ENVIRONMENTAL ANALYSIS AND DECISION ON THE NEED FOR AN ENVIRONMENTAL IMPACT STATEMENT (EIS) Department of Natural Resources (DNR)

Form 1600-1 Rev. 6-2001

Region or Bureau
Southeast Region
Type List Designation
Type List Designation II

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., 07/03/2008.

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Applicant: Margaret Zerwekh

Address: 500 Mill Road, Delafield, WI 53018

Title of Proposal: Nemahbin Roller Mill Dam Abandonment

Location: Waukesha County, City of Delafield
Township Range Section(s): NW ¼ NW ¼ Section 19, Township 7 North, Range 18 East

PROJECT SUMMARY

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

Mrs. Margaret Zerwekh has requested to abandon the Nemahbin Roller Mill Dam which impounds the Nemahbin Roller Dam Millpond (hereafter “Millpond”) located on the property located at 500 Mill Road,

on the Bark River in the City of Delafield, Waukesha County. Abandonment of this dam would include a drawdown of the 12-acre Millpond adjacent to the dam.

The application for abandonment did not include a site specific dam removal and river restoration plan. The Department will require that a full engineering document for removal of the structure be submitted and approved before any work begins. The project may require additional permits/approvals from the Department and local units of government depending on the scope of work proposed in the removal plans. Examples of the elements needed for the Department to proceed with Mrs. Zerwekh's application include but are not limited to:

- Drawdown Plan
- Material Removal Plan
- Erosion Control Plan
- Sediment Stabilization Plan,
- Planting Plan
- Floodplain Analysis
- Stream bank Stabilization Plan
- Existing and Proposed Grades
- Construction Sequencing
- Site specific analysis.

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

The Nemahbin Roller Mill Dam (hereafter "the dam") was originally an earthen and brush dam constructed around 1839. George Applebecker was the owner of the dam around the first half of the 20th century. The dam used to power a saw mill, and later a feed and flour mill. According to an early inspection report dated September 10, 1919 by the Railway Commission of Wisconsin, this was a concrete wasteway dam, constructed of reinforced concrete 3 feet into the river bed. The berms were constructed of earth and gravel. A 5-foot concrete plank apron was installed below the dam to prevent scouring. The spillway was recorded as 21.3 feet long and 7 feet high from the top of the spillway to the low point in the retaining wall. The flashboards (stoplogs) had a height of 5 feet. A 7-foot wide flume (spillway) constructed of reinforced concrete was 38 feet long and 9 feet deep. The dam was operated 6 days per week (approximately 300 days per year) as part of a feed mill in 1919. The report states the water level had never risen above the dikes. At that time, the millpond was estimated to cover approximately 25 acres and the maximum depth was recorded at 8 feet. Department records show the Millpond currently covers approximately 12 acres and has a maximum depth of 5 feet. (Wisconsin Lakes, PUB-FH-800 2001) The Public Service Commission established ordered water levels for the Millpond. The minimum water level was set at 97.5 feet (880.36 feet Mean Sea Level (MSL)) and the maximum at 99.0 feet (881.86 MSL). (Order No. 2-WP-868-51)

By 1948, Ken and Margaret Zerwekh were the owners of the Nemahbin Roller Mill Dam. Mrs. Zerwekh is still the owner of the dam at this time. A dam inspection report from 1980 states the power house had been "newly rebuilt", and the dam was being used to produce electricity.

On March 29, 1994, Department staff conducted an inspection of the Nemahbin Roller Mill Dam. As a result of the numerous deficiencies found during that inspection, a number of corrective measures were required of the owner. One of these items was a dam failure analysis, compiled by Rust Environment and Infrastructure, Inc. in 1998. Subsequent to review of the hydraulic and hydrologic analyses included in this report, the Department assigned a preliminary hazard rating of Class III, High Hazard. In this preliminary hazard rating, the Department required the spillway to be upgraded in compliance with Chapter NR 333.07, Wisconsin Administrative Code, by December 1, 2008. After consideration of the high cost of repairing the

dam and citing her desire to return the Bark River to a free-flowing waterway, Mrs. Zerwekh submitted a dam abandonment request to the Department on October 3, 2004.

City of Delafield officials had expressed a desire to evaluate the alternatives for retaining the Millpond. Subsequently, the City has chosen to not initiate the steps necessary to obtain the property from Mrs. Zerwekh. The City of Delafield is the current owner of the Fish Hatchery Dam, located approximately 6,000 feet upstream of the Nemahbin Roller Mill Dam. The Fish Hatchery Dam creates Nagawicka Lake, a 917 acre body of water, the majority of which is located in the city of Delafield. The City was instructed by the Department in 1997 to make repairs on this dam. An order was issued in 2006 to the City to repair the dam by September 15, 2007. The City has completed the repairs to the dam.

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

Wisconsin Statutes 31.02, 31.19
Wisconsin Administrative Code NR 102, NR 104, NR 116, NR 150, NR 195, NR 333
Waukesha County/City of Delafield Conditional Use Permit
Army Corps of Engineers Permit under Section 404 of the Clean Water Act

PROPOSED PHYSICAL CHANGES (more fully describe the proposal)

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

Removing the dam structure will result in a portion of the 12-acre Millpond being converted from a shallow pond to a terrestrial environment dominated by wetland vegetation. The resulting width of the river channel, consisting of the remaining portion of the Millpond, will be similar to upstream and downstream sections. Removal of the dam proposes to eliminate the continual concentration of sediment within the millpond that is released annually downstream during spring and high water flows. The project proposes to restore the natural fluctuations in sediment translocation to improve aquatic habitat and sediment stabilization.

The dam removal project would include a gradual draw down of the impounded water. This process will result in limiting mobilization of trapped sediment, however some movement of material is inevitable as the river channel recreates itself. After the millpond is drawn down, the exposed mudflats typically would be planted with a rapid-growing ground cover such as rye grass. This stabilization will subsequently ensure that less sediment will travel downstream upon removal of the dam structure.

The objectives of a typical dam removal/restoration project include enhancing the water quality and biotic integrity of the river (Bark River) by:

a) Restoring the original banks and bed of this portion of the Bark River
b) Eliminating the thermal impacts of the shallow Millpond
c) Restoring fish migration (passage) to upper and lower portions of the river
d) Eliminating spawning habitat for undesirable, non-native fish species such as common carp

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

The dam and Millpond have altered, homogenized, and decreased the quality of aquatic habitat within this section of the Bark River. The dam removal will allow the river to return to its natural, pre-dam state,

improving water quality, conditions for native aquatic species, aquatic habitat, and increasing biodiversity.

The dam removal process will be conducted in two stages. The first stage involves the gradual draw down of the Millpond which will allow the flow and turbidity of the water to gradually return to previous conditions. The exposed mudflats will be stabilized in order to prevent erosion and lessen the amount of sediment that could flow downstream.

The second stage involves the actual removal of the dam structure and portions of the embankment. The entire concrete and wood portion of the dam will be removed. Portions of the embankment will be removed in order to alleviate the backwater created by high flows during the 100-year flood event.

The Department has not received full engineering plans for this project. As a result, the Department evaluation of the "Manipulation of Aquatic Resources" section will need to take into account the following (this list is not all inclusive):

- Plan to stabilize approximately 52,000 cubic yards of sediment currently estimated to exist in the millpond
- Plan for drawdown rate (rate per day, total volume to be released)
- Water diversion plan
- Construction staging plan (removal of structure, embankment, stabilization of banks, etc.) and timeline
- Sediment and Erosion Control plans during removal
- Planting plan
- Site specific analysis

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

No buildings or other permanent structures will be created or destroyed as part of this project. The area in which the dam is located will be restored to natural conditions once the dam is removed.

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

No negative long-term effects from emissions or discharges are expected. During and following removal of the dam, turbidity and sediment transport typically increase due to the in-water construction and the natural restoration of the river bed. Sediment discharge from the Millpond area will increase as the stream scours through its new channel. Furthermore, rainstorm events will cause turbidity to increase during and after construction until the stream channel and flowage bed become reestablished. Sediment management practices will be in used during construction to limit sediment transport. At a future time, it is expected that the Bark River will act like a natural stream system and effectively transport sediment based on standard fluvial geomorphic principles.

Typically, air emissions, including dust and exhaust, from dam demolition equipment and activities will increase temporarily in the local area during the work period.

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

Attachment 1 County map showing the general area of the project

Attachment 2 USGS topographic map

Attachment 3 Plat map

Attachment 4 Riparian Parcel boundaries

Attachment 5 Aerial Photo of site

Attachment 6 DNR county wetlands map

Attachment 7 Zoning map

Attachment 8 List of wetland plants

Attachment 9 Sediment survey data – organic

Attachment 10 Sediment survey data – inorganic

Attachment 11 Sediment and Water Cross Section Data and Calculations

Attachment 12 DNR Fact Sheet – Basic Nomenclature of a Dam

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

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

X Literature/correspondence (specify major sources)

Correspondence contained within the WDNR Dam Safety file

X Personal Contacts (list in item 25)

Field Analysis By: ☐ Author **X** Other (list in item 25)

Past Experience with Site By: **X** Other (list in item 25)

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

The Bark River is located within the Rock River Watershed. The river originates in the Southwest ¼ of the Southwest ¼ of Section 4, Township 8 North, Range 19 East, Town of Lisbon, Waukesha County, and flows in a southwesterly direction. The Nemahbin Roller Mill Dam lies on a short stretch of the Bark River between Nagawicka Lake and Upper Nemahbin Lake. The dam elevation is 884 ft MSL and impounds the Bark River to form the approximately 12 acre shallow Millpond.

The Millpond ranges in depth from 0.5 feet to 5 feet, with the water being deepest near the dam spillway. The average depth is 1 to 2 feet. The Millpond substrate materials transition from firm sands and gravels at the eastern end to mucky, unconsolidated silts near the dam spillway. The total sediment volume contained by the Millpond is approximately 52,000 cubic yards. These figures were compiled utilizing cross sectional data collected in the summer of 2007 by the Southeast Regional Planning Commission. Eighteen transects were completed; water and sediment depth were determined at 10 to 20 points along each transect.

The soils adjacent to the Millpond are classified as Fox, Matherton, and Sebewa silt loams. On June 14th, 2006, sediment cores from three different sample locations were extracted from the accumulated sediment within the Millpond created by the Nemahbin Roller Mill Dam. Each core contained organic plant detritus

in the upper core, changing to a uniform fine silt texture in the lower portions of the cores. Sediment analysis revealed the presence of Polycyclic Aromatic Hydrocarbons (PAHs) in each core, although all at levels below the Threshold Effect Concentration (TEC). The TEC (Threshold Effect Concentration) is the level at which a contaminant first starts to negatively impact aquatic organisms. The PEC (Probable Effect Concentration) is the level at which a contaminant will almost always negatively impact aquatic organisms. Similarly, while PCBs (Polychlorinated biphenyls), DDE (Dichlorodiphenyldichloroethylene), and DDD (Dichlorodiphenyldichloroethane) were detected in core samples A. and B., each was at levels below TEC concentrations. Arsenic is present in samples A. and B. at levels higher than are typically found in the Southeast Region waterways, but below the Probable Effect Concentration (PEC). The organic and inorganic test results are listed in Attachments 9 and 10 respectively.

The qualities of the sediments within the Millpond are at levels that would not preclude active management such as dredging, capping, etc. The presence of Arsenic is of the greatest concern, as it is present in levels that are likely impacting resident aquatic macroinvertebrate populations. There is a history of herbicides containing Arsenic used on Nagawicka Lake (located upstream) to control aquatic plants. Any management activities of the millpond sediment would need to minimize sediment release downstream. These activities could, in the event of dam removal, include a slow drawdown, with on-going stabilization of exposed material; use of bio-engineering, turbidity barriers or sediment traps where appropriate; or mechanical removal. Sediment management practices will be in place during construction to minimize sediment transport downstream.

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

The quantitative analyses and observations of the Bark River and Nemahbin Roller Mill Dam Millpond that are referenced in this document were conducted by the Wisconsin DNR and SEWRPC between 1999 and 2007. The Millpond is a shallow, warm water body with limited diversity of aquatic plants and animals. The mill pond provides (list values). In 2000, SEWRPC designated approximately three-quarters of the Millpond shoreline as Primary Environmental Corridor. Environmental Corridors are defined as linear areas in the landscape containing concentrations of natural resource amenities, as well as scenic, recreational, and historic resource amenities. Much of the Millpond Environmental Corridor is dominated by Cattails (*Typhus sp.*) which form a stand wider than 50 yards along the southern edge of the Millpond. The cattails begin in standing water and gradually transition to palustrine wetlands populated with deciduous shrubs and trees. Along the northern edge of the Millpond the bank rise is steeper, containing the cattail stand in standing water.

According to the Natural Heritage Inventory Program Database, one State of Wisconsin listed endangered species, Slender Madtom (*Notorus exilis*), is located within the project area. Two species of Special Concern, Black-crowned Night Heron (*Nycticorax nycticorax*) and Glade Fern (*Diplazium pycnocarpon*) are also located within the project area. State designated threatened or special concern species found within one mile of the project area include Ellipse mussel (*Venustaconcha ellipsiformis*), Mottled Darner (*Aeshna clepsudra*), Lake Chubsucker (*Erimyzon sucetta*), Least Darter (*Etheostoma microperca*), Banded Killfish (*Fundulus diaphanous*) and Pugnose Shiner (*Notrois anogenus*). Of these species, the Slender Madtom (endangered) and the Pugnose Shiner (threatened) are both found in the Bark River system and the connecting lakes. One State of Wisconsin threatened mussel species, Ellipse (*Venustachoncha ellipsiformis*), was found both upstream and downstream of the dam. Three uncommon species were found upstream of the Nemahbin Roller Mill Dam: Creek heelsplitter (*Lasmigona compressa*), Round pigtoe (*Pleurobema sintoxia*) and Spike (*Elliptio dilatata*) Spike). Dam removal will increase the riverine, cobble-

bottomed habitat that these species require and will remove the obstruction to upstream passage of their host fish species. Temporary, low levels of silt migration will not have any lasting impact on these species.

a. Fish

Fish species observed in the Millpond in September, 2007 were primarily tolerant species including several large carp and a school of darters. In 1999, Department staff conducted a fish population assessment of the Merton Millpond, a comparable dam impoundment located on the Bark River upstream of Nagawicka Lake. The following table lists the fish species found.

Common Name	**Scientific Name**
Black Bullhead	*Ictalurus melas*
Bluntnose Minnow	*Pimephales notatus*
Brook Stickleback	*Culaea inconstans*
Central Mudminnow	*Umbra limi*
Central Stoneroller	*Campostoma anomalum*
Common Carp	*Cyprinus carpio*
Common Shiner	*Notropis cornutus*
Creek Chub	*Semotilus atromaculatus*
Fantail Darter	*Etheostoma flabellare*
Fathead Minnow	*Pimephales promelas*
Hornyhead Chub	*Nocomis biguttatus*
Largemouth Bass	*Micropterus salmoides*
Northern Pike	*Esox lucius*
Rainbow Darter	*Etheostoma caeruleum*
Rock Bass	*Ambloplites rupestris*
Slender Madtom	*Noturus exilis*
White Sucker	*Catostomus commersoni*
Yellow Bullhead	*Ictalurus natalis*
Yellow Perch	*Perca flavescens*

A fish reconnaissance on the stretch of the Bark River from Nagawicka Lake to Upper Nemahbin Lake was conducted by the University of Wisconsin – Milwaukee, and Wisconsin Lutheran College in conjunction with SEWRPC staff between 26 June, 2007 and 24 July, 2007. The reconnaissance identified the following species:

Banded Darter	*Etheostoma zonale*
Banded Killifish	*Fundulus diaphanus*
Blackstripe Topminnow	*Fundulus notatus*
Bluegill	*Lepomis macrochirus*
Bluntnose Minnow	*Pimephales notatus*
Bowfin	*Amia calva*
Brook Silverside	*Labidesthes sicculus*
Central Mudminnow	*Umbra limi*
Central Stoneroller	*Campostoma anomalum*
Common Shiner*	*Notropis cornutus*
Fantail Darter	*Etheostoma flabellare*
Golden Shiner	*Notemigonus crysoleucas*

Goldfish	*Carassius auratus*
Grass Pickerel	*Esox americanus*
Green Sunfish**	*Lepomis cyanellus*
Hornyhead Chub	*Nocomis biguttatus*
Johnny Darter	*Etheostoma nigrum*
Largemouth Bass	*Micropterus salmoides*
Largescale Stoneroller	*Campostoma oligolepis*
Least Darter	*Etheostoma microperca*
Longnose Gar*	*Lepisosteus osseus*
Northern Pike*	*Esox lucius*
Pumpkinseed*	*Lepomis gibbosus*
Rainbow Darter	*Etheostoma caeruleum*
Rock Bass*	*Ambloplites rupestris*
Sand Shiner	*Notropis stramineus*
Slender Madtom	*Noturus exilis*
Smallmouth Bass	*Micropterus dolomieu*
Spotfin Shiner	*Cyprinella spiloptera*
Weed Shiner	*Notropis texanus*
White Sucker	*Catostomus commersoni*
Yellow Bullhead*	*Ictalurus natalis*
Yellow Perch*	*Perca flavescens*

Only 24% of the total species were found within the Millpond (denoted by *).

b. Mussel Species

Two sites were sampled along the Bark River between Upper Nemahbin Lake and Nagawicka Lake. One State of Wisconsin threatened species, Ellipse (*Venustachoncha ellipsiformis*), was found in both sample sites. Three uncommon species were found upstream from the dam; *Lasmigona compressa* (Creek heelsplitter), Round pigtoe (*Pleurobema sintoxia*) and Spike (*Elliptio dilatata*). Mussel species which were found as live samples are listed below.

Site #1 – Bark River below Roller Mill Dam (sampled 13 August, 2007)

Creeper	*Strophitus undulates*
Cylinder	*Anodontoides ferrucianus*
Ellipse	*Venustachoncha ellipsiformis*
Fat Mucket	*Lampsilis siliquoidea*
Floater	*Pyganodon grandis*
Lilliput	*Carunculina parva*
Pocketbook	*Lampsilis cardium*
White heelsplitter	*Lasmigona complanata*

Site #2 – Bark River below Nagawicka Dam – August 13, 2007

Creek heelsplitter	*Lasmigona compressa*
Creeper	*Strophitus undulates*
Cylinder	*Anodontoides ferrucianus*

Ellipse	*Venustachoncha ellipsiformis*
Fat Mucket	*Lampsilis siliquoidea*
Floater	*Pyganodon grandis*
Pocketbook	*Lampsilis cardium*
Round Pigtoe	*Pleurobema sintoxia*
Spike	*Elliptio dilatata*
Wabash Pigtoe	*Fusconaia flava*

c. Wildlife

The Millpond in its existing condition provides herptile, furbearer, and waterfowl habitat. Turtles and frogs using this pond should easily adapt to a riverine system if the dam were removed. No significant adverse impact would be expected. Muskrats (*Ondatra zibethicus*) would be the primary furbearer using the pond; mink (*Mustela vison*) and otter (*Lutra canadensis*) may also be present in this area, but at very low levels. A decrease in muskrat population would be expected if the dam is removed, however there is adequate habitat nearby and healthy muskrat populations exist in the region. Waterfowl populations in the Millpond such as Canada goose (*Branta canadensis*), Mallard (*Anas platyrhynchos*) and Wood Duck (*Aix sponsa*) would be expected to decline with removal of the dam. There are limited forage and roosting sites on the pond. While waterfowl would still use the river system, an overall reduction of numbers is anticipated, but no overall adverse impact is expected due to the close proximity of other open water habitats. Wading birds such as Great Blue Heron (*Ardea herodias*) would also be expected to temporarily decline but would adapt well to the riverine system well. A naturally fluctuating river system would also provide habitat for shorebirds. Overall, no significant adverse impact to wildlife is anticipated from the removal of the dam. There is adequate habitat nearby for any displaced wildlife, and the riverine system will provide other niche habitats for a more diversified wildlife population.

d. Aquatic Plants

Aquatic plant surveys conducted by SEWRPC within the Bark River between Nagawicka Lake and Upper Nemahbin Lake in August 2000 identified the following plant species:

Common Name	**Scientific Name**
Eurasian Water Milfoil	*Myriophyllum spicatum*
Coontail	*Ceratophyllum demersum*
Flatstem pondweed	*Potamogeton zosteriformus*
Common Water-weed	*Elodea Canadensis*
Curly leaf pondweed	*Potomogeton crispus*
Water Crowfoot	*Ranunculus sp.*
Water Celery	*Vallisneria Americana*
Milfoil species	*Myriophyllum sp.*
Sago pondweed	*Stuckenia pectinata*
Musk grass	*Chara vulgaris*
Yellow water lily	*Nuphar variegata*
White water lily	*Nymphaea tuberosa*

Within the Millpond, aquatic plant diversity was determined to be low to moderate. Downstream of the dam, plant diversity in the river increased as it approached Upper Nemahbin Lake, especially along the river banks. A plant reconnaissance survey conducted on the Millpond by WDNR in September 2007 identified the following plants in addition to the species listed by the SEWRPC study:

Common Name	Scientific Name
Water star grass	*Zostarella dubia*
Slender naiad	*Najas flexilis*

e. Wetlands

Between Nagawicka Lake and Upper Nemahbin Lake the Bark River is a slow moving, low gradient meandering stream through emergent and wet meadow wetland complexes. According to the Wisconsin Wetland inventory classification system, the wetland areas adjacent to the Millpond were classified as broadleaf persistent wet meadow and non-persistent wet meadow. An inventory of the area conducted in 2000 identified three dominant wetland communities surrounding the Millpond; broadleaf deciduous forest/deciduous shrub, deep/shallow marsh, and deep/shallow marsh and wet meadow. Much of the wetland area adjacent to the river above the Millpond is also classified as broadleaf persistent wet meadow, while downstream of the dam lie two small islands that are broadleaf deciduous forest/deciduous shrub palustrine wetlands. The area along the dam embankment is not classified as wetland.

Wetland functional values throughout the immediate Millpond fringe wetlands suggest a low functional value rating for floral diversity, fishery habitat, flood attenuation, shoreline protection and groundwater discharge. These wetlands provide a moderate functional value for wildlife habitat and water quality protection.

f. Wetland Plants

Surveys conducted by SEWRPC in 2000 and 2003, found that the dominant species in the areas adjacent to the millpond to be cattails (*Typha sp.)* and purple loosestrife (*Lythrum salicaria).* A complete list of plants found in the wetlands surrounding the Millpond is detailed in Attachment 8.

12. Cultural Environment

a. Land use (dominant features and uses including zoning if applicable)

The 2010 recommended land use plan prepared by SEWRPC allocates three zoning types for the areas adjacent to the Nemahbin Roller Mill Dam. Approximately 2700 ft of dam frontage was zoned Primary Environmental Corridor, 1100ft was zoned Low-Density Residential, and 300 ft was zoned Medium-Density Residential. The eastern section of the Primary Environmental Corridor forms the western edge of Cushing Memorial Park. These zoning allocations have been adopted by the City of Delafield.

b. Social/Economic (including ethnic and cultural groups)

The Roller Mill Dam was originally constructed in 1842 to power a saw mill, and later a feed and flour mill. In the mid-1970s, electrical power generation was added and ran continuously except in times of inadequate flow or when the structure was being repaired or maintained. Generation of electricity was ceased in the late 1990s and the turbine and penstock was abandoned and removed in 2006. It is possible that some of the properties which currently abut the Millpond will not be immediately adjacent to the new river channel formed after removal of the dam. Recreation opportunities are expected to change from flat water paddling to a riverine paddling system.

c. Archaeological/Historical

According to Mark Dudzik, DNR Archaeologist, no significant historical or archeological sites are known to exist in the project area.

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

Kettle Moraine State Forest—Lapham Peak Unit, and Lower Nemahbin State Natural Area are within a one mile buffer of the project area. The Ice Age Trail passes within a quarter mile to the east of the millpond.

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

14. Physical (include visual if applicable)

The drawdown of the Millpond for dam removal will result in the exposure of approximately 12 acres of substrate. An undetermined amount of this exposed area will become the restored river channel. The sand and cobbles of the natural river bed will constitute most of the exposed area, however there are areas closer to the dam structure that contain deep, silty sediments. These soil materials will require seeding and may need to be mechanically stabilized after drawdown to minimize the transport of sediment downstream after the dam removal is complete. Once the exposed soils have dewatered and become vegetated, they should not be a source of noxious odors.

The scour of anoxic sediment increases the potential for toxic un-ionized ammonia releases during drawdown. Completing the drawdown during the spring/early summer and fall of the year can minimize the potential for toxic effects. Cool water temperatures and lower water pH will mitigate the effects of un-ionized ammonia.

Removal of the dam and the resulting Millpond will restore an approximately 0.5 mile long, free-flowing reach of the Bark River. Average water depths will decrease within the Millpond and millrace. Following dam removal, water depths will likely mimic water depths that currently exist upstream and downstream of the dam. Water velocities will increase after the free-flowing river channel is restored due to a narrower channel and restored historical hydraulic gradient. The elevation of the millpond is approximately 10 feet higher than that of the Bark River just downstream of the dam. The construction plans will need to address the elevation differences to prevent erosion and to enhance fish passage.

The wetlands adjacent to the pond are identified as a broadleaf persistent wet meadow and non-persistent wet meadow with moderate functional values. After dam removal it is anticipated that the former impoundment wetland areas will revert to similar broadleaf persistent wet meadow.

Negative impacts to downstream water quality will be minimized due to the drawdown and stabilization of sediments prior to dam removal. Once the area is stable, water quality is expected to increase. Higher dissolved oxygen levels and lower algal levels will encourage the expansion of native aquatic plant and animal communities.

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

The transition from Millpond to river channel will have a variety of biological impacts on the impounded area, as well as the upstream and downstream reaches of the Bark River. Currently, the Millpond supports vegetation and wildlife that is associated with shallow aquatic environments, including turtles, warmwater

fish species, and exotic invasive plant species. A gradual drawdown of the dam over spring/summer will allow the migration of amphibians and turtles, and avoid the stranding of mussel species. A mussel and fish relocation may be needed for animals stranded in isolated pools of water during the drawdown.

The potential for aquatic plants and algae to reach nuisance levels will be reduced by removal of the dam and impounded water. The impoundment of water creates a thermal impact to the Bark River. The removal of the dam will eliminate the warming of the impounded water. The ecosystem that is currently supported by the Millpond will change significantly when the river channel is restored. A faster, continuously flowing stream will allow fish migration and colder water will encourage a greater diversity of fish species. Faster flow will also extend and gradually restore the gravelly or sandy substrate favored by the majority of mussel species and lithophilic (fish that spawn on gravel and small stones) fish species for spawning.

The wetlands adjacent to the pond are identified as a broadleaf persistent wet meadow and non-persistent wet meadow with moderate functional values. After dam removal it is anticipated that the former impoundment wetland areas will revert to similar broadleaf persistent wet meadow

Biological impacts due to this project can be better assessed once the Department receives full engineering plans from the applicant as described previously in sections 1 and 5.

16. Cultural

a. Land Use (including indirect and secondary impacts)

Removal of the dam and will expose approximately 12 acres of land. The 12 acres of exposed land that was under water with the former impoundment consists of accumulated soft organic sediment. Over time this sediment will be capable of supporting wetland plant species and be converted from former open water to a riverine wetland complex. According to the Waukesha County Register of Deeds Office most of the parcels are established through meets and bounds descriptions. The majority of the newly exposed land will continue to be under the ownership of Mrs. Zerwekh and the City of Delafield as per the original subdivision plat and certified survey maps obtained through the Deeds office. The quantity of exposed land gained by all owners will be dictated by those records however, no property owner will lose any land as a result of removing the dam. Due to the nature of the sediments, the likelihood of wetland characteristics, and the existence of floodplain it is unlikely that any land gained will be suitable for development. Future development will be governed by the City of Delafield's Zoning Ordinance and any necessary analyses will be the responsibility of the land owner and developer.

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

There are no expected consequences or impacts to any ethnic or cultural groups or social impacts resulting from the removal of the dam. The Department of Natural Resources has not conducted any studies regarding economic impacts with dam removal projects.

c. Archaeological/Historical

According to WDNR Archaeologist Mark Dudzik, there are no known archaeological or historical impacts that will result from removal of the dam.

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

There are no special resources in the general area of the Millpond that should be affected by dam removal activities. Lapham Peak State Forest, Lower Nemahbin State Natural Area, and the Ice Age Trail are all within a one-mile radius of the dam.

18. Summary of Adverse Impacts That Cannot Be Avoided (more fully discussed in 14 through 17)

Negative impacts that cannot be avoided include temporary noise and emissions from earthmoving equipment, and temporarily high turbidity around the dam and downstream areas associated with dam removal activities. Fish and wildlife may be temporarily displaced. Suitable habitat for fish and mussel species downstream from the dam removal may experience temporary or permanent sedimentation from dam removal. Non-vegetated areas of sediment will be exposed prior to seeding, planting, and sediment stabilizing activities. Positive impacts will be reflected in the improvement of water quality and aquatic habitat over time, as the barrier to migrating and spawning fish will be removed and a free-flowing stream restored. It is expected that the long-term benefits of removing the high-hazard, structurally unsound dam will outweigh the temporary inconveniences and negative impacts.

DNR EVALUATION OF PROJECT SIGNIFICANCE (complete each item)

19. 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.

There exists a possibility that isolated communities of aquatic organisms and fish species are present in the impoundment. Populations of the same species and individual species populations have been physically segregated for a substantial length of time. This means that small populations of fish communities exist that have not intermingled or bred with larger populations. The extent to which such fragmentation has developed is dependent upon many factors, such as mobility of species, reproductive capacities and habits, life-span etc. The removal of the Nemahbin Roller Mill dam should allow these fragmented populations to freely migrate and reproduce. The segmentation of the populations will be effectively ended, allowing them a greater range in which to feed, nest, breed, and seek shelter. Removal of the dam will open additional riverine habitat to fish and other aquatic life species that have been isolated downstream of the dam.

Reductions in sedimentation will cause improvements in the quality of physical habitat and convert the substrate back to its natural condition of a sand and cobble stream bottom. Most benthic invertebrates require this rocky substrate. These invertebrates are an important food source for fish. Many fish species also prefer these rocky bottom conditions for spawning and feeding. Native species and most sport fish exhibit lowered vitality and productivity under the stresses of increased turbidity, lowered water quality, and scarcity of suitable habitat. Other, generalist types of species, such as carp, are unaffected or actually flourish despite these adverse effects and often dominate the fish community in impoundments.

The removal of the Nemahbin Roller Mill dam will improve dissolved oxygen levels and decrease the water temperature in this reach of the Bark River. The removal will also eliminate the artificial warming caused by the impoundment. These effects should have positive impacts on fish and aquatic life.

Following the permanent drawdown and removal of the dam, the former aesthetics of the Millpond would

be lost and replaced with a meandering, free-flowing creek. This would be similar to what existed under pre-development conditions and what currently exists upstream and downstream of the Nemahbin Roller Mill Dam and Millpond.

Any adverse impacts associated with this project are expected to be short-term only. These adverse impacts include turbidity in the waterway, soil disturbance and human activity near the dam site. These adverse impacts will be only those which are unavoidable and occur despite control measures. Unavoidable turbidity effects will precede the spawning period when fish are most vulnerable. There should be no significant impacts in terms of temperature.

Short-term adverse impacts associated with the conversion of the Millpond into a free-flowing stream may affect wildlife which currently use the pond, including ducks, herons, turtles and frogs, muskrats, and raccoon. There are substantial areas of wetland adjacent to the project area along the Bark River that will provide adequate habitat for wildlife displaced from the Millpond during dam removal. The adverse impacts may affect some individuals, but will have no significant long-term impact on the overall numbers, the reproductive capability, or the success and stability of the species or regional populations as a whole.

Long-term effects on the riparian and aquatic system should be highly beneficial. Improvements will occur in physical characteristics, which in turn will create ecological and biological benefits. The Millpond will revert back to a natural sandy-cobble substrate characteristic of the Bark River, providing additional habitat for riverine forms of aquatic life.

20. Significance of Cumulative Effects

The cumulative impacts of similar projects have shown to have increasingly beneficial effects on aquatic habitat. The adverse environmental impacts associated with dams and impoundments are well documented in literature regarding riparian systems. Selective dam removal has been proposed as a cost-effective and technically feasible means of restoring river ecosystems in southeastern Wisconsin. Dams have been constructed across Wisconsin waterways to serve a variety of purposes, including generation of hydraulic power, flood control, and the creation of an impoundment for recreational use.

According to the WDNR Dam Safety Section there are approximately 3,800 dams in the state. The Dam Safety Section reviews the condition of dams throughout the State in the interests of public safety, navigability and flood control issues. Many of these dams were put in place over a century ago as a source of energy for a variety of uses and have become obsolete with the development of wide-scale provisions of electric power. Many obsolete dams are no longer providing any benefit and basically serve no useful purpose. In most cases, these neglected and deteriorated dams are hazards to safety, are obstructions to navigation and fish migration and create adverse environmental impacts.

Dam removal projects are underway at many locations across the country. Repeated actions of this type have been found to restore river systems to healthy ecosystems.

21. Significance of Risk

There are some unknowns that create uncertainty in predicting the effects on the surrounding environment with a dam removal. It is possible that a substantial amount of sediment will scour upon removal of the dam, and be carried downstream, settling along bends, within pools, and in the floodplain in times of higher flows. The draw down process will aid in stabilizing the sediment in the Millpond by allowing vegetation to take root. During a typical removal, Best Management Practices for erosion control and turbidity are used

to minimize impacts of sediment transport downstream.

Typical construction projects require work site inspections at the close of each working day in which the functionality and integrity of all erosion and flow control devices are verified and repaired as necessary. These inspections are also conducted when rainfall exceeds ½-inch. The draw down of the Millpond will mitigate the effects of exposed soils and runoff by allowing vegetation from existing seed bank to establish itself. Areas exposed by dam removal activities will be seeded to further minimize runoff, erosion, and transport of these materials downstream.

Typically pre-construction meetings for dam removal projects are held with potential property owners, local residents, county and city officials, and local emergency officials, as appropriate.

22. Significance of Precedent

This project does not set any precedent or hold the potential to influence any future WDNR actions or decisions. Water regulation decisions are made on a case-by-case basis, and this decision will not impact future projects.

23. 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.

Property owners with frontage on the Millpond and along the millrace will be directly impacted as a result of the conversion from a quiescent pool of water to a free flowing river. Wetland environments are likely to replace former impounded areas.

ALTERNATIVES

24. 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.)

No Action – Leaving the dam in place and allowing it to deteriorate due to the effects of river action, weathering and erosion, and freeze and thaw cycle. The dam would not be upgraded to meet DNR Code requirements. This is neither a technically or environmentally sound, nor a legally acceptable alternative. The dam and supporting infrastructure is structurally unsound and presents a safety hazard to human health and property and the environment should it fail. Sediments from the Millpond would continue to breach the dam during times of high flow, adding to the downstream accumulations at the mouth of the Bark River from previous dam failures. The dam would be out of compliance with NR 333.07, Wisconsin Administrative Code.

Ultimately, dam failure would occur as an uncontrolled and catastrophic event, releasing downstream a wall of flood water, structural debris and sediment. Ultimately, this alternative would result in the greatest negative environmental and socio-economic impacts when compared to other alternatives.

Reconstruct the dam – Four alternative spillway systems were considered in the "Rehabilitation Feasibility

Report" prepared by Mead & Hunt for the Roller Mill Dam. The estimated costs for reconstruction ranged from $672,000 to $854,466. The owner of the Roller Mill Dam has determined that reconstructing the dam is not economically feasible at this point in time and reconstructing the dam would not provide the environmental benefits associated with dam abandonment as previously discussed. The owner would also have to take on the long-term cost of maintaining the dam.

Declare the dam abandoned and remove – Proposed action.

Modify the dam – There is no cost-effective modification to the dam that would meet the State requirements for maintenance of this dam other than total reconstruction.

SUMMARY OF ISSUE IDENTIFICATION ACTIVITIES

25. 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
08/02/2007	Sue Beyler – Inland Fisheries Team Supervisor, Southeast Region, WDNR	Provided fish survey data for the Bark River
04/25/2007	Craig Helker - Water Resources Management Specialist, WDNR	Conducted sediment survey on the Nemahbin Roller Mill Dam Millpond
09/17/2007	Mark Dudzik – Archaeologist, WDNR	Assessed historical and archaeological impacts of dam removal at Nemahbin Roller Mill Dam
10/29/2007	Thomas Slawski – Principal Planner, SEWRPC	Provided mapping and sediment, fish and mussel data from the Nemahbin Roller Mill Dam Millpond
11/01/2007	William Wawrzyn – Fisheries Biologist, WDNR	Provided input on sediment management, fish and mussel communities for the Bark River and the Nemahbin Roller Mill Dam Millpond
11/27/2007	Brian Glenzinski – Wildlife Biologist, WDNR	Provided an assessment of wildlife habitat adjacent to the Roller Mill Dam Millpond
09/13/2007	Heidi Bunk – Lakes Biologist, WDNR	Provided field assessment of Nemahbin Roller Mill Dam Millpond and Bark River, and sediment depth analysis

04/25/2007	Steve Galarneau – Lake Michigan Program Coordinator, WDNR	Conducted sediment survey on the Nemahbin Roller Mill Dam Millpond
ongoing	Michelle Schneider – Water Management Engineer, WDNR	Inspected Nemahbin Roller Mill Dam. Provided technical dam engineering content
ongoing	Brent Binder – Water Management Engineer, WDNR	Inspected Nemahbin Roller Mill Dam. Provided technical dam engineering content
ongoing	Bill Sturtevant – Dam Safety Engineer, WDNR	Inspected Nemahbin Roller Mill Dam
ongoing	Zoe McManama – Water Resources Specialist, WDNR	Field work participant, data analyst, and document collator.

Project Name: Nemahbin Roller Mill Dam Abandonment County: Waukesha

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.