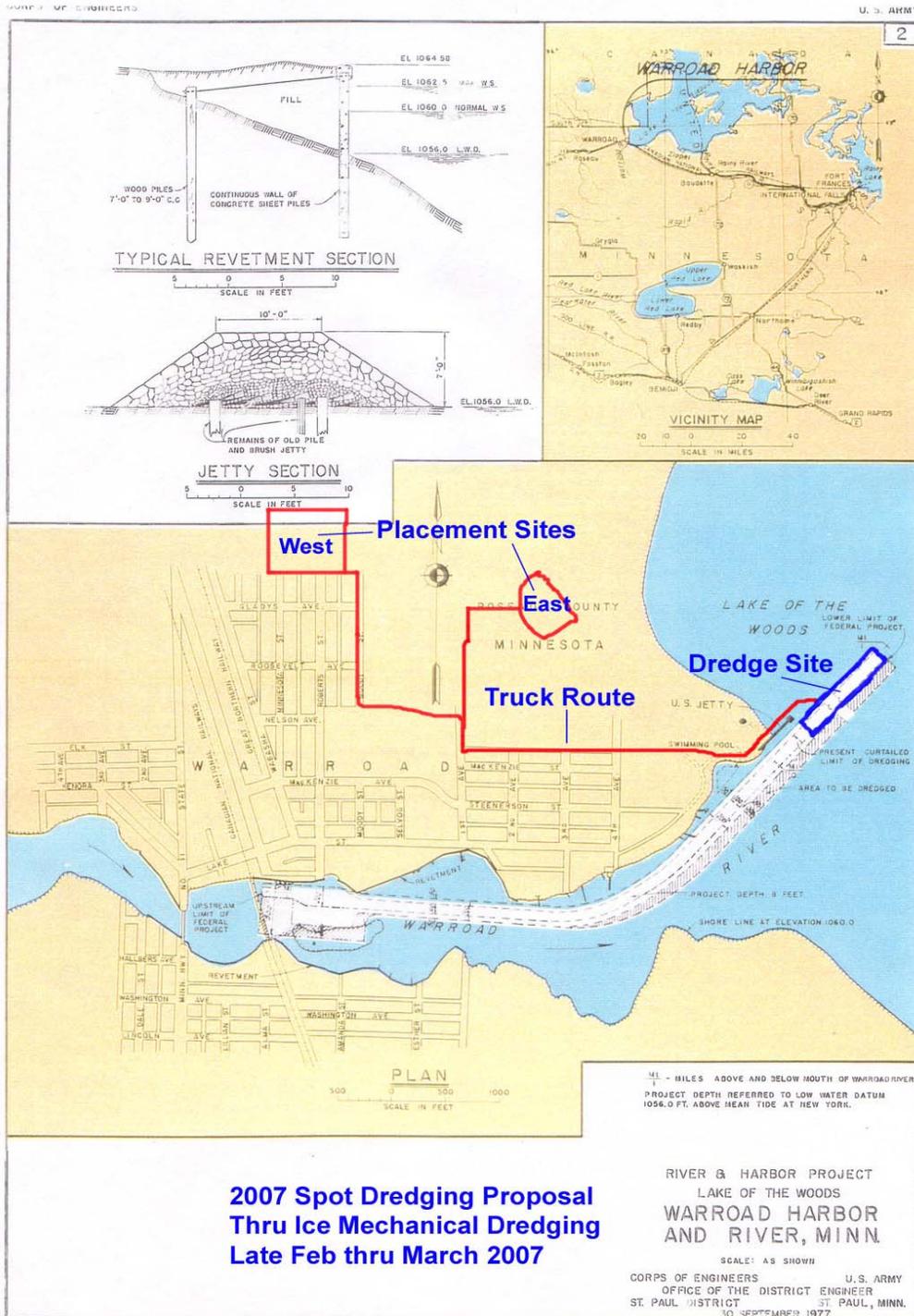


Figure 2-1. Proposed Warroad dredging, 2007.

2.3 Quantity of Material to be Dredged

Based on depth soundings taken in February 2005, the estimated volume of material to be dredged is approximately 35,000 cy.

2.4 Quality of Material to be Dredged

Particle size analysis of the material in the dredge cut revealed that it is mostly silty fine sand with peat. Lake sediment collected in February 2005 at two locations in the channel to be dredged was analyzed to characterize the potential human health concerns of placing the dredged sediment on the upland site. Parameters analyzed were metals, grain size, percent solids, total volatile solids (TVS), polycyclic aromatic hydrocarbon compounds (PAH/PNAs), pesticides and arochlor polychlorinated biphenyls (PCBs). Sample results for the four samples (two samples at each location) were either substantially below the Minnesota Pollution Control Agency (MPCA) Tier 1 Soil Reference Values (SRV) or undetectable.

2.5 Method of Dredging

All material removed from the dredge site will be mechanically taken through the ice with excavation equipment (i.e., backhoe) and trucked to the approved disposal sites. The contractor will clear snow from and maintain the entire work area before the start of the dredging project to ensure strong ice and safe working conditions. The contractor will likely start dredging farthest from the harbor and work toward the harbor. The overlying ice will be removed and sidecast and the underlying sediment excavated. Trucks will be loaded with material on the ice and trucked to the placement sites via public roads and dumped.

2.6 Time when Dredging Would Occur

Work is projected to begin in mid-February 2007 through March 2007. If dredging is not completed as weather and/or ice conditions necessitate, dredging will be completed the following year within the same time frame (mid-February through March 2008).

2.7 Proposed Dredged Material Placement Site

The proposed dredged material placement sites are on the northwest side of Warroad (see Figure 2-1). One site is located near the lakeshore road next to the excavated marina basin. This eastern site covers about 7.3 acres. The site is owned by the city of Warroad and is being made available at no cost to the Federal government. The site is covered with fill from the 1996 dredging of the harbor. The western site is located between the lakeshore road and West Main Street, immediately north of the Marvin Windows factory (Figure 2-1). This western site covers about 10.0 acres. The site is a privately owned agricultural field and is being made available for use by the city of Warroad at no cost to the Federal government. Likewise, the site is covered with fill placed from the 1996 dredging of the harbor. If evenly spread after thawing, the 35,000 cy of dredged material will cover the two sites to a depth of approximately 1.2 foot. Dredged

material placed on the sites will become the property of the landowners.

2.8 Placement Site Preparation

Snow will be plowed at the access sites as needed to allow trucks access for dumping of material. Temporary roads will be maintained on the placements sites to allow for truck traffic. No carry water runoff is expected; therefore, no berm or retaining structures will be constructed around the perimeter of the sites to contain the dredged material and carry water.

2.9 Placement Site Operation

Dredged material will be dumped from trucks onto the placement sites into individual piles. Individual piles of dredged material will be placed to maximize space at the placement sites while allowing for truck access. Material will remain in piles until thawed and weather permits whereupon it will either be spread evenly at the sites or removed for beneficial use by the owners.

2.10 Placement Site Cleanup

The contractor will not be required to perform any clean-up activities at the placement sites.

3.0 ALTERNATIVES

Under Section 404 of the Clean Water Act, dredged or fill material cannot be placed into waters of the United States if a practicable alternative is available. Because the city of Warroad has made on-land placement sites available for the proposed maintenance dredging, alternatives involving placement of dredged material in Lake of the Woods have been eliminated from further consideration for this dredging action. The three potential alternatives for channel maintenance dredging at the Warroad Harbor project are as follows:

Alternative 1- No action

Alternative 2 - Hydraulic dredging with on-land disposal

Alternative 3 - Mechanical dredging through the ice with on-land disposal

Although alternative on-land placement sites are possible, the sites being offered for use by the city of Warroad are nearly ideal. Except for some small areas of city property, nearly all the land within a reasonable distance to the harbor is privately owned and unavailable for use or has wetland and woods. The alternate available sites are somewhat distant from the dredge cut, thereby increasing the cost of the dredging. The selected sites combined are of sufficient size and fairly level without wetlands, brush, or forest vegetation. Therefore, no alternative on-land

placement sites are considered in this assessment.

3.1 Description of Alternatives

Alternative 1 - No Action

Maintenance dredging at the Warroad Harbor project would not be conducted. The no-action alternative would involve no dredging-related disturbance to Lake of the Woods, the Warroad River, or the proposed placement site areas. Shoaling of the approach channel to Warroad Harbor would continue to occur.

Navigational use of the approach channel would be gradually curtailed as the approach channel filled with sediment. Navigating the channel would become hazardous, especially during storm conditions.

Loss of boat access to Lake of the Woods would substantially reduce the economic benefit of the harbor to the city of Warroad. This economic loss would be substantial to the city and would result in a loss of jobs and businesses. An end to continued Corps of Engineers channel maintenance could become a source of controversy, and loss of the harbor could damage community cohesion.

Alternative 2 - Hydraulic Dredging with On-Land Disposal

The maintenance dredging in Warroad Harbor in 1983 and 1996 was done hydraulically. Material was placed in water in 1983 as no on-land sites were available, and material was placed on-land in 1996. Hydraulic dredging involves the removal of loosely compacted material from a boom mounted on a floating barge. The boom dislodges sediments, and the resulting slurry is pumped via a pipeline to a disposal area where it is dewatered. One of the main advantages of hydraulic dredging is that it can quickly pump sediment to the disposal sites. Its drawbacks include cost effectiveness when compared to the other action alternative, effects on groundwater and surface water quality, limited capabilities in rough water, pipelines and work vessels that can be obstructions to navigation, and debris in the sediment that can reduce efficiency.

Warroad Harbor dredging alternatives were evaluated in an economic analysis of Lake of the Woods small-boat harbors (URS Group, Inc., 2005). Under the scenarios analyzed, hydraulic dredging alone was not the most cost effective means of maintaining the Warroad channel to the authorized depth over a 25-year period of analysis. Per volume costs of hydraulic dredging were estimated at \$19.0 per cy of material compared to mechanical dredging through the ice at \$1.5 per cy of material. This factor was the main one in eliminating Alternative 2 (hydraulic dredging) as the proposed action.

Another factor considered for eliminating Alternative 2 was that access to Lake of the Woods from Warroad Harbor would be more restricted by hydraulic dredging equipment during the boating season when boats are generally restricted to the access channel as compared to Alternative 3. Vehicles are not restricted to the access channel in winter and could more easily circumvent winter mechanical dredging equipment.

A final factor considered for eliminating Alternative 2 was that hydraulic dredging would have some effects on water quality. Sediment resuspended at the dredge cutterhead and effluent from the placement sites would temporarily increase turbidity in the near-shore zone in Lake of the Woods. Groundwater levels near the placement sites could also temporarily rise with Alternative 2. Although hydraulic dredging effects would be minor and temporary, winter dredging through the ice will result in fewer and less severe effects on water quality.

Alternative 3 - Mechanical Dredging through the Ice with On-land Disposal (the selected alternative – see above for proposed action)

4.0 AFFECTED ENVIRONMENT

4.1 Climate

The climate in the area is severe, with a recorded temperature range at Warroad from 103°F to -50°F. Average annual precipitation is about 21 inches. Prevailing winds are from the south in summer and from the northwest in winter. Ice cover on Lake of the Woods usually extends from November through March.

4.2 Terrestrial Resources

Roseau County has a flat topography with silt/clay glacial till soil covered in many areas with peat. Surface drainage is poor and has been modified by agricultural ditches.

The vegetation is transitional between prairie, boreal forest, and eastern deciduous forest. Most of the county has been logged and burned in this century, resulting in the present flora of earlier successional stages dominated by poplar and jack pine. Much of the land around Warroad has been cleared for agriculture. Oats, wheat, soybeans, sunflowers, potatoes, and hay are important crops.

Extensive sphagnum bogs exist in Roseau County, dominated by black spruce, tamarack, Labrador tea, and leatherleaf. Willows, tag alder, and red-osier dogwood are common shrubs in the poorly drained areas with mineral soils.

Wildlife inhabiting the area include moose, white tail deer, black bear, gray wolf, foxes, skunks, porcupines, squirrels, beaver, snowshoe hare, and numerous small mammals. Ruffed and spruce grouse occur in the wooded areas. Many species of water birds migrate through Roseau County. Gulls, terns, and shorebirds are common along the shore of Lake of the Woods.

The federally-listed threatened species gray wolf (*Canis lupus*) is present in Roseau County. Human activity in the project area prevents use of the area by wolves. The project area is also within the range of the bald eagle (*Haliaeetus leucocephalus*), which is a threatened species on the Federal list.

4.3 Aquatic Resources

Warroad River - The Warroad River drains about 162 square miles, mostly in eastern Roseau County. The river is about 13 miles long, has a well-defined channel along most of its length with a narrow floodplain, and seldom floods. The river enters an estuary of Lake of the Woods about 2 miles from Warroad, where the floodplain broadens. Average discharge for the period of record is about 44 cubic feet per second (cfs). Sediment yield of the Warroad River is very low, estimated to be about 1,000 cy per year (Hickock and Associates, 1977). Historic dredging of the harbor has created several wetland areas and Government Island from dredged material in the harbor area.

Wetlands - River floodplain wetlands occur along the Warroad River, dominated by cattail (*Typha* spp.) and reed canary grass (*Phalaris arundinacea*). The wetlands along the south shore of Lake of the Woods near Warroad have been formed through littoral processes, on beach zones, sand spits, and bay-mouth bars. Lakeshore vegetation is subject to wave action, wind, and shifting sediment, in addition to varying lake level. Stands of hardstem bulrush (*Scirpus acutus*) occur the farthest offshore and afford protection from wave action. Pondweeds (*Potamogeton* spp.), water milfoil (*Myriophyllum exalbescens*), water crowfoot (*Ranunculus* sp.) and elodea (*Elodea canadensis*) are common submersed aquatic plants near the mouth of the Warroad River. Dense stands of cattail occur along the shore. Extensive areas of shrub wetlands occur near Warroad on poorly drained soils.

Lake of the Woods - Lake of the Woods is a large (1,485 square miles) remnant of glacial Lake Agassiz. The Minnesota portion of the Lake has a maximum depth of 36 feet and a mean depth of 17.4 feet (EPA, 1975). The 6-foot depth contour lies about 1 mile offshore at Warroad. Lake of the Woods water levels are regulated at Kenora, Ontario, to between 1061.25 and 1056.0 feet msl according to international treaty.

An off-shore sandbar 2,000 to 3,000 feet offshore extends southeast along the shoreline from Springsteel Point north of Warroad. Formation of the sandbar is due to littoral processes of wave action and sediment movement. Relatively little sediment movement occurs landward of the sandbar, due to the rapid decay of wave energy at the bar (Hickock and Associates, 1977).

Prior to 1996, dredged material had been sidecast on the southeast side of the approach channel. In 1983, material was hydraulically placed to form an island near shore on the southeast side of the channel, approximately across from the jetty.

Sediment - Sediments from the proposed dredge cut are fine silty sand with peat and relatively uncontaminated. Lake sediment at two locations in the channel to be dredged out from the jetty was analyzed to characterize the potential human health concerns of placing the dredged sediment on the upland site. Sediment samples were collected in mid-February 2005 and were sent for analysis. Parameters analyzed were metals, grain size, percent solids, TVS, PAH/PNAs, pesticides and aroclor PCBs. Sample results for the four samples (two samples at each location) were either substantially below the MPCA Tier 1 Soil Reference Values (SRV) or undetectable.

Water quality - The Minnesota portion of Lake of the Woods has moderately hard water and is eutrophic (EPA, 1975). The physical characteristics of the southern portion of the lake contribute to its eutrophic condition. The south part of the lake is shallow, well-mixed by the

wind, and often turbid with wave-resuspended sediment. Dissolved oxygen is adequate for aquatic life. The pH is slightly alkaline, from 6.6 to 8.8 (EPA, 1975). Water quality in the Warroad River is influenced by the low relief, bogs, clay soils, and agricultural activity in the

watershed. The river is turbid with relatively high levels of plant nutrients. The estuary portion of the river near the lake acts as a settling basin for sediment.

Aquatic biota - Benthic macroinvertebrates were collected in 1980 at the mouth of the Warroad River prior to the 1983 dredging. Fingernail clams (*Musculium* sp., and *Spaerium* sp.) were the most abundant by numbers of individuals. Snails (*Physa* sp., *Amnicola limosa*, *Valvata tricarinata*) were the next most abundant group. Chironomid midges (*Chironomus* spp.) and scuds (*Hyallella azteca*) were common, especially at locations with aquatic macrophytes.

Phytoplankton in the southern part of Lake of the Woods follows a seasonal succession typical of eutrophic lakes, with spring and fall blooms of green algae and diatoms, and summer blooms of blue-green algae.

Lake of the Woods supports 38 species of fish. Walleye (*Stizostedion vitreum*), sauger (*Stizostedion canadense*), yellow perch (*Perca flavescens*), northern pike (*Esox lucius*), tulibee (*Coregonus artedii*), and white sucker (*Catostomus commersoni*) are the most common species in test net catches (Schupp, 1974). Sport fishing is the primary recreational activity on Lake of the Woods. Walleye, sauger, and northern pike are the primary sport fish species.

The shallow littoral zone adjacent to the mouth of the Warroad River provides nursery habitat for northern pike and yellow perch. Fish expected to occur in the immediate area during summer include northern pike; yellow perch; bluegills (*Lepomis machrochirus*); black crappie (*Pomoxis nigromaculatus*); species of darters and minnows; and occasionally walleye, sauger, and burbot (*Lota lota*).

4.4 Social Setting

The populations of Roseau County and the city of Warroad have fluctuated between 1950 and the present (Table 4-1). The 2000 Census lists the population of Warroad as 1,722. The populations generally declined during the 1950's and 1960's, with slight growth in Warroad in the 1960 Census figure. This trend reversed in the 1970's, with both the city and county experiencing overall growth. Growth became more pronounced in the 1980's. By 1990, both the county and the city of Warroad had grown beyond their 1950 levels and continued to grow from 1990 to 2000. Growth is expected to continue during the coming decades, based on Minnesota Department of Trade and Economic Development projections for the year 2020.

Table 4-2 describes socioeconomic characteristics for the study area and for the State of Minnesota. The data show that the study area is relatively sparsely populated compared to the rest of the State. According to the 2000 Census, the median household income for Roseau County was \$39,852, which is considerably lower than the statewide median income of \$47,111. The unemployment rate is 2.4 percent for Roseau County compared to 2.9 percent for the entire State.

Table 4-1 Population trends for the city of Warroad and Roseau County, Minnesota.

Year	City of Warroad	Percent Change	Roseau County	Percent Change
1950	1,276	n/a	14,505	n/a
1960	1,309	+2.6	12,154	-16.2
1970	1,086	-17.0	11,569	-4.8
1980	1,216	+11.9	12,574	+8.7
1990	1,679	+38.0	15,026	+19.5
2000	1,722	+2.6	16,338	+8.7
2020*	n/a	n/a	19,290	+18.1

* projected

Table 4-2. Socioeconomic characteristics

Characteristic	Roseau County	Minnesota
Land area (square miles)	1,663	84,068
Persons per square mile	9.82	58.52
Unemployment rate	2.4%	2.9%
Poverty rate	6.6%	7.9%
Median household money income	\$39,852	\$47,111
Per capita money income	\$17,053	\$23,198
Median value of owner-occupied housing units	\$76,300	\$122,400
Households	6,190	1,895,127
Housing units	7,101	2,065,946
Persons per household	2.60	2.52

Source: U.S. Census Bureau

The two largest employers in Warroad, Marvin Windows and Christian Brothers, are classified as manufacturing. They account for 48.2 percent of the employed population that works for the manufacturing sector in Warroad. Although these operations are not related to the harbor, many sectors of the local economy rely on the harbor either directly or indirectly. Industries classified as “arts, entertainment, recreation, accommodation, and food services” and “retail trade” rely heavily on lake-based tourism. Together, these industries employ 181 individuals in Warroad or approximately 22 percent of the employed population. Warroad has four hotels, which together recorded \$1,344,008 in gross revenue in 2004, two official launch services and four businesses that sell bait and tackle. The city owns and operates a campground next to the harbor and rents out dock space. The campground recorded \$120,920 in gross revenue in 2004. The city-owned dock space has recently expanded. In 2005, the city will collect \$8,250 in revenue from the dock rental fees (Lovelace, 2005). Table 5 summarizes Warroad’s current job market.

Table 4-3. Warroad employed population 16 years and over

Industry	Number	Percent
Agriculture, forestry, fishing and hunting, and mining	6	0.7
Construction	9	1.1
Manufacturing	406	48.2
Wholesale trade	0	0
Retail trade	77	9.1
Transportation and warehousing, and utilities	14	1.7
Information	5	0.6
Finance, insurance, real estate, and rental and leasing	27	3.2
Professional, scientific, management, administrative, and waste management services	20	2.4
Educational, health, and social services	149	17.7
Arts, entertainment, recreation, accommodation and food services	104	12.3
Other services (except public administration)	16	1.9
Public administration	10	1.2
Total	843	100

Source: U.S. Census Bureau

4.5 Commercial and Recreational Significance of Warroad Harbor

Warroad Harbor is one of the main access points for the south side of Lake of the Woods. The harbor is almost exclusively used for recreational fishing, recreational boating, and homeland security operations. The local economy is closely connected with the harbor and the tourism dollars that it brings to the area. Many businesses in Warroad rely directly or indirectly on tourism and the harbor for a significant portion of their revenue. The number of business establishments providing goods and services to fishermen and recreational boaters demonstrates

the harbor's economic significance. Among the many businesses directly or indirectly affected by the harbor are two official launch/guide services, four businesses that sell bait and tackle, three gas stations, and four hotels.

4.6 Cultural Resources

Previous cultural resources surveys in the Warroad area were conducted in May 1977 in connection with emergency permits to dredge the north side of the Warroad River channel near its mouth at Cal's Resort, Telle's Launch Service, Warroad Airways, and some adjacent Minnesota Department of Natural Resources property (Brew, 1977a, 1977b, 1977c, 1977d); in 1977 in connection with a small boat harbor project (Brew and Yourd, 1977); in 1996 covering the proposed western dredged material disposal area (Dolence, 1996); and in 1996 covering the proposed dredge disposal area #3 north of town (Johnson, 1996).

Brew's 1977 surveys covered their respective proposed on-land dredged material disposal areas but also made comments as to the archeological potential of the areas to be dredged and of the city as a whole. A light scattering of prehistoric cultural materials was found in material stockpiled at Warroad Airways, which had been dredged from the river channel in 1976. A mixture of prehistoric and historic cultural materials was found in the fill material placed at what is now Lakeview Park in the 1930s during testing along the proposed boat harbor access channel through the park. A prehistoric potsherd was also recovered from the original ground surface below the fill at the park (at 1.4 meters below the current ground surface). The eastern disposal area was initially used for disposal of material excavated from the marina basin (Brew and Yourd, 1977). No cultural resources were observed in the western disposal area during Dolence's 1996 survey. Finally, an isolated, broken, stone grinding wheel was found in disposal area #3 during Johnson's 1996 survey.

Trygg's 1967 map (sheet 22, Minnesota series) based on the U.S. government land surveyors' original plats and field notes shows an Indian village of 24 families was located on the north side of the Warroad River at/near its mouth. Site records and field notes made by Fryklund in 1934 as part of the University of Minnesota, Department of Anthropology's Archaeological Site Survey, indicate that a large historic Ojibway cemetery with spirit houses and an associated village had been on both the north and south sides of the mouth of the Warroad River, as well as historic Ojibway graves and a ca. 1990 Ojibway village on the west side of the city. The village and cemetery north of the river ("Warroad Village North") has been given site number 21RO9. The part of the cemetery and village south of the river ("Warroad Village South") has been given site number 21ROp. The historic graves and late 19th-early 20th century Ojibway village on the west side of the city (Ka Ka Geesick and Nay May Pock Burials) are designated as site number 21ROq. In addition, Grace Lee Nute's 1930 article on "Posts in the Minnesota Fur-trading Area, 1660-1855" indicates that an American Fur Company post dating to ca. 1820 was also located north of the Warroad River in this area. The exact location of this fur-trade post remains undetermined.

Eighteen historic buildings and structures in the city of Warroad (RO-WRC-001 to RO-WRC-005 and RO-WRC-007 to RO-WRC-018) are on record in the standing structures file at

the Minnesota State Historic Preservation Office of the Minnesota Historical Society. They include a house, a log church, six commercial buildings, the Masonic Hall, the Warroad Cooperative Creamery, the Canadian National (CN) Depot, the Great Northern Railroad Depot, a log school, a second school, the Father Aulneau Memorial Church, a fur post historical marker, and the Warroad historic marker. These historic buildings and structures are located on Main Street, Lake Street, Washington Avenue, Mackenzie Avenue, Wabasha Street, State Street, and Roberts Street in the city of Warroad.

Of the above sites, the Canadian National Depot (RO-WRC-012) on Mackenzie Avenue at the CN railroad tracks was listed on the National Register of Historic Places on April 6, 1982, based on its association with significant historic events. The Warroad Cooperative Creamery (RO-WRC-011) on the northeast corner of Main Street and Mackenzie Avenue is considered potentially eligible for listing on the National Register. The National Register eligibility of the other architectural and archeological sites remains undetermined.

The eastern disposal area, located just north of the marina basin, was used for disposal of material excavated from that basin in 1977 and subsequently for disposal of some of the material from the 1996 Warroad River approach channel dredging. The western disposal area was also used for dredge disposal in 1996. Both the eastern and western disposal areas will be used during the current dredging project. None of the above architectural and archeological sites are located in or near either of these two disposal areas.

5.0 ENVIRONMENTAL EFFECTS OF THE PROPOSED ACTION AND ALTERNATIVES

5.1 Effects of the Proposed Action

Physical effects - The dredge cut will be excavated to an elevation of approximately 1049.0 feet msl, and 2,900 feet long by 100 feet wide. A total area of about 6.7 acres of lakebed will be disturbed by dredging. The two on-land placement sites will be disturbed by truck traffic and placement of the dredged material. After dredged material thaws, some water stored in the sediment will infiltrate into the ground at the placement sites, but is not expected to affect groundwater levels given the low quantities estimated.

The diesel-powered excavating equipment will generate noise, which will be fairly continuous for probably 10 to 12 hours per day. The noise should not disturb people in Warroad because the equipment will operate at some distance from most residences and businesses. Trucks carrying material to and from the placement sites will use public streets. The added noise and traffic will be a minor inconvenience for city residents and visitors.

Effects on water quality – During dredging and placement of material effects on water quality will be negligible. The lake will be frozen down to the sediment in most areas with no or very little water present to convey or suspend sediment into the water column. Very little sediment resuspended at the dredged area is expected when the ice thaws. Some settling of

sediment will occur within the excavating access channel which may result in minor resuspension of sediment and increased turbidity. The impacts should be minor, localized, and temporary.

A possible short-term effect of placing the material may be a temporary ponding of the groundwater under the placement sites after the material thaws. No runoff to adjacent surface waters such as Lake of the Woods is expected. Any water infiltrating to the groundwater at the placement sites is not expected to significantly affect groundwater levels or quality. Contaminants in the dredged material are primarily associated with the sediment particles which filter out as water enters the ground.

Effects on aquatic biota - Macroinvertebrates in the dredge cut will be killed. The dredge cut will recolonize with macroinvertebrates in the following growing seasons. Any dredging-related turbidity and elevated levels of unionized ammonia will have minor adverse effects on aquatic life in the immediate areas of the dredge. These effects are expected to be temporary immediately after ice out. No significant redistribution or bioaccumulation of in-place pollutants is expected, based on the analyses of sediments from the dredge cut.

Effects on other wildlife - Operation of the excavating equipment and trucking of material should have no effect on wildlife.

Effects on terrestrial resources – Minimal effects to terrestrial resources are expected. The two placement sites have only low ground cover vegetation, will probably be covered with snow, and afford only limited habitat value to wildlife. Placement of dredged material will elevate the areas slightly. No problems with contaminants in the dredged material are expected, based on the results of analysis of dredge cut sediments.

Effects on threatened and endangered species - The dredging and related activities will have no effect on federally-listed threatened and endangered species or their habitats. Coordination with the U.S. Fish and Wildlife Service on this subject is included in the Coordination section below.

Cumulative effects - Dredging the approach channel at Warroad Harbor will result in further disturbance of three areas already disturbed by historic human activities; the dredge cut and the two placement sites. Removal of sediment from the dredge cut will have no significant effect on the littoral transport of sediment along the shore of Lake of the Woods. No geomorphic effects on beach profile or shoreline features are expected. Operation of excavation equipment and trucks will burn several hundred gallons of irreplaceable petroleum fuel.

5.2 Social Effects of the Proposed Action

Effects on use of aquatic and terrestrial resources - The proposed action will have minor negative effects for the duration of the dredging activity. Noise will be increased by the engines on the excavating equipment and from trucks traveling to and from the placement sites. Any use of the land where the dredged material will be placed will cease temporarily. Long-term use of these relatively isolated parcels of land is not expected to change significantly. Persons using public roads will experience some inconvenience because of the increased truck traffic to

and from the placement sites. Staging of construction equipment near the municipal boat landing will reduce the parking area available, but should not prevent access to the lake.

Effects on harbor-dependent recreational and economic activity - The proposed work should not significantly affect recreation, guide services, or harbor-related tourism, although heavy excavation equipment in the approach channel may inconvenience some winter recreation during the period of dredging.

Maintenance dredging of the approach channel would allow continued recreational and commercial use of Warroad Harbor and would contribute to safe navigation in the harbor. Continued use of the harbor would provide social and economic benefits to the city of Warroad and should contribute to community cohesion.

5.3 Effects on Cultural Resources

As of December 15, 2006, the Canadian National Depot (RO-WRC-012) in the city of Warroad is the only site listed on the National Register of Historic Places in the project vicinity. The Warroad Cooperative Creamery (RO-WRC-011), also located in the city, is considered potentially eligible. Neither of these buildings will be affected by the proposed dredging and dredged material disposal action. None of the other architectural and archeological sites on record for the Warroad vicinity at the State Historic Preservation Office at the Minnesota Historical Society should be affected.

Mechanical dredging through the ice will take place in part of the existing Warroad River approach channel and will involve removing materials deposited since 1996 by the coastal sediment transport naturally occurring along the Lake of the Woods shoreline. The dredged material will be trucked across the ice and along city streets to the eastern dredged material disposal area, which was initially used in 1977 to dispose of material from the excavation of the marina basin and subsequently for dredged material disposal in 1996, and/or the western disposal site, which was used for dredge disposal in 1996. No effects to historic properties are expected from the dredging, transport, and disposal of the dredged material proposed for 2007. The Minnesota State Historic Preservation Office is expected to concur with this no effect on historic properties determination, as they did for the 1996 channel dredging which involved the same dredging and disposal areas.

6.0 COORDINATION

- Need for dredging was discussed in a series of conversations between the city of Warroad and the St. Paul District.
- Section 7 of the Endangered Species Act coordination with the Twin Cities Field Office of the U.S. Fish and Wildlife Service (USFWS) documenting the determination that the proposed dredging activity will have no effect to federally threatened or endangered species (Appendix A).
- Fish and Wildlife Coordination Act coordination with the Minnesota Department of Natural Resources (DNR), Minnesota Pollution Control Agency (MPCA), and USFWS seeking input on the proposed project. Two responses received from Minnesota DNR. One response recommended that public safety should be a priority given the potential thin ice conditions as a result of the project (Appendix A). The other was a phone conversation with Mr. Matt Langan (Ecological Services Division, Environmental Review). Mr. Langan indicated the Minnesota DNR had no input at the time but would review the Draft Environmental Assessment and compile independent review into a collective response from the DNR.
- Request from Minnesota DNR for clarification as to whether Protected Waters Permit from the State is required. Response from the DNR stating that Protected Waters Permit would not be needed (Appendix A).
- The Minnesota State Historic Preservation Office is being coordinated with regarding this proposed dredging and dredged material disposal action. It is expected that they will concur that no National Register of Historic Places eligible or listed properties will be affected by this work.
- This environmental assessment has been provided to interested agencies and organizations. This assessment is available upon request from the St. Paul District.

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APPENDIX A - LETTERS OF COORDINATION

Section 7 Endangered Species Act Coordination email

Ok, Thanks, Dan.

12/19/2006 04:08 PM To
<Laurie_Fairchild@fws.gov>
cc
Subject
RE: No Effects Determination for proposed Warroad Dredging Project
(UNCLASSIFIED)

Laurie, we have access to the MN DNR Natural Heritage Database (updated as of 2006). It shows an active nest approximately 1,500 meters (1 mile) south of the harbor. We'll be dredging at the harbor and trucking material north.

Thanks

Dan

-----Original Message-----
From: Laurie_Fairchild@fws.gov [mailto:Laurie_Fairchild@fws.gov]
Sent: Tuesday, December 19, 2006 3:33 PM
To: Kelner, Daniel E MVP
Subject: Re: No Effects Determination for proposed Warroad Dredging Project
(UNCLASSIFIED)

Hi Dan, just for my information, there aren't any bald eagle nests within a 1/2 mile of the project?

Laurie

12/18/2006 03:53 PM To
<laurie_fairchild@fws.gov>
cc
Subject
No Effects Determination for proposed Warroad Dredging Project (UNCLASSIFIED)

Laurie, It is our determination there will be "No Effects" to any federally threatened or endangered species or to their habitat from the proposed Warroad Harbor dredging project that we propose for late winter (Feb-March 2007). You will have an opportunity to review the Draft Environmental Assessment shortly.

Thanks

Dan Kelner
Fisheries Biologist
U.S. Army Corps of Engineers, St. Paul District 190 5th street East, Suite
401 St. Paul MN 55101 TELE (651) 290-5277
FAX (651) 290-5258

Fish and Wildlife Coordination Act email response from Minnesota DNR

Thanks.

Michael Larson
Area Fisheries Supervisor
MN DNR Fisheries
204 Main Street East
Baudette, MN 56623
Phone: 218.634.2522
Fax: 218.634.2563
Area website:

>>> "Kelner, Daniel E MVP" <Daniel.E.Kelner@mvp02.usace.army.mil>
12/19/2006 03:17 PM >>>
Classification: UNCLASSIFIED
Caveats: NONE

Mike, thanks for the input. The work is planned for mid-February through March. The area to be dredged will be completely fenced off and signs posted through the duration of the project. Public safety and lake access is a priority for the project. This is one of the reasons we're doing it in the winter as boat traffic would be restricted during open water dredging more so than vehicle/foot traffic in winter. The City of Warroad will keep the area plowed prior to dredging to allow maximum ice building and access. The Contractor will adhere to all Corps Safety requirements and work will not start until approved by the Corps.

Dan Kelner

-----Original Message-----

From: Mike Larson [<mailto:Mike.Larson@dnr.state.mn.us>]
Sent: Tuesday, December 19, 2006 1:34 PM
To: laurie_fairchild@fws.gov; Kelner, Daniel E MVP; Bruce.Paakh@state.mn.us; Daniel.Thul@state.mn.us; Jeffrey.Dittrich@state.mn.us; Katie.Haws@state.mn.us; Mike.J.Larson@state.mn.us; Paul.Stolen@state.mn.us; William.Haapala@state.mn.us
Subject: Re: Proposed Warroad Harbor Dredging (UNCLASSIFIED)

Dan: What is the time frame for the work? There is a considerable amount of fishing activity through the Warroad access. Public safety should be a priority. The project will create a large thin ice situation.

Michael Larson
Area Fisheries Supervisor
MN DNR Fisheries
204 Main Street East
Baudette, MN 56623
Phone: 218.634.2522
Fax: 218.634.2563
Area website:

>>> "Kelner, Daniel E MVP" <Daniel.E.Kelner@mvp02.usace.army.mil>
12/18/2006 03:47 PM >>>
Classification: UNCLASSIFIED
Caveats: NONE

The St. Paul District Corps of Engineers proposes to dredge a portion of the federally authorized Warroad Harbor channel. I am the project biologist on the project and will be preparing a Draft Environmental Assessment that will

be going out for 30 day public review within the next few weeks. I'm seeking any input you may have on the proposed project prior to publication of the Draft EA to identify any concerns and aid our planning process. Below is a brief bulleted list of the project components and attached is a map of the proposed area showing the dredge cut and disposal areas. Please email or call with any comments you may have. You will also have a chance to review and comment on the Draft EA.

1-All excavation work in the channel will be accomplished using mechanical excavation, thru the ice in late winter. Time frame is mid Feb thru March.

2-All material removed will be semi-solid and will be trucked off the lake to one of two pre-approved dredge disposal sites. These are the same sites that were approved for disposal of dredge material in 1996 (East and West Disposal Sites in the Attached Figure).

3- Protected Waters Permit and 401 Water Quality Certification will not be required. Both dredge disposal sites are upland and relatively flat agricultural fields and there will be no placement of fill in waters of the U.S. or return effluent to the lake. There will be no resuspension of sediment into the lake as the lake will be frozen to the substrate

4-Footprint of the work extends just off the jetty structure, with-in the authorized channel for approximately 2,900 feet lakeward. The channel is 100 feet wide and currently 3 to 4 feet deep in that area.

5-Dredging in this footprint area will be conducted to provide a 6 foot average depth - the authorized depth requirement.

6-Maximum dredge material that could be removed is 35,000 Cubic Yards.

7-All excavation and trucking operations will follow a strict safety plan to ensure safe work environment for construction activities and the general public.

8-All construction areas will be fences, signed, and controlled to prevent added risk to general public using adjacent areas.

9 - Contaminant testing of sediment within the channel was done in 2005 and there are no concerns with regards to Inorganics, PCBs, or Pesticides.

10- No adverse effects are expected on state or federally listed species or their habitats.

Thanks

Dan Kelner
Fisheries Biologist
U.S. Army Corps of Engineers, St. Paul District 190 5th street East, Suite
401 St. Paul MN 55101 TELE (651) 290-5277
FAX (651) 290-5258

Protected Waters Permit clarification response from Minnesota DNR

From: Dan Thul [<mailto:Dan.Thul@dnr.state.mn.us>]
Sent: Wed 12/20/2006 12:46 PM
To: Bluhm, Kevin W MVP
Cc: Larry Kramka
Subject: Re: Warroad Harbor Ice Dredging- Spot dredging EA(UNCLASSIFIED)

I concur that no State Public waters work permit is required from the COE. In 1996 we issued a permit (PA#96-1269) for maintenance dredging of a portion of the authorized project. The COE applied for the permit at our request but made it clear through a letter dated April 24th, 1996 from Robert Post, Chief, Engineering and Planning Division, that the State Public Waters Work permit was requested "as a matter of comity." The area of work you propose at this time is within the area authorized in 1996 by Permit 96-1269. I will route the E-mail I received from Daniel Kelner, COE Project Biologist, through our normal permit routing agency list for soliciting comments on the proposed project.

>>> "Bluhm, Kevin W MVP" <kevin.w.bluhm@mvp02.usace.army.mil> 12/15/2006
>>> 9:55 AM >>>

Classification: UNCLASSIFIED
Caveats: NONE