Appendix B

Draft Environmental Assessment

ENVIRONMENTAL ANALYSIS AND DECISION ON THE NEED FOR AN ENVIRONMENTAL IMPACT STATEMENT (EIS)
Form 1600-1 Rev. 6-2001

Department of Natural Resources (DNR)

Region or Bureau
Type List Designation

NOTE TO REVIEWERS: This document is a DNR environmental analysis that evaluates probable environmental effects and decides on the need for an EIS. The attached analysis includes a description of the proposal and the affected environment. The DNR has reviewed the attachments and, upon certification, accepts responsibility for their scope and content to fulfill requirements in s. NR 150.22, Wis. Adm. Code. Your comments should address completeness, accuracy or the EIS decision. For your comments to be considered, they must be received by the contact person before 4:30 p.m.,.

Contact Person:
Title: Water Management Specialist
Address:
Telephone Number

Applicant: City of Delafield

Address:

Title of Proposal: Nagawicka Lake Restoration and Sediment Dredging

Location: County: **Waukesha** City/Town/Village: **Delafield**

Township **7N** Range **18E** Section(s): **5,8,9,17,18,19**

PROJECT SUMMARY

1. Brief overview of the proposal including the DNR action (include cost and funding source if public funds involved)

The city of Delafield, Wisconsin is pursuing restoration and dredging within portions of Nagawicka Lake. Because of the important recreational value and aquatic habitat provided by the lake, various lake management issues have been raised by the community. These include the build-up of sedimentation and proliferation of invasive plant species, which result in demunition of aquatic habitat. The Nagawicka Lake restoration goals as defined by the citizens of the community include the following:

- Maintain and enhance aquatic habitat,
- Provide better public watercraft access for recreation,
- Maintain property values and the city tax base,
- Maintain adequate public safety, and
- Prevent/minimize further lake sedimentation.

As part of this project, removal of sediment is proposed in five selected areas within the lake

Dredge Location	Approx. Dredge Plan Area (acre)	Approx.[1] Dredge Prism Volume
West Channels	5.1	16,485
Northwest Channels	12.8	44,678
Northeast Channels	1.6	4,277
Bark River Inlet	4.9	33,590
Zastrow's Bay	2.2	8,146
Total	26.6	**107,176**

[1] Includes 0.5' over cut allowance and 5% contingency for pier removal.

Dredging will be conducted using hydraulic methods. Dewatering of the sediments will be conducted on the 36 acre city of Delafield (city) property located off of Oakwood Road. This property will eventually be developed by the city for a public park. The city is planning to use the dewatered sediments for on-site landscaping. Alternatively the city may sell the sediments for topsoil amendment to a local nursery or landscaper. If the city maintains the sediment on-site, the city will implement a WDNR approved groundwater monitoring plan.

The city plans on commencing dredging operations in 2009, around July 1st, 2009. The project is planned over a 2 year period being complete in 2010. The project will be conducted for an estimated 112 dredge days, operating 24 hours a day/5 days a week.

Estimated Cost of Funding Source:

The proposed dredging and restoration project will be financed solely by the city tax base. The estimated cost of the dredging component of the project is approximately $3,800,000. Cost for aquatic restoration is estimated at approximately $130,000. The city has a requirement that capital projects greater than $1,000,000 need to have a referendum to approve the project. It is anticipated that referendum voting would occur in 2008. The referendum has not been finalized or formally communicated with city residents at the time of preparing the dredge permit application.

2. Purpose and Need (include history and background as appropriate)

Over the years, various areas of Nagawicka Lake have experienced siltation due to sediment deposition and decay organic matter. The city with, community input, has identified the five critical areas within the lake that require dredging. These areas affect most of the approximately 264 riparian owners surrounding the lake. Siltation of these areas has resulted in limitations to recreational access, safety concerns, and degradation of aquatic habitat.

In addition, a March 2001 Lake Management Plan for Nagawicka Lake prepared by the Southeastern Wisconsin Regional Planning Commission (SEWRPC 2001) established the need for lake restoration and selective dredging to maintain the viability of the lake system. The SEWRPC report noted that Nagawicka Lake ranks high on the WDNR recreational rating due to its proximity to large communities and good water quality.

The removal of sediment from the five restoration areas will create an opportunity for sediment stabilization and the reintroduction of native Wisconsin submergent vegetation. By revegetating the restored lake bed areas with native species, the lake bottom will be stabilized by their root systems, the disturbed areas will be covered with beneficial plant material (versus being left open to colonization by EWM or other exotic and invasive species), and the fishery habitat will be improved. In general, the intent of dredging and restoration of dredged areas is to remove accumulated soft sediments and to restore the dredged area to better ecological conditions than exhibited prior to dredging.

The city's goal for dredging include:

- Maintaining and enhancing the lake aquatic habitat
- Providing safe watercraft access
- Maintaining property values and city tax base, and
- Preventing/minimizing further lake degradation resulting from either siltation or by invasive plant species.

Listed below are the five dredge areas and purpose and need:

West Channels
The specific need for dredging of the West Channels is to provide better access for safe navigation for boaters. In order to comply with the WDNR requirement, the extent of the channel will not extend further than 150 feet into the lake. The navigation channel bottom will range approximately 25 feet. A significant proportion of the sediment in the West Channels is composed of a very organic muck resulting from the decomposition of organic matter such as leaves and other vegetation. Furthermore it has been noted by the WDNR that southern portion has significant growth of erosion water milfoil that will be eradicated by dredging. Present water depth in the west channels ranges from 0.5 feet to 2.5 feet.

This work would meet the goals listed above. Alternative methods such as navigational buoys, extension or relocation of piers would not meet any of the goals listed above as defined by the citizens of the community. Pier extensions, although temporary, may alleviate water access problems by homeowners. This is not a viable long term solution for lake access by homeowners as sediment accumulation will continue resulting in the need to move piers further out into the lake.

Based upon the proposed dredge alignment for the west channel areas, it is estimated that approximately 16,485 cubic yards (cy) (including 0.5 foot overcut and 5% pier contingency) of sediment will be removed.

Northwest Channels

Conditions in the Northwest Channels are similar to the West Channels, with water depths ranging from less than 1.5 to 3.0 feet, with substantially lesser depths in many locations. At several locations, the water depth is very shallow (less than 6 inches) because of excessive sediment accumulation. When water levels are naturally lower in the fall, a shoreline mudflat is exposed, and, in the winter, these mudflats freeze down to 6 to 12 inches. In the spring, when water levels rise back to normal, the blocks of sediment-laden ice float out into the channels, melt, and deposit their sediment load into the channels.

Dredging the Northwest Channels will provide benefits similar to the West Channel dredging such as improved boater safety due to increased water depth and bottom channel width, an improved environment for reestablishment of native Wisconsin submergent vegetation, an improved fishery habitat, and will also alleviate the problem of sediment transport into the channel by the above described process.

Alternatives to dredging such as navigation buoys and relocation or extension of piers would have no beneficial results for the issues described above for the Northwest Channels and would not provide a means to accomplish the goals set forth by the citizens of the community. Furthermore, pier extension in the channel areas will further restrict boat navigation resulting in safety hazards.

Northeast Channels

The Northeast Channels require dredging due to shallow water depth caused by accumulated sediment. The existing channels are very narrow at some locations, therefore magnifying the impact of the shallow water depths on safe navigation for boaters. Existing water depth in those channels ranges from 1.0 feet to less than 3.0 feet. Estimate volume based upon the channel prisms is 4,277 cy (including 0.5 ft. overcut and 5% pier contingency).

Dredging the Northeast Channels will provide improved boater safety due to increased water depth and bottom channel width, an improved environment for reestablishment of native Wisconsin submergent vegetation, and an improved fishery habitat.

Alternatives to dredging such as navigation buoys and relocation or extension of piers would have no beneficial results for the issues described above for the Northeast Channels and would not provide a means to accomplish the goals set forth by the citizens of the community. Furthermore, pier extension will restrict boat navigation in the channels causing a safety hazard.

Bark River Inlet

Dredging criteria within the inlet river and the north and south shorelines are the same as for the west and northwest channels (5' shoreline setback 4V:1H sideslopes, 25' wide dredge channel bottom, and 5' post-dredge water depth).

A sedimentation trap has been designed at the Bark River inlet to the lake to reduce future sediment loading to the lake. Collecting sediment at this location not only reduces overall particulate loading to the lake but also allows for effective future maintenance dredging. The sediment trap has been designed for 7 to 14 year storage capacity based upon sediment deposition efficiency. The base target elevation for the sedimentation trap will be established at 883.0 MSL.

Alternatives to dredging such as navigation buoys and relocation or extension of piers would have no beneficial results for the issues described above for the Bark River Inlet area and would not provide a means to accomplish the goals set forth by the citizens of the community. Pier extension will not alleviate near shore accumulation of sediment. Larger piers into the lake to allow homeowners access will result in increased safety hazard for boaters as piers extend further into the lake.

Zastrow's Bay

The proposed dredging within Zastrow's Bay has also been modified to account for vegetation and water depth information. In general for ZB1 and ZB2, shoreline dredge channels are proposed in areas where the water depth is less than 3 feet. In the March 8, 2007 letter, the WDNR noted that water depths in ZB3 (southern inlet) is greater than 3 feet and therefore dredging should not be conducted. The city and LWC believe dredging in this area is needed to provide safe lake access to riparian owners. Considering this area is outside of a sensitive area, dredging in water depths greater than 3.0 feet meets the city and LWC goals. Areas in the middle of these inlets where native vegetation and deeper water are present will remain undredged. The Zastrow's Bay dredge prism is estimated at 8,146 cy (including 0.5 ft. overcut and 5% pier contingency).

Dredging of the Zastrow's Bay area will provide improved boater safety due to increased water depth, an improved environment for reestablishment of native Wisconsin submergent vegetation, and an improved fishery habitat. The dredging will accomplish the first four aforementioned goals.

Alternatives to dredging such as navigation buoys and relocation or extension of piers would have no beneficial results for the issues described above for the Zastrow's Bay area and would not provide a means to accomplish the goals set forth by the citizens of the community. Pier extension is not practical in Zastrow's Bay. The extension of piers will result in increased hazards for watercraft.

3. Authorities and Approvals (list local, state and federal permits or approvals required)

- Chapter 30.20, Wis. Stats.
- WPDES Discharge Permit
- Approval of Solid Waste Disposal for dredging spoils pursuant to Wis. Admin. Code NR500.
- WDNR Notice of Intent for land disturbance greater than 50,000 sq. ft.

No local or federal approvals are required for this project.

PROPOSED PHYSICAL CHANGES (more fully describe the proposal)

4. Manipulation of Terrestrial Resources (include relevant quantities - sq. ft., cu. yard, etc.)

Approximately 107,176 in lake cubic yards of sediment will be excavated from five separate areas within Nagawicka Lake. Proposed excavation method will be a hydraulic dredging. The sediments will be slurried to the upland dewatering site owned by the City. Dewatering will occur on the 36 acre city owned property. Of this approximately 5 acres will be used for dewatering and 15 acres for construction support including equipment storage, office trailer(s), vehicle parking and other service needs. In addition, the city owned property of Ridely Drive currently used by the City's weed harvester, will also be used by the contractor for shoreland staging. This area is presently bituminous paved as such no new land disturbance will be needed. The contractor will use the shoreland staging area for locating the booster pump and generator(s) equipment storage for the barge and pipeline assembly. This area, measuring approximately 3,000 sq. ft., will be fenced to restrict unauthorized access. The dredging pipelines routes (both influent and effluent) will be positioned on private properties crossing beneath existing driveways along Hirschman Lane. At major road intersection of Hirschman Lane and Nagawicka Road, the pipelines will be trenched below grade to allow uninhibited access to these roads. At driveway junctions the pipeline will either be placed through existing culverts or trenched below the driveway.

The city has necessary property easement agreements for the pipelines and for riparian disturbance surrounding the shoreland service area.

Sediment Dewatering Site

The city has plans to develop their parcel into a city park within the next several years. The park features could include general recreation areas, ball/soccer fields, hiking trails and general green space. It is likely that the sediment, once dewatered, could be beneficially used to achieve the design grading plan for the parcel when the park gets constructed. For the sediment dewatering, approximately 5 acres will be used to stage the 89 geotextile bags used for dewatering. Underlying the 5 acre dewatering pad will be a low permeable geomembrane liner which will restrict water seeping from

the bags entering the subsoils. Surrounding the dewatering pad will be the 10 acre construct support area used for contractor trailer, equipment storage and staging, and vehicle parking. Upon completion of the project the contractor will be required to remove all dredging equipment and processes and restore the property.

5. Manipulation of Aquatic Resources (include relevant quantities - cfs, acre feet, MGD, etc.)

To be updated by WDNR
The proposed dredging will remove approximately 107,176 cubic yards of sediments from the lake. Within the dredge alignments, aquatic plants will be removed and associated seed beds. The dominate vegetation in many of the dredge areas is Eurasian Water Milfoil (EWM), an evasive species.

Recently, the WDNR LWC members and the city's restoration consultants performed a vegetation survey at several of the proposed dredge locations. The results of this survey are presented in the Chapter 30 permit application. As a result of the vegetation survey, the primary concern was regarding dredging in areas where the water depth is less than 3 ft and diverse native plant species and fish habitat are present. As a result of these discussions, the city has substantially modified the original dredge plan submitted with the Preliminary Application. In addition to the vegetation surveys, the LWC also performed water depth and soft sediment measurements in key areas under consideration for dredging.

Also during the dredging process, it is expected that approximately 400,000 gpd of water will be displaced as carriage water. However, the majority of this water would be returned to the lake upon sediment dewatering.

Hydraulic Dredging:

Hydraulic Dredging will employ the use of barge, mounted hydraulic dredges(s) and pipelines. Pipelines will be positioned across the lake to convey the slurry to the dewatering sites. The pipeline location will change as different areas within the lake are developed. Associated with this process are booster pumps typically situated near the shore land staging area to pump the slurry to the dewatering area. The carriage water is returned to the lake by is accomplished via return pipeline. Landside pipelines will be routed through private properties having owner's agreement(s).

6. Buildings, Treatment Units, Roads and Other Structures (include size of facilities, road miles, etc.)

The proposed dredging plan will require construction of near shore access/staging area. The size of the staging area will measure approximately 3,000 sq./ft. This area will be used for dredge support activities including booster pump(s) and generator(s), barge equipment storage, a temporary 40 foot dock for water craft docking, and pipeline construction area. This area is currently bituminous paved and used by the city for the lake weed harvester. No additional land disturbance will be required at the shoreland staging area.

For water management, approximately 10,000 ln ft of upland pipe will be used to carry the slurry and return water to and from Zastrow's Bay. These pipes will be positioned within the same alignment to minimize land disturbance to property owners. Presently the city has a 20 foot easement agreement with the Lang property and the Lakeshore Country LLC property for pipeline placement and maintenance. Additional piping will be used on the lake to transport the slurry to overland pipe.

At the dewatering site it is expected that approximately 15 acres of the 36 acre property will be used for sediment management operations. This will include 5 acres for the geotextile bag containment area, and 10 acres for support operations including office trailer toilets, equipment storage and vehicle parking. The remaining approximately 21 acres will be open for city use.

No permanent buildings or structures are planned during the project operations.

7. Emissions and Discharges (include relevant characteristics and quantities)

Air emissions during the project will primarily be related to diesel equipment activity including generators for pumps, boat engines from barge tugs, and other smaller pieces of equipment. All air emissions will not cause a violation to any state or federal air standards.

Carriage water discharge back into Nagawicka Lake will be permitted under WPDES General Permit No. WI-0046558-3.

No other discharges/emissions are expected.

Some odors may be present at the dewatering site due to organic matter present in the sediments. However, based upon similar dredging projects using geotextile bags odors will not be a significant nuisance to adjacent property owners.

All vehicles and generators will be equipped with mufflers to suppress exhaust noise. In addition, the contractor will be required to have generators for booster pumps placed within noise suppressant enclosures. Pumps and the dredging cause little noise, as such, should not affect property owners. Because the planned dredging will be via hydraulic, transportation of sediments to the dewatering sites by trucks will not be needed. Vehicle emissions resulting from large equipment operations will nearly be eliminated, thereby maintaining good air quality for the surrounding residents.

8. Other Changes

None.

9. Identify the maps, plans and other descriptive material attached

See Chapter 30 Permit Application for detailed drawings on the dredging and dewatering process layout.

AFFECTED ENVIRONMENT (describe existing features that may be affected by proposal)

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10. Information Based On (check all that apply):

☒ Literature/correspondence (specify major sources)

☒ Personal Contacts (list in item 26)

Field Analysis By: ☒ Author ☒ Other (list in item 26)

Past Experience With Site By: ☒ Other (list in item 26)

11. Physical Environment (topography, soils, water, air)

To be updated by WDNR
Nagawicka is part of Bark River watershed. The lake is located in Sections .5, 8, 9, 16, 17, 20, and 21 of Township 7 North Range 18 East, in Waukesha County. The lake's total tributary drainage area is approximately 68 percent is rural land uses and the remaining 32 percent is urban land uses.

Water Quality:
Nagawicka Lake has been defined as a deep-water, dimictic, meso-eutrophic lake with water quality ranging from poor to good. Sources of pollution to this lake are primarily non-point as a result of human activities within the watershed. The principal polluter to the lake is phosphorous. Annually, it has been estimated that approximately 13,000 pounds of phosphorous enter the lake.

Soils:
The lakebed material in the project sites is primarily muck, sediment deposition from overland run-off and decaying organic matter. Muck thickness ranges from 1 to 5 feet thick in the 5 areas to be dredged. The lands surround the lake primarily consist of sands and gravel with layer of various thicknesses of silts and clays.

Air Quality:
The city of Delafield and surrounding areas is primarily suburban residential setting with some light industrial and agricultural uses. The majority of local impacts to air quality are the result of automobiles and other diesel/gasoline-powered vehicles.

12. Biological Environment (dominant aquatic and terrestrial plant and animal species and habitats including threatened/endangered resources; wetland amounts, types and hydraulic value)

To be updated by WDNR
29 sediment samples have been collected from Nagawicka Lake, and have been analyzed for

chemical and/or physical composition. Results of historical analytical testing show the vast majority of sediment proposed to be removed is below the TEC. Arsenic, cadmium, copper, lead, zinc, pesticides [4-4'-DDE (DDE), aldrin, endrin] and several PAH's were detected at low levels within certain locations within the lake. The vast majority of chemical concentrations of these locations are either less than the TEC or between the TEC and MEC

Pesticide concentrations are likely due to agricultural and residential runoff. Arsenic and copper are constituents of herbicides and algicides historically used to control aquatic plant growth in certain parts of the lake. Sodium arsenate-based herbicides have not been applied on the lake since 1967. The major use of copper and sulfate-based algicides ceased in 1970 with a small final isolated use in 1989. There is no commercial production or known use of PAHs within the Nagawicka Lake watershed, though they often occur as a component of coal tars, oils, and soots and have been detected in gasoline engine exhaust, coke oven emissions, cigarette smoke, charcoal broiled meats, vegetation near heavily traveled roads, surface water, and soils near hazardous waste sites.

Aquatic Plants

Aquatic plants include larger plants, or macrophytes, and microscopic algae, or phytoplankton. These plant communities form an integral part of the aquatic part of the aquatic food web, converting inorganic nutrients present in the water and sediments into organic compounds which are directly available as food for other aquatic as food for other aquatic organisms.

Aquatic Macrophytes:

Aquatic macrophytes play an important role in the ecology of Southeastern Wisconsin lakes. They can be either beneficial or a nuisance, depending on their distribution and abundance, and the activities taking place on the waterbody. Macrophytes are usually an asset because they provide food and habitat for fish and other aquatic life, produce oxygen, and may remove nutrients and pollutants from the water that could otherwise cause algal blooms or other problems. Aquatic macrophytes become a nuisance when their presence reaches densities that interfere with swimming and boating and the normal functioning of a lake ecosystem. Many factors, including lake configuration, depth, water clarity, nutrient availability, bottom substrate, wave action, and type of fish populations present, determine the distribution and abundance of aquatic macrophytes in a lake. Some nonnative plant species, lacking natural controls, may be specially favored by the habitats available in this Region and can exhibit explosive growths to the detriment not only of lake users, but also of indigenous aquatic life and native plant species.

To document the types and relative abundances of aquatic macrophytes in Nagawicka Lake, an aquatic plant survey was conducted by staff of the Southeastern Wisconsin Regional Planning Commission during June 1997. The survey of aquatic plant communities in Nagawicka Lake was conducted in association with the city of Delafield Lake Welfare Committee. This survey was used to update and refine the aquatic plant survey conducted by Aron & Associates[1] in 1993. The aquatic plant survey was completed to obtain a general overview of species composition. A species list, compiled from the results of this aquatic plant survey, is provided in the following Table 1.

[1] *Aron & Associates*, Nagawicka Lake Plant Management Plan, *August 1993.*

Table 1
Aquatic Plant Species Observed in Nagawicka Lake and Their Ecological Significance

Aquatic Plant Species Present	Ecological Significance
Ceratophyllum demersum (coontail)	Provides good shelter for young fish and supports insects valuable as food for fish and ducklings.
Chara vulgaris (muskgrass)	Excellent producer of fish food, especially for young trout, bluegills, small and largemouth bass; stabilizes bottom sediment; and has softening effect on the water by removing lime and carbon dioxide.
Elodea Canadensis (waterweed)	Provides shelter and support for insets valuable as fish food.
Myriophyllum spicatum (Eruasian water milfoil)	None known.
Myriophyllum sp. (native milfoils)	Provides shelter and is a valuable food producer, supporting many insects eaten by fish; fruits eaten by many wildfowl; a few wildfowl eat foliage; sparingly eaten by muskrats and moose.
Najas flexilis (bushy pondweed)	Stems, foliage, and seeds important wildfowl food and produces good food and shelter for fish.
Nuphar sp. (yellow water lily)	Leaves, stems, and flowers are eaten by deer; roots eaten by beavers and porcupines; seeds eaten by wildfowl; leaves provide harbor to insets, in addition to shade and shelter for fish.
Nymphaea sp. (white water lily)	Provides shade and shelter for fish; seeds eaten by wildfowl; rootstocks and stalks eaten by muskrats; roots eaten by beaver, deer, moose, and porcupine.
Potamogeton amplifolius (large-leaf pondweed)	Provides support for insets and produces good food supply for fish and ducks.
Potamogeton crispus (curly-leaf pondweed)	Provides food, shelter, and shade for some fish and food for wildfowl.
Potamogeton pectinatus (sago pondweed)	This plant is the most important pondweed for ducks, in addition to providing food and shelter for young fish.
Potamogeton praelongus (white-stemmed pondweed)	Provides feeding grounds for muskellunge; also good food producers for trout; good food producer for ducks.
Potamogeton zosteriformis (flat-stemmed pondweed)	Provides some food for ducks.
Vallisneria Americana (water celery)	Provides good shade and shelter, supports insects, and is valuable fish food.

[a] *Information obtained from A Manual of Aquatic Plants, by Norman C. Fassett and Guide to Wisconsin Aquatic Plants, Wisconsin Department of Natural Resources.*

Source: SEWRPC

Phytoplankton:
Phytoplankton, or algae, are small, generally microscopic plants that are found in all lakes and streams. They occur in a wide variety of forms, in single cells or colonies, and can be either attached or free floating. Phytoplankton abundance caries seasonally with fluctuations in solar irradiance, turbulence due to prevailing winds, and nutrient availability. In lakes with high nutrient levels, heavy growths of phytoplankton, or algal blooms, may occur. Algal blooms have been occasionally perceived as a problem in Nagawicka Lake. Filamentous algal species in particular are known to occur within the Lake, and the Lake has been subjected to algicide treatments to control nuisance levels of phytoplankton growth.

Aquatic Animals
Aquatic animals include microscopic zooplankton; benthic, or bottom-dwelling invertebrates; fish and reptiles' amphibians; mammals; and waterfowl that inhabit the Lake and its shorelands. These make up the primary and secondary consumers of the food web.

Zooplankton:
Zooplankton are minute, free-floating animals inhabiting the same environment as phytoplankton. Zooplankton are primary consumers in the aquatic food chain, feeding to a large extent on such phytoplankton as green algae and diatoms. The zooplankton, in turn, are preyed upon by fish, particularly the larvae and fry of bluegills, pumpkinseeds, sunfish, and largemouth bass. While the zooplankton population is an indicator of the trophic status of a lake and of the diversity of aquatic habitat, and zooplankton were sampled as part of the Wisconsin Department of Natural Resources Long-Term Trend Monitoring Program, no information on the species composition or relative abundance is currently available for Nagawicka Lake. However, given the composition and condition of the fish community in Nagawicka Lake, it may be assumed that the zooplankton population is sufficiently robust and diverse to support a relatively healthy fishery.

Fish of Nagawicka Lake:
Nagawicka Lake supports a relatively large and diverse fish community. Studies conducted by the Wisconsin Department of Natural Resources during the 1980s indicated that 30 species of fish have been captured in the Lake. The pugnose shiner, a State Threatened Species, has also been reported from Nagawicka Lake.

Important predator fish in Nagawicka Lake include walleyed pike, northern pike, smallmouth bass, and largemouth bass. Largemouth bass are considered to be common, while the rest are considered to be present. These species are carnivorous, feeding primarily on other fish, crayfish, and frogs. These species are among the largest and most prized game fish sought by Nagawicka Lake anglers. A wide range of panfish are also present in the Lake. "Panfish" is a common term applied to a broad group of smaller fish with a relatively short and usually broad shape makes them a perfect size for the frying pan. Panfish species known to exist in Nagawicka Lake include bluegills, pumpkinseeds, green sunfish, and black crappies.

"Rough fish" is a broad term applied to species, such a scarp, that do not readily bite on hook and line, but feed on game fish, destroy habitat needed by more desirable species, and are commonly considered in Southeastern Wisconsin as undesirable for human consumption. Rough fish species which have been found in Nagawicka Lake include carp, lake chubsucker, and bowfin.

Nagawicka Lake is currently passively managed for the production of bluegills, largemouth bass, and northern pike, which regulates the harvest of fishes from the Lake under current state fishing regulations.

Given the rural nature of all but the immediate shoreland area of Nagawicka Lake, many animals and numbers of waterfowl commonly inhabit areas of the watershed, especially in the still undeveloped areas southwest of the Lake and upstream of the Lake. A variety of mammals, ranging in size from large animals like the northern white-tailed deer to small animals like the pygmy shrew, are found in the Nagawicka Lake area. Mink, muskrat, beaver, white-tailed deer, red and grey fox, grey and fox squirrel, and cottontail rabbits are mammals reported to frequent the area.

A large number of birds, ranging in size from large game birds to small songbirds, are found in the Nagawicka Lake area. The Nagawicka Lake drainage area supports a significant population of waterfowl, including mallard and teal. Larger numbers move through the drainage area during migrations when most of the regional species may also be present.

Mallards, wood duck, and blue-winged teal are the most numerous waterfowls and are known to nest in the area. Many games birds, songbirds, waders, and raptors also reside or visit the Lake and its environs. Sandhill cranes and loons are notable migratory visitors.

Because of the mixture of lowland and upland woodlots, wetlands, and agricultural lands sill present in the area, along with the favorable summers climate, the area supports many other species of birds. Hawks and owls function as major rodent predators within the ecosystem. Swallows, whippoorwills, woodpeckers, nuthatches, and flycatchers, as well as several other species, serve as major insect predators. In addition to their ecological roles, birds such as robins, red-winged blackbirds, orioles, cardinals, kingfishers, and mourning doves serve as subjects for bird watchers and photographers. Threatened species resident in the vicinity of Nagawicka Lake include the Cerulean and Kentucky warblers and the Arcadian flycatcher. The worm-eating warbler is an endangered species resident in the vicinity of the Lake.

Amphibians and reptiles are vital components of the ecosystems in an environmental unit like the Nagawicka Lake drainage area. Examples of amphibians native to the area include frogs, toads, and salamanders. Turtles and snakes are examples of retiles common to the Nagawicka Lake area. Blanding's turtle, a threatened species, is resident in the Kettle area of Nagawicka Lake.

The complete spectrum of wildlife species originally native to Waukesha County has, along with its habitat, undergone significant change in terms of diversity and population size since the European settlement of the area. This change is a direct result of the conversion of land by the settlers from its natural state to agricultural and urban sues, beginning with the clearing of the forest and prairies, the draining of wetlands, and ending with the development of extensive urban areas. Successive cultural uses and attendant management practices, both rural and urban, have been superimposed on the land use changes and have also affected the wildlife and wildlife habitat. In agricultural areas, these cultural management practices include

draining land by ditching and tiling and the expanding use of fertilizers, herbicides, and pesticides. In urban areas, cultural management practices that affect wildlife and their habitat include the use of fertilizers, herbicides, and pesticide; road salting for snow and ice control; heavy motor vehicle traffic that produces disruptive noise levels and air pollution and non-point source water pollution; and the introduction of domestic pets.

[2] *Wisconsin Department of Natural Resources Fish Management Report No. 131,* Creel Survey on Pewaukee and Nagawicka Lakes, Waukesha County, Summer 1982, February 1987.

In addition, a site-specific vegetation survey was performed by the WDNR, LWC and the city's consultants on August 8, 2006. The results of the vegetation survey are included in the Revised Chapter 30 Dredge Permit Application.

13. Cultural Environment

To be updated by WDNR

a. Land use (dominant features and uses including zoning if applicable)
Land use immediately surrounding the lake is primarily residential with the exception of a couple of public access points. Nagawickee Park is located on the east side of the lake. Farmlands are outlying the residential areas. Nagawicka Lake's shoreland is fully developed with the majority being year-round homes. The proposed sediment dewatering site is currently used for agricultural row crop production.

b. Social/Economic (including ethnic and cultural groups)
Nagawicka Lake is used year-round for a variety of recreational activities including fishing, swimming, boating, ice fishing, and snowmobiling. Presently, there are no-ethic or cultural groups associated with the lake.

c. Archaeological/Historical
There are no known archaeological or historical values associated with the proposed project locations.

14. Other Special Resources (e.g., State Natural Areas, prime agricultural lands)

There are no other special resources identified with this project.

ENVIRONMENTAL CONSEQUENCES (probable adverse and beneficial impacts including indirect and secondary impacts)

15. Physical (include visual if applicable)

To be updated by WDNR
This project will include removal of 107,176 cubic yards of sediments from Nagawicka Lake. The consequence of this work will deepen existing channels for improving recreational access and removal invasive aquatic plant species.

The project will have benefits for the community by improving not only recreational access but also lake quality by removal of evasive species, restocking selected dredge areas with native aquatic species, and reducing future sediment loading to the lake.

Secondary impacts would be associated with the upland dewatering site including a temporary increase in construction vehicle activity and other nuisance impacts such as noise, dust, and visual impacts. Also due to organic material decomposition, odors may be of concern.

16. Biological (including impacts to threatened/endangered resources)

To be updated by WDNR
The areas to be dredged were substantially reduced since submittal of the Preliminary Dredge Application to account for input received from the WDNR related to water depth and the presence of submergent native vegetation and fish habitat. The dredge channel areas and volumes were determined using the following criteria:

- A minimum 5-ft wide setback from the shoreline, starting on the developed side,
- Maximum side slope of the dredge cut of 4H : 1V to maintain stability, and
- Post-dredge water depth of 5 ft, except for the sediment trap where water depth will be 6.5 ft.

These three criteria define the channel bottom width which will vary depending on the original channel width and water depth. Twenty five (25) ft was the minimum width selected where 2 boats would be expected to pass within the channel. In general, the dredge areas and volumes are substantially reduced, by over 100% from the Preliminary Application, as a result of the above criteria. The dredge volumes include an over dredge allowance to account for constructability limitations of hydraulic dredging. Experience with other dredge projects indicates a dredge cut line can be achieved within 0.5 ft. of the design cut line. Therefore, for permitting purposes, a tolerance of +0.5 ft. and 5% pier removal contingency is included with the dredge volume.

The dredge conveying pipelines will cause minimal disturbance to wildlife that inhabitant these areas. However, upon removal of the pipeline, it is expected that wildlife will return. As such, this temporary action has no significant long-term consequence on wildlife surrounding Nagawicka Lake.

Dredging projects generally have negative impacts related to removal and/or resuspension of sediment. This can include reduced water quality, sediment deposition on fish spawning areas, formation of algal blooms due to resuspension of nutrients in the water column, and invasion of non-native aquatic plant species. These impacts are expected to be minimal for this project, primarily since the work will be using hydraulic methods which significantly reduces re-suspension of solids, effecting lake quality.

Removal of bottom material will result in removing benthic organisms from the lakebed. These populations will need to re-establish from other areas of the lake. Fish habitat for various species may be impacted. Dredging will be conducted during periods to minimize fish spawning or waterfowl nesting. Construction noise and physical disturbances may impact animals utilizing the lake shoreline. It will also result in the removal of plants and the seed bank for plants that are valuable for fish and aquatic invertebrates on which fish feed. However, since the dominant plant found in the area to be dredged is the invasive Eurasian Water Milfoil, its removal may benefit the lake quality.

Although dredging will remove some of the phosphorous-rich sediments, lake fertility will still be high due to the amount of phosphorus in other areas of the lake as well as nutrient loads from the surrounding watershed. Increased water depths may alter the growth of some aquatic plant species. If these native plant species diminish, EWM could populate these areas. This dredging proposal may not reach hard lake bottom in all locations to be dredged, and therefore, some silt and muck would remain.

17. Cultural

To be updated by WDNR

a. Land Use (including indirect and secondary impacts)

The lakeshore is fully developed as such the project will have little impact on current land use.

b. Social/Economic (including ethnic and cultural groups, and zoning, if applicable)

Nagawicka Lake is popular for summer recreational activities. The project could result in limited use of certain areas of the lake due to barge movement or hydraulic pipelines. Depending on the duration of the project, limited access of the lake may occur over several summer construction seasons in portions of the lake.

After dredging the ecosystem of the lake as well as recreational access will be improved.

c. Archaeological/Historical

No archeological/historical impacts are expected.

18. Other Special Resources (e.g., State Natural Areas, prime agricultural lands)

No impacts are expected.

19. Summary of Adverse Impacts That Cannot Be Avoided (more fully discussed in 15 through 18)

Physical:

- Disturbance to sensitive lake bed areas.

Biological:

- Temporary disturbance of fish and wildlife.
- Potential discharge of pollutants into surface or groundwaters.
- Possible increase in non-native evasive plant species.
- Potential loss to fish habitat and productivity due to loss/change of aquatic plant community.

Cultural:

- Temporary disturbance to recreational use.

DNR EVALUATION OF PROJECT SIGNIFICANCE (complete each item)

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20. Environmental Effects and Their Significance

a. Discuss which of the primary and secondary environmental effects listed in the environmental consequences section are long-term or short-term.

Primarily environmental effects resulting from dredging will be short-term disturbance of the lake bottom and temporary displacement of aquatic species. Once the channel bottom revegetates, plant, fish, and benthic organisms will return.

Because the upland disposal sites are currently used for agricultural production, the use of these sites for sediment disposal may result in additional metals and pesticides loading. Furthermore, agricultural use of these properties may be limited based upon the volume of sediment applied to the site. The carriage water return from the disposal sites will be permitted under a **WPDES Permit**. Some short-term environmental consequences are expected from this discharge back into the lake including:

- Potential for increase in lake turbidity.
- Slight increase in ammonia at point of effluent return to the lake.

However, it is expected that these consequences will be short term and the lake quality will return to its current state within a short period of time after dredging.

No long-term negative impacts are expected by the dredging and/or disposal of sediments.

The project will improve lake quality by removing invasive milfoil and replacing with native plant stock in selected areas and improving water recreational access and safety.

b. Discuss which of the primary and secondary environmental effects listed in the environmental consequences section are effects on geographically scarce resources (e.g. historic or cultural resources, scenic and recreational resources, prime agricultural lands, threatened or endangered resources or ecologically sensitive areas).

There are no known impacts to geographically scarce resources. The proposal will minimize or avoid high quality areas of the lake preserving fish and wildlife habitat and native aquatic plant communities.

c. Discuss the extent to which the primary and secondary environmental effects listed in the environmental consequences section are reversible.

The primary and secondary effects are reversible over time. The primary construction affects such as access roads, staging areas, and shore access areas will be returned to original state upon construction completion. The effects due to dredging are reversible to the extent that the dredge areas will fill back in over time. The effects to fish, plants, and benthic communities will be minimal and temporary.

21. Significance of Cumulative Effects

Discuss the significance of reasonably anticipated cumulative effects on the environment (and energy usage, if applicable). Consider cumulative effects from repeated projects of the same type. Would the cumulative effects be more severe or substantially change the quality of the environment? Include other activities planned or proposed in the area that would compound effects on the environment.

No further dredging beyond the scope of this project is planned. Repeated dredging could be detrimental to the lake quality. Continued dredging will cause irreversible damage to the lake ecosystem altering the shoreline which provides spawning, feeding, nursery, and living habitat for many species.

The city of Delafield has implemented a lake restoration plan which includes this dredging proposal but also provides measures for reducing the lake siltation and curbing the use of high phosphorous fertilizers on lawns of riparian owners. In addition, the city has implemented an upland stormwater management plan that will limit further sediment loading from areas within the city. These measures are believed to significantly reduce the need for any future dredge in the lake.

22. Significance of Risk

a. Explain the significance of any unknowns that create substantial uncertainty in predicting effects on the quality of the environment. What additional studies or analysis would eliminate or reduce these unknowns?

An unknown of any dredge project is the long term effect on the native aquatic plant and animal community. Although much of the areas to dredged will have native plants reintroduced for channel stabilization, it's unclear the effect positive or negative on invasive plant communities. There are no known studies to further aid in determining the long term consequences of such projects.

b. Explain the environmental significance of reasonably anticipated operating problems such as malfunctions, spills, fires or other hazards (particularly those relating to health or safety). Consider reasonable detection and emergency response, and discuss the potential for these hazards.

The city of Delafield is the proposal applicant. Although unanticipated, environmental significant incidents such as spills, fires, or other hazards will be responded to by the local fire and police services. In addition, the city will provide on-site inspection of the contractor during dredging that will provide immediate notification if any environmental hazard becomes apparent.

23. Significance of Precedent

Would a decision on this proposal influence future decisions or foreclose options that may additionally affect the quality of the environment? Describe any conflicts the proposal has with plans or policy of local, state or federal agencies. Explain the significance of each.

Permitting similar dredging projects by the WDNR is fairly common. There are no recognized conflicts with plans or policies of local, state, or federal agencies.

24. Significance of Controversy Over Environmental Effects

Discuss the effects on the quality of the environment, including socio-economic effects, that are (or are likely to be) highly controversial, and summarize the controversy.

Dredging of Nagawicka Lake generally has community support. The city will prepare and vote on a referendum prior to authorizing funding for the project. This public process will allow for public discussion on the acceptability of the project. The long-term effects are expected to enhance the quality of the lake by removal of eurosion water milfoil and revegetating selected dredge areas with native plants. This is viewed as enhancing the lake quality as such that the project is expected to have community support. It is also envisioned by the city that dredging will maintain riparian property values consequently maintaining the city's tax base.

This project has no known conflicts with local, state, or federal plans. This project is incompliance with the Lake Management Plan prepared by SEWRPC (SEWRPC, March 2001). It is also consistent with plans of the LWC.

ALTERNATIVES

25. Briefly describe the impacts of no action and of alternatives that would decrease or eliminate adverse environmental effects. (Refer to any appropriate alternatives from the applicant or anyone else.)

a. No Action

All environmental benefits and impacts would be avoided if this project were not initiated. However, lake quality would continue to degrade resulting from continued siltation and shoreline erosion. In addition, emergency services (safety) and recreational activities would be hindered due to channel degradation. Boat traffic because of shallow channel depth would reduce water quality as propellers stir up shallow channel areas. Ultimately, riparian property values could be affected which would, in turn, result in decreased tax levies and continued proliferation of EWM.

b. Reduced Project Scope

Reducing or limiting dredging would reduce the environmental impacts of this project. However, this action could result in future dredging plans by riparian owners or the city that could have more significant environmental impacts. Furthermore, reducing the scope of dredging would limit the lake restoration goals of the city, thereby, causing local controversy and potential funding restrictions. Ultimately, a reduced project scope will limit recreational access, reduce riparian property values, and erode the city tax base.

SUMMARY OF ISSUE IDENTIFICATION ACTIVITIES

26. List agencies, citizen groups and individuals contacted regarding the project (include DNR personnel and title) and summarize public contacts, completed or proposed).

Date	Contact	Comment Summary

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DECISION (This decision is not final until certified by the appropriate authority)

In accordance with s. 1.11, Stats., and Ch. NR 150, Adm. Code, the Department is authorized and required to determine whether it has complied with s.1.11, Stats., and Ch. NR 150, Wis. Adm. Code.

Complete either A or B below:

A. EIS Process Not Required ☐

The attached analysis of the expected impacts of this proposal is of sufficient scope and detail to conclude that this is not a major action which would significantly affect the quality of the human environment. In my opinion, therefore, an environmental impact statement is not required prior to final action by the Department.

B. Major Action Requiring the Full EIS Process ☐

The proposal is of such magnitude and complexity with such considerable and important impacts on the quality of the human environment that it constitutes a major action significantly affecting the quality of the human environment.

Signature of Evaluator	Date Signed

Number of responses to news release or other notice:

Certified to be in compliance with WEPA	
Environmental Analysis and Liaison Program Staff	Date Signed

NOTICE OF APPEAL RIGHTS

If you believe that you have a right to challenge this decision, you should know that Wisconsin statutes and administrative rules establish time periods within which requests to review Department decisions must be filed.

For judicial review of a decision pursuant to sections 227.52 and 227.53, Stats., you have 30 days after the decision is mailed, or otherwise served by the Department, to file your petition with the appropriate circuit court and serve the petition on the Department. Such a petition for judicial review shall name the Department of Natural Resources as the respondent.

To request a contested case hearing pursuant to section 227.42, Stats., you have 30 days after the decision is mailed, or otherwise served by the Department, to serve a petition for hearing on the Secretary of the Department of Natural Resources. The filing of a request for a contested case hearing is not a prerequisite for judicial review and does not extend the 30-day period for filing a petition for judicial review.

Note: Not all Department decisions respecting environmental impact, such as those involving solid waste or hazardous waste facilities under sections 144.43 to 144.47 and 144.60 to 144.74, Stats., are subject to the contested case hearing provisions of section 227.42, Stats.

This notice is provided pursuant to section 227.48(2), Stats.