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
Northern – Spooner
Type List Designation
NR 150.03(8)(f) 2.a. and 9.a.

Note: this is not the final signed version, but is very close to the final.

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., Monday, February 25, 2002.

Contact Person:
Amy Cronk

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Telephone Number
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Applicant: **City of Shell Lake**

Address: **501 First Street**
Shell Lake, WI 54871

Title of Proposal: **Diversion of Water from Shell Lake to the Yellow River**

Location: County: **Washburn** City/Town/Village: **City of Shell Lake, Town of Bashaw**

Township Range Section(s):

Intake Location: SW¼ NE¼ Section 25, T38N-R13W, City of Shell Lake
Outlet Location: SE¼ NW¼ Section 11, T38N-R13W, Town of Bashaw

PROJECT SUMMARY

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

The City of Shell Lake has applied to the Department of Natural Resources for a permit to divert water from Shell Lake to the Yellow River in order to control high water levels (see Attachment 1 – plat map of the project area). The application requests approval to divert up to 20 cubic feet per second (cfs), which is approximately equal to 9000 gallons per minute or 13 million gallons per day. The City proposes construction of a 4.4-mile buried pipeline from the northwest corner of the lake to the Yellow River (south and west of Spooner). Permit applications have also been received for construction of inlet and outlet structures in the beds of these navigable waters, water diversion, and for grading associated with construction.

This proposal is intended to alleviate high water conditions in Shell Lake. This pipeline would be used to move water from Shell Lake (hereafter "the lake") to the Yellow River (hereafter "the river") to maintain the lake level at 1221.0 feet mean sea level (MSL), plus or minus 0.8 feet (9.6 inches). This level maintains the ordinary high water level of 1221.8 feet (set at an administrative hearing in 1994) and allows a little freeboard as well. Water could also be diverted if a significant volume of snowmelt is anticipated. The City would not divert water during periods of high flow in the Yellow River or if the lake level drops below 1220.2 feet.

The proposed route for the pipe is shown on the map included as Attachment 2. From the northwest corner of the lake, the pipe would run generally northwest to the Yellow River. The outlet location in the river is approximately 0.6 stream miles above the mouth of Sawyer Creek.

The estimated project cost is $1.4 million to be covered through a special assessment on all lakeshore property owners ($11.56 per foot of lake frontage). In November 2001, the City also received a federal grant of $750,000 toward the project. Another source of public funds that may be used for the diversion project is a grant to the City from the Federal Emergency Management Agency (FEMA) under their Hazard Mitigation Grant Program (discussed in more detail under item 2).

In addition to past actions described in item 2 below, Department staff have met with the City's Lake Level Committee and worked with their consultants to evaluate options and develop this assessment. The City submitted applications for grading, water diversion, and structures on the bed of navigable waters. A legal notice for these permits was published in the *Washburn County Register* and the *Spooner Advocate* on August 23, 2001. Department staff have reviewed submittals on the project route, and performed field inspections of the affected areas to gather information for permit review and preparation of this Environmental Assessment.

Throughout this document, the flow rates and water levels to be maintained using the diversion structure have been proposed by the City in their permit application submittals. However, the final operating ranges would be set by the Department (as conditions in the permits) and could be different from the originally proposed lake levels and flow rates.

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

High water levels in Shell Lake in recent years have prompted action by the City to request permits to divert water to other water bodies and control the lake level. A Regional Flood Elevation of 1226 feet MSL was set in 2001. According to City records, there are 365 homes built on the lakeshore. Eighty-six homes have first floor level elevations of 1226 MSL or less. Another 103 homes have the lowest adjacent grade level elevations of 1226 MSL or less. Likewise, many of the properties have lakefront areas inundated by water that were previously dry shore or lawn areas. Action needs to be taken at this point to protect the structures (see discussion of alternatives in item 25 below).

Lake level records have been kept since the mid-1930's. Attachment 3 shows a graph of the level recorded annually from approximately 1936 to 2001 (no record exists of whether this annual reading is a maximum, minimum, or random-day level recording until 1983). The graph of recorded levels shows a steady climb in lake stage. Low stages in the cycle appear to occur approximately every 15 years. Since the mid-1960s, both the low and high points in the cycle have been at higher levels than previously recorded. A table of historic water levels is provided in Attachment 4. Details of past recorded and anecdotal levels are given in the discussion below.

History of Water Level Fluctuations: Shell Lake is the largest land-locked lake in the state of Wisconsin. When the lake is at an elevation of 1220.61 mean sea level (MSL), it is 2,580 acres in size (2,588.6 including islands) with a maximum depth of about 36 feet. The lake has several small inlet streams, but there is no surface water outlet to a stream or river. The only way for the lake to lose water is through normal evaporation and groundwater seepage. A 1982 study by the Department determined the water loading to Shell Lake consists of three basic sources: direct precipitation (58%); runoff from inlet streams, diversion ditch, urban areas, and rest of watershed (29%); and groundwater discharge (13%). A study completed by the United States Geological Survey in 1999 confirmed that the lake receives water primarily from precipitation and runoff.

Shell Lake has a history of severe water level fluctuations. At the time of the first government land survey in 1855 and for the first 70 years of white settlement, Shell Lake was a much larger water body than exists today. Between 1917 and 1936 the lake level dropped 13 feet. Anecdotal reports suggest the lowest stage occurred in 1933 but no official recording was made of it.

The Inland Lake Protection District recently developed a draft lake management plan (June 2000, FINAL DRAFT) that contains a good summary of historic water levels which reads as follows: "Data preceding 1949 are scarce, however local history writers indicated very high water existed between 1882 and 1911. An 1852 atlas shows "Shell River" draining from the lake at the WNW corner. In 1885, the sawmill dug a channel through the area that is now Highway 63 in order to drain water off the mill floor. Other reports indicate that what is now "Tiptown" was an island and that Scout Island was merely a few rocks sticking out of the water. Additionally, the report states that Rolph's Point was three small islands. Another account commented that strong east winds caused waves to blow water onto the railroad depot platform. Other historical records indicate that the lake has been as high as 1232.5 feet above mean sea level (MSL) in 1882, and that high levels persisted until around 1911. Over the next 39 years, the lake level declined nearly 18 feet. In 1936, when continuous lake level monitoring started, the lake level was 1216.5

feet MSL. Townspeople feared that the lake was too low at this level and used dynamite to blast a channel to bring water from the Welsh Lake area southwest of town."

"In 1942 Washburn County and the Village of Shell Lake diverted water from the Clam River basin to Shell Lake under a permit from the Public Service Commission. This diversion has been at least partially blocked with an earthen plug."

The draft lake management plan goes on to summarize more current water level fluctuations as follows: "Since 1949 the level of Shell Lake has fluctuated between 1214.96 feet MSL and 1222.69 feet MSL – a total difference of approximately 9 feet. Two key factors cause these large fluctuations: variation in precipitation and changes in vegetation within the watershed. Rainfall of 9.14 inches during May and June of 1996 brought Shell Lake to 1222.69 feet MSL, its highest level since 1900. Similar high water levels occurred in 1986 when July precipitation totaled 9.59 inches. In 1999 water levels fluctuated between 1220.68 and 1221.78 feet MSL."

Since this draft lake management plan was written, water levels have continued to rise on Shell Lake over the last two years. For 2000, the lowest lake level was recorded in early April at 1220.71 feet MSL and continued to rise slowly over the next several months to a high in mid-August of 1221.87 feet MSL. For the remainder of the summer and fall, the lake slowly dropped in elevation until freeze-up. The last open water elevation taken in early November was recorded as 1221.27 feet MSL. The first elevation taken in 2001 during early ice-out in mid-April was recorded as 1222.53 feet MSL. With the completion of ice-out and ongoing early spring rains, the lake continued to rise above 1223 feet MSL through May and early June. *The highest water level in 2001 was recorded on June 19th at 1223.54 feet MSL. This set a new modern-day high record elevation for Shell Lake.* The lowest water level for 2001 was recorded on November 18th at 1222.14 feet MSL that resulted from a very dry period during late summer and fall.

The City of Shell Lake has engaged in a number of projects over the last 15 years to address high water levels. In the early 1980's the City developed preliminary design concepts for a gravity/siphon project to divert water from the lake into Sawyer Creek, but this work was never finished. When water levels began to rise in the spring of 1986, the City revived the siphon project and began to work with the Department on specific design parameters. At this same time, the City also pursued assistance through a multi-phase program with the U.S. Army Corps of Engineers to study potential options for lake level control. In the fall of 1986, the City blocked off a section of the diversion ditch by installing an earthen plug to reduce the amount of runoff reaching the lake.

The Corps' Phase I study report was provided to the City in early 1987. That report identified creation of an outlet from the lake to either Sawyer Creek or the Clam River as the best two options. The City subsequently agreed to fund Phase II of this project which included a reconnaissance study and test pumping project to determine what discharge rates could be allowed. The City completed the test pumping project and continued to facilitate discussions between the Department and Corps regarding acceptable discharge rates for the remainder of 1987. Water levels dropped to around 1220 feet MSL in the fall of 1987, which were about two feet lower than in the fall of 1986.

The Corps provided their Reconnaissance Report (Phase II) in March of 1988 which concluded that any appreciable rise in water levels above the high recorded in 1986 (near 1222 feet MSL) could result in catastrophic losses to existing developments around the lake. The report went on to recommend that the City agree to fund the next study phase that would include a specific design and cost estimates. Water levels on the lake continued to drop in 1988 another foot to around 1219 feet MSL. With reduced water levels, the City decided to not continue with the next phase of the Corps' assistance program or the siphon project.

Water levels on Shell Lake remained about the same in 1989 and dropped even lower in 1990 to around 1218 feet MSL. With increased winter runoff and rains, the lake elevation rose to around 1220 feet MSL in 1991 and remained relatively the same through 1994. Water levels increased another foot in 1995 (1221 feet MSL) and again in 1996 to around 1222 feet MSL. Water levels remained around 1222 feet MSL in 1997 as well. In response to increased water elevations during 1996, the City appointed an ad hoc Lake Level Committee in early 1997 to again study and recommend potential solutions to the rising water level problems. This ad hoc committee studied a number of options throughout 1997, including the previous siphon discharge to Sawyer Creek. In late 1997, the committee recommended the City contract with the U.S. Geological Survey (USGS) to complete a hydrologic budget study which was approved by the City Council. This study began in early 1998 and was designed to gain a better understanding of the hydrology of the lake and possible long-term effects of withdrawing lake water.

A trial discharge to Sawyer Creek was performed in 1997 from February 19 to May 8 (79 days). Water was pumped from the lake (at the city park) to a storm sewer manhole tributary to the storm sewer outlet near the old high school. The flow rate of the diverted water was 3 cubic feet per second (cfs), resulting in 169 million gallons being removed from the lake. Department staff

monitored the stream conditions during the diversion and identified numerous factors affecting the stream (temperature fluctuation, scouring, food source modification, and discharge velocity).

The City Council decided to proceed with an application to the Department for the siphon project to divert water to Sawyer Creek in early 1998. The public review process for this permit application resulted in a contested case hearing that took place in the summer of 1999. The administrative law judge hearing this case subsequently denied the permit application for a siphon discharge to Sawyer Creek in May, 2000, because of potential ecological and environmental impacts to the stream.

Following the permit application decision, the ad hoc Lake Level Committee met with Department staff several times in the summer of 2000, to clarify resource concerns and explore other possible discharge options. As a result of those meetings, the committee began to review several options that would discharge water to the Yellow River.

The final USGS study report was provided in early 2000. The conclusions in the report emphasized a strong, direct correlation between direct precipitation/runoff and lake levels. Conclusions from the study indicated that groundwater inflow and discharge do not have significant, direct effects on lake surface elevations. The study report also concluded that withdrawing lake water during high stage elevations would have the effect of depressing lake levels further during low stage elevations (i.e. lower lows than normal).

In the fall of 2000, the Lake Level Committee began gathering additional information on the elevations of structures around the lake. This information was subsequently used to develop a grant application to the Federal Emergency Management Agency (FEMA) under their Hazard Mitigation Grant Program for money to address ongoing threats on structures around the lake from the continuing rise in water levels. The City was recently awarded conditional approval for this matching grant (75% federally funded) and is currently working with FEMA staff on additional reviews necessary to receive final approval. The total amount of the grant including state and local contributions is $169,560. This grant money provides enough resources to move or floodproof three structures on the lake.

In the spring of 2001, heavy snowmelt and rain created significant flooding threats to a number of homes around the lake. The City made an emergency request to the Department and received approval to temporarily pump lake water to a low depression just northwest of the lake. From ongoing discussions with the Department and further investigation since the summer of 2000, the City developed the current proposal to create a gravity/siphon discharge to the Yellow River.

Summary of Historic Lake Levels (from discussion above):

- Highest recent recorded level: 1223.54 feet MSL on June 19, 2001
- Highest historic anecdotal level: 1232.5 feet MSL in 1882
- Lowest recorded level: 1214.69 feet MSL in 1949
- Ice ridge water level evidence on shoreline: 1226 feet MSL.

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

Wisconsin DNR:

- Wisconsin State Statutes Chapter 30:
  - 30.12 Structures on the bed of navigable waters (Shell Lake and the Yellow River)
  - 30.19 Connection of a lake to another water body
  - 30.18 Diversion of greater than 2 million gallons of water per day
  - 30.19 Grading on the bank of a navigable water body
- Wisconsin Administrative Code NR 103 Wetland Practicable Alternatives Analysis
- Wisconsin Administrative Code NR 299 Water Quality Certification
- Wisconsin Administrative Code NR 216 Stormwater construction site permit
- Wisconsin State Statutes Chapter 283: Wisconsin Pollutant Discharge Elimination System for construction site dewatering

Other:

- Applicable easements from landowners for pipe crossings
- 36 CFR Part 800 - Archaeological Survey
- State (Wisconsin Department of Transportation) and county permits for utility crossings of highways

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

Excavation for the 4.4-mile pipeline is proposed to begin on the bed of Shell Lake in the vicinity of North Lake Drive and CTH "B" (see map in Attachment 2). The proposed route is to run under USH 63, then north of the City's wastewater treatment system to New Knapp Road. The pipeline would be installed under and alongside this road (in a northerly direction including directional boring beneath a branch of Sawyer Creek) to the intersection with Tozer Lake Road. From there it would run north and west diagonally (through cropland) along the east side of Sawyer Creek to Sawyer Creek Road. It would then go north along Sawyer Creek Road and finally cross private cropland and forestland until it reaches the Yellow River discharge location. In addition to installation along road or road right-of-ways, the pipeline is proposed to transverse 7,265 linear feet of agricultural land, 3,930 feet of woodland, and 330 feet of old field.

Manipulation of the landscape would involve excavation of a trench for the pipe, tree and brush removal along the corridor as needed, refilling and smoothing of the disturbed surface after pipe installation, and seeding the disturbed ground. The pipe specified in the project application would be 30 inches in diameter. The pipe would be buried along the route from 4 feet to 30 feet deep, depending on the topography. The excavated width of the pipe trench would be up to 20 feet wide, depending on the depth of installation. At the minimum pipe depth (4 feet from the ground surface down to the *top* of the pipe), the trench would be 10 feet wide with a 15-foot wide area of disturbed ground. Construction boxes would be utilized for safety purposes and to reduce the amount of material to be excavated. The pipe corridor would generally be 20 feet wide and maintained free of woody vegetation for access and maintenance purposes. The piping design includes pressure relief valves and drain points for clearing the pipe after each diversion period is completed. The system is designed as a siphon from the lake and then gravity flow to the river. The pipeline would terminate at a spring-fed backwater of the Yellow River. Manipulation of the riparian area at this location is covered in the next section.

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

Manipulation of aquatic resources would occur in several areas during this project: the overall lake level of Shell Lake, the water intake structure in Shell Lake, streams and wetlands along the route, and the outlet structure near the Yellow River.

Lake Level and Flows: The proposed diversion system is primarily intended to keep lake levels from exceeding 1221.0 feet MSL (plus or minus 0.8 feet). The project should substantially minimize, but not eliminate, the chance of water levels exceeding 1221.8 feet. Lake levels could rise above these elevations because the volume that could be diverted is limited to 20 cfs, and there would be times when conditions on the Yellow River would not allow diversions to occur.

Major runoff waters would be stored in the lake until the effects of the runoff event on the Yellow River have passed. Once the river elevation has gone down, the excess Shell Lake water could be diverted without aggravating flood conditions on the river. In theory, at the 20 cfs maximum flow rate, it would take about 65 days to remove the equivalent of one foot of stored water from the lake (assuming there are no other water inputs to, or outputs from, the lake). In reality, it could take considerably longer, because of the volume of groundwater and rainwater entering the lake.

Intake Structure in Shell Lake: The proposal calls for a pipe to be laid on the bed of Shell Lake (see the diagram in Attachment 5). Three, 24-inch perforated pipes would be joined onto one 30-inch storm pipe and placed at 1215 feet elevation (6 feet below a lake elevation of 1221 feet). The perforations in the intake pipe are planned to be one-quarter inch or smaller. Concrete collars would be attached to this structure to anchor the pipe network to the bed of the lake. The 30-inch pipe would lead back 280 feet to the lakeshore. From the shore, the pipe would be buried and run 300 feet to a control structure. Excavation and grading would be required at the shoreline for pipeline placement.

Sawyer Creek, Wetlands, and Feeder Streams Along the Pipe Route: A tributary stream of Sawyer Creek would be crossed as it passes under New Knapp Road. The tributary stream flows through a culvert at this point. The culvert would be left in place while the pipe is laid under the existing culvert. Excavation would also take place adjacent to Sawyer Creek on the Schlapper property. That excavation would occur 400 feet plus from the stream with erosion control measures installed prior to opening the excavation. The disturbed soil along this area would be reseeded to cropland after construction.

Outlet to the Yellow River: Another area where aquatic resources would be manipulated is at the discharge area on the banks of the Yellow River and the associated spring-fed backwater (see the map of this area in Attachment 6). Work that is necessary in this riparian area (which includes wetlands and riparian wooded buffer) would include installation of the end pipe, apron endwall

and rock riprap Associated work would include: trenching for the pipe, tree removal, soil displacement and fill associated with the rock riprap.

The diversion pipe is designed to terminate on the bank in an enlarged pipe section on a concrete apron. The water would flow through a metal grating and onto an open, rock-riprap channel (see Attachment 7).. The estimated velocity would be 5 feet per second (fps) at the end of the pipe, and reduced to 1.4 fps at the end of the rock channel. From there, it is proposed that the diversion water would enter the spring-fed backwater area, and then flow into the main channel of the river.

No excavation or removal of bed material is proposed in the either the lake or the river. At the start-up of a diversion, the flow would be started gradually and increased slowly to minimize scouring and displacement of solids. Diversion flows are planned for up to 20 cfs, although the piping design would accommodate a maximum flow of 41 cfs.

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

At the lake end, intake piping would be laid on and anchored to the bed of Shell Lake. A control structure (housing valves and monitoring equipment) would be installed on private land, approximately 300 feet back from the shoreline (see Attachment 5). This structure would be a maximum size of 10 feet square, and terminate above ground. Two telescopic valves in this control box would regulate the volume of water diverted. These valves would be constructed to be protected from vandalism.

Just over two linear miles of the 4.4 miles of pipe placement would be alongside or underneath town roads. Road crossings and one stream crossing would be accomplished through directional drilling. Removed road signs and roadbed material would be stock piled and replaced after pipe installation. There would be two areas (USH 63 and CTH “B”) where the pipeline would be bored under the road.

At the Yellow River, a concrete apron would be placed at the discharge end of the pipe, along with a riprapped channel (as described in item 5 above).

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

Water is proposed to be diverted from the lake to the river at a maximum flow of 20 cubic feet per second. This is slightly less than 9000 gallons per minute or 13 million gallons per day. An initial diversion (if needed) is proposed to bring the lake level down to 1221.0 MSL. Subsequent diversions would be done to maintain the lake at this level.

During construction, there is potential for dust emissions, noise, and soil erosion along the entire route. Also, groundwater or rainwater that enters excavated areas during construction would have to be removed to provide dry conditions for construction (particularly where concrete needs to be poured). This collected rain or groundwater would need to be pumped out and discharged on upland for seepage to groundwater (or other appropriate methods of discharge as allowed under a stormwater permit).

8. Other Changes

None anticipated.

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

Attachment 1: Plat map

Attachment 2: Map of the proposed pipe route

Attachment 3: Graph of recorded historic lake levels

Attachment 4: Table of recorded historic lake levels

Attachment 5: Diagram of proposed inlet piping and control structure in Shell Lake

Attachment 6: Map of the Yellow River from Spooner to the Hector Dam Road bridge

Attachment 7: Diagram of proposed outlet structure and riprap channel at the Yellow River backwater

Attachment 8: Shell Lake fish species

Attachment 9: Yellow River fish and aquatic life species

Attachment 10: Partial list of plant species

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

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

☒ Literature/correspondence (specify major sources)

- Permit applications and supporting materials submitted by the City of Shell Lake on June 29, August 14, August 24, October 3, October 12, and November 29, 2001, and January 10, January 14, and January 15, 2002.
- State Historical Society letter dated December 26, 2001.

☒ 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)

The project area in southwestern Washburn County is characterized by wooded ridges, interspersed with a variety of wetland types and gently-rolling to level cropland. Other than the state owned Sawyer Creek Fish and Wildlife Area, much of the forested area is highly fragmented by agricultural lands in the vicinity of the proposed pipeline. The majority of the soils along the proposed route are moderately well drained to well drained sandy loams on zero to six percent slopes with low water availability. There are areas of somewhat poorly drained loamy sand soils in the vicinity of Sawyer Creek as well as very poorly drained muck soils in the wetlands of the area. Air quality is excellent with no chronic source of contaminants.

The physical and biological characteristics of Shell Lake and the Yellow River are described in detail in the section below. Besides the lake and river, Sawyer Creek (a Class I trout stream) runs north from the City of Shell Lake to the Yellow River. The mouth of the creek is approximately 0.6 miles below the proposed diversion outlet on the river. There are also several spring ponds, bank seeps, and small tributaries running into the Yellow River along it's length in this part of Washburn County.

The United States Geologic Survey (USGS) has calculated the summer $Q_{7,10}$ of the Yellow River to be 25 cubic feet per second (cfs) at Spooner. $Q_{7,10}$ is defined as the lowest sustained 7-day flow to occur in a 10-year period. This 25 cfs estimate was calculated based on low-flow conditions expected in the months of July and August. This level is representative of drought or near-drought conditions. Normal flows in the Yellow River are much higher. The average stream flow of the Yellow River (upstream at Spooner) is estimated at 100 cfs. This value is estimated by using the drainage area (125 sq. miles) and the mean annual runoff (~11 inches). Flow measured below the Hector Dam Road bridge on August 3, 2001 was 150 cfs. The City's consultant reported an estimated flow of 180 cfs at the same location on August 22, 2001. Attachment 6 is a map showing the Yellow River project reach between the City of Spooner and the Hector Dam Road bridge.

At the discharge point, a spring-fed backwater area is fed by 3 bank springs as well as groundwater upwelling through the bottom substrate. On October 29, 2001 the spring water temperature at points of emergence was 47 to 48.5 degrees F. Total groundwater flow was estimated between 25 to 75 gallons per minute (0.06 to 0.17 cfs). Maximum flow velocity in the outlet channel (leading to the main river) was measured (using a float chip and timer) at 0.1 feet/ second. The river temperature was 43 degrees F.

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

Terrestrial Resources:

Land Cover: Approximately 56 percent of the pipeline route is proposed to pass through or adjacent to forestland, shrubland, or old fallow fields (much of it along the roadside edge). The forestland has a mix of primarily second-growth hardwoods containing oak, maple, birch, and aspen with scattered white pine, red pine, and spruce in the mature canopy. Sapling and shrub growth dominates much of the roadside edge and is a significant component of the interior forest. Common woody species include hazel, gray dogwood, ironwood, black cherry , blackberry, and wild grape as well as sapling maple, oak, aspen, birch, and ash. The forest ground layer vegetation is highly variable depending on sunlight exposure and is commonly dominated by pennsylvania sedge and bracken fern. Along the roadside edge and in the few fallow fields bluegrass, timothy, brome, golden rod,

aster, milkweed, ragweed, and wild sunflower are common. There are no known endangered, threatened, or special concern plant species identified along the route.

Approximately thirty-nine percent of the route would pass adjacent to or through existing cropland areas. Cropland use is usually on a rotation of small grains (beans, peas, oats), corn, and legume forage crops (alfalfa and clover). Roughly five percent of the proposed route is adjacent to residential and industrial areas primarily within the city limits of Shell Lake.

Wildlife Resource: Shell Lake has a relatively well-developed shoreline which currently limits the diversity and abundance of wildlife habitat and hence species composition of the riparian area. The remaining undeveloped shoreline areas of the lake as well as shallow water areas contain wildlife species typical for large northern Wisconsin lakes. Common waterfowl nesting here include mallards, wood ducks, and a few broods of Canada geese. A variety of ducks including canvasbacks, redheads, lesser scaup, ring-necks, widgeon, blue-winged teal, green–winged teal, mallards, and wood ducks commonly use Shell Lake during both spring and fall migration. Other aquatic or semi-aquatic bird species utilizing Shell Lake primarily as feeding sites include great blue herons, green-backed herons, kingfishers, common loons, and ring-billed gulls. Bald eagles, a federally threatened species, have two actives nest locations on the lake, one in the northeast and the other in the southwest. Mammalian species that inhabit Shell Lake and are dependent on the water resource as a critical habitat component include muskrats, mink, otter, and beaver. Reptiles and amphibians that are known to inhabit Shell Lake include painted turtles, snapping turtles, bullfrogs, green frogs, spring peepers, leopard frogs, eastern gray tree frogs, American toads, and northern water snakes. Bullfrogs are listed as a species of special concern in the state of Wisconsin.

Terrestrial wildlife that occur along the proposed pipeline route are quite diverse due to the interspersion of forests, fields, wetland, and riverine habitat types. All the following mammalian species are non-migratory, however a number of them do hibernate or greatly curtail activity during the winter months. Common mammals that utilize a combination of these habitat types include white-tailed deer, cottontail rabbits, raccoon, weasels, red fox, gray fox, coyote, striped skunk, black bear, shrews, and white footed mice. Forest dwelling mammals include gray and fox squirrels, northern flying squirrel, red squirrel, chipmunks, red-backed vole, porcupines, fisher, and snowshoe hare. Open land mammalian species include badger, woodchuck, thirteen lined ground squirrel, and meadow vole. Wetland and riverine habitat species include otter, muskrat, mink, and beaver. There are no known endangered, threatened, or special concern mammal species in the vicinity of the proposed pipeline.

Bird species are equally as diverse and more abundant than mammals especially during the non-winter months. Fifty-eight avian species were recently identified as probable or confirmed breeders within the Shell Lake area as part of the Wisconsin Breeding Bird Atlas survey (this is not a complete, comprehensive survey). This list includes 45 species of songbirds, two upland game birds (ruffed grouse and woodcock), three hawks, three waterfowl, great horned owl, bald eagle, sandhill crane, common loon, and American crow. These birds utilize all available habitat types with some being specialists and occupying only specific niches. Other birds overwinter in the area and include rough-legged hawk, junco, tree sparrow, evening grosbeak, redpoll, and horned lark. The bald eagle (a federally threatened species) is known to inhabit the area of the proposed pipeline, however there are no known nesting locations for this species along the route. There two known osprey nests located within 1.5 miles of the project. One is located near the Yellow River approximately one mile north of the proposed outlet site. The other is located near Sawyer Creek approximately one and a half miles south of the proposed outlet and one mile west of the pipeline corridor. The osprey is listed as a Wisconsin threatened species.

Reptiles and amphibians are common along the proposed route occupying all available habitat types. Wetland habitat and ephemeral ponds provide prime breeding habitat for wood frogs, chorus frogs, spring peepers, gray tree frogs, northern leopard frogs, and American toads. These same species forage during the non-breeding time period on the uplands of the area, some preferring woodland habitat and others grassy fields or wetlands. The blue-spotted salamander is common in the woodlands of the area and most numerous in forested lowland areas. Eastern tiger salamanders are also relatively abundant and are found in a variety of habitats including grassy fields and woodlands. Both species of salamanders use ephemeral woodland ponds as breeding locations. Snakes of the area include the common garter snake, hog nosed snake, smooth green snake, brown snake, and western fox snake of the open grasslands, wetlands and fields. Woodland species in this area are the red-bellied and northern ring-neck snake.

The Yellow River serves as a minor staging area for migrating waterfowl with Canada geese and several species of ducks (especially mallards and wood ducks) using the river as an evening roost and feeding area throughout the fall and early winter. In recent years, Canada geese and mallards have over-wintered on the river. Breeding waterfowl on the Yellow River include Canada geese, wood ducks, mallards, and hooded mergansers. Permanent water such as that found in slower portions of Sawyer Creek and throughout the Yellow River provides year-round habitat for northern water snakes, pickerel frogs, green frogs, and bullfrogs. Bullfrogs are listed as species of special concern in the state. Snapping turtles and painted turtles are common year-long residents of the Yellow River. Blandings turtles, a state-threatened species, have been observed in the Yellow River,

(approximately three miles upstream of the proposed discharge site) and are suspected of inhabiting the entire river system. The Yellow River likely serves as a major hibernaculum for water hibernating frogs and all turtles in the area.

Aquatic Resources:

Shell Lake: The quality of the water in Shell Lake is very good for most parameters. It is of comparable or better quality than that of the Yellow River. Shell Lake is classified as an Outstanding Resource Water under Wisconsin Administrative Code NR 102. This is the highest level of protection granted for a surface water under Wisconsin law and is reserved for the state's most high quality waters.

Shell Lake is considered a mesotrophic body of water. "Mesotrophic" means that it is a moderately fertile lake. The fertility of a lake is determined by the amount of nutrients (primarily nitrogen and phosphorus) that have accumulated in the lake since the time of formation (after the glacial time period for most Wisconsin lakes). The accumulation of nutrients in a lake over time is a natural process called eutrophication.

The water quality of Shell Lake is categorized as very good, and the water quality parameter values are better than the average values for natural lakes in Wisconsin. The conversion of water quality parameter values (phosphorus, chlorophyll, and secchi disk) to Trophic State Index (TSI) numbers is a way to numerically quantify the stage of fertility, or eutrophication, of a lake. Average TSI values from 1988 to 1998 are: Chlorophyll A = 44 with an average of 5.17 micrograms per liter (ug/L), Secchi disk = 39 with an average of 4.44 meters, and Total Phosphorus = 47 with an average of 12.61 ug/L. TSI values of 40 to 49 indicate mesotrophic lakes. Values less that 40 indicate very clean, or "oligotrophic" lakes.

Shell Lake stratifies about once out of every five years. During stratification the epilimnion (top layer) is located approximately between 0 and 19.5 feet (0-6 meters). At the depth of the proposed intake (10 feet or 3 meters) the temperature ranges between 17°C and 22°C (62°F and 72°F) and dissolved oxygen (D.O.) ranges between 7 milligrams per liter (mg/L) and 11 mg/L during stratification periods. During the years that the lake is not stratified, the temperature at the proposed depth of withdrawal would range between 15°C and 25°C during the normal stratification months and between 1°C and 5°C during most other months.

Because it is landlocked, Shell Lake has a simpler biotic community than drainage lakes. It has no known plant or animal species that are not already present in Yellow River system.

Shell Lake has a very limited aquatic macrophyte (plant) population. Most aquatic macrophytes are located in the southern basin of the lake near Scout Island. The dominant littoral (near shore) zone substrate of Shell Lake consists of gravel, cobble and boulder, which is not conducive to having large populations of rooted aquatic vegetation (particularly with occurrences of high wave energy). Therefore, aquatic plant densities in areas outside of the southern basin are very low. Further, water level fluctuations over the last decade have caused a decline in plant growth (based on observations by Department staff and members of the public fishing that area).

Shell Lake is known to harbor one exotic, aquatic species. Curly-leaf pondweed occurs sporadically on the bed of Shell Lake, and is most commonly found in the southern basin of the lake. There are no other documented exotic species known to occur in Shell Lake.

Shell Lake is most known for its walleye fishing and a low density, but trophy quality, muskie fishery. It also has an excellent smallmouth bass population. Northern pike and largemouth bass also reach quality size, even though they are not as abundant as in other area waters. Popular panfish species including bluegill, black crappie, and yellow perch. In recent years, the bluegill fishery has improved in both size and numbers. All sport species are sustained through natural reproduction except muskie which are maintained by a stocking program. A list of fish species common to Shell Lake is included in Attachment 8 at the end of this assessment.

Walleye in Shell Lake have above-average mercury content. Mercury content varies by the size and the age of the fish. Generally, walleyes less than 15 inches have mercury concentrations less than 0.5 ppm (parts per million). Walleyes between 15 and 18 inches are between 0.5 and 0.75 ppm. Walleyes between 18 and 22 inches are between 0.75 and 1.0 ppm.

Wetlands Along the Proposed Route: Both east and west of the New Knapp Road crossing of Sawyer Brook is an extensive speckled alder thicket that encompasses approximately 25 acres on the west side of the road crossing and 12.5 acres to the east. Reed canary grass, cattail, willow, wool grass, and sedges are found in conjunction with alder in these wetland areas. About one-tenth mile north of where the proposed pipeline route joins New Knapp Road is an approximately 1.5 acre wetland that consists of willow, sedge and cattails nearest the road that grades into a tamarack bog on the west end. The Sawyer Creek corridor adjacent

to the proposed pipeline is bordered on both banks by a narrow wetland band for much of its length. This wetland complex is characterized as a scrub-shrub wetland comprised of deciduous shrubs, primarily alder, as the dominant woody species. The last 400 feet of the pipeline route follows the edge of a large forested and shrub wetland that borders the Yellow River corridor. This larger wetland complex completely encompasses the spring-fed backwater (an aquatic-bed wetland) that is proposed as the discharge site. Common plant species in this wetland include elodea, cattail, jewelweed, coontail, and purple loosestrife. The last 32 feet of pipeline, including the discharge structure, would be constructed in the forested wetland adjacent to the spring-fed backwater.

Spring-Fed Backwater Area: The area of the proposed discharge is located in a spring fed backwater, which is directly connected to the Yellow River. During the summer months, vegetation growth in the river channel impedes flow and causes a river stage increase of around 1.5 feet. This backs up river water over the shallow springs in the backwater, creating a warm water slough with a thin layer of cold spring water along the bottom sediments. After river channel vegetation dies down in the fall, the standing water in the backwater drains away and the springs can be seen emerging from the bottom and flowing to the river. Sediments in the backwater are soft and flocculent and 3 to 5 feet thick. The water temperatures of the springs are between 45° and 49° F (7°-10°C) throughout the year and the flow amount is estimated between 25 to 75 gallons per minute.

The surrounding wetland/floating bog habitat consists of vegetation dominated by reed canary grass, willow, cattail, purple loosestrife, and jewelweed. Because of soft bottom and seasonal water variation, the backwater itself has a very limited submerged aquatic plant community. Elodea, coontail, water crowfoot, Richardson's pondweed, and curly leaf pondweed are sparsely present. There are sporadic occurrences of purple bacteria and filamentous algae growth. The spring input creates a micro-environment that differs from the river (creating habitat diversity for fish and invertebrates) but it is too closely integrated with the warm water from the river to support any aspect of a cold water (trout) fishery. There are other similar spring-fed backwater areas and spring ponds along the Yellow River in this portion of Washburn County.

Yellow River: The Yellow River, in the proposed area of discharge, is considered a Warm Water Sport Fish community per Wisconsin Administrative Code NR 102. The river has a rich and highly diverse fish and aquatic community. Fish species (documented to be occurring in the Yellow River near the proposed discharge area) are dominated by cyprinids (common shiners, hornyhead chubs, and spotfin shiners), followed by a catostomid community (white sucker, redhorse, and northern hog suckers), and a sportfish community (largemouth and smallmouth bass, rock bass, walleye, northern pike, muskie, yellow perch, and bluegill). The greater redhorse is a state-listed threatened species and is common in the Yellow River (including the immediate area near the discharge point). Carp are the only exotic fish. Sheephead and two crayfish species that are indigenous to North America have only recently established themselves in this drainage system. Fish and other aquatic species found in the Yellow River are listed in Attachment 9 at the end of this document.

Even though the Yellow River is a warm water stream, there is some seasonal use by trout species. The Yellow River has multiple cold water tributaries which contain brook and brown trout. Trout occasionally enter the river to take advantage of feeding opportunities or to migrate between cold water tributaries. Brook, brown, and rainbow trout are stocked in the river at the Governor Thompson Hatchery in Spooner to provide "put and take" fishing opportunities.

Mercury sampling of gamefish showed a range of concentrations from 0.09 to 0.39 ppm. These are fairly low levels and no special consumption advisories are needed.

Collecting and identifying aquatic insects and other stream life (macroinvertebrates) gives an indication of the quality of the water and habitat. The Hilsenhoff Biotic Index was developed as a numerical scale to quantify stream health. Previous macroinvertebrate sampling of the Yellow River in 2000 (downstream of the proposed discharge site) resulted in a Hilsenhoff Biotic Index score of 2.38, which is considered excellent. The habitat in that particular area contains a fast-moving riffle area consisting of cobble, gravel, sand, and small amounts of fine sediment. The habitat in the direct vicinity of the proposed discharge area is slow moving, containing no riffles. The macroinvertebrate assemblage in this area of the Yellow River has not been specifically documented, but would likely contain dragonflies, burrowing mayflies, and other important macroinvertebrates.

The aquatic plant community of the Yellow River (near the outflow from the spring-fed backwater) consists of wild rice, white water lily, elodea, coontail, curly leaf pondweed, flat stem pondweed, long leaf pondweed, and wild celery (see the plant species list in Attachment 10). The riparian wetland plant community is dominated by purple loosestrife, reed canary grass, iris, milkweed, and speckled alder. Purple loosestrife is extremely evident in this area.

There are multiple stands of wild rice in this section of the river (above and below the discharge location). One small stand is located approximately 50 meters downstream of the Green Valley Road bridge on the east shore (the Green Valley Road bridge is approximately 0.7 miles upstream of the proposed outlet point). The next two stands are located downstream of the proposed

discharge point. Each stand is approximately 0.5 acres in size. There are larger expanses of wild rice occurring downstream of this area, but they have not been surveyed.

The Yellow River harbors two known exotic plant species. Purple loosestrife occurs in the riparian wetland areas and curly leaf pondweed occurs sporadically in small patches within the stream.

The most common freshwater mussel species present in the Yellow River include fat muckets and giant floaters (found in slack water areas like the Hector Dam flowage). Mucket (a different species from the fat mucket) are also found in free-flowing areas, and fingernail clams are found everywhere in the river system. It is likely that many more species are present, but specific survey work has not been done.

13. Cultural Environment

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

Within the City, the pipeline crosses industrial and residential parcels, goes under USH 63, and then passes near the community's wastewater treatment system. Outside the city limits, the land use is predominantly agricultural and rural residential in the area crossed by the pipeline. The Town of Bashaw is unzoned.

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

Agriculture, forestry, tourism, recreation, government, and light industry are the major economic interests in Washburn County. Shell Lake is the county seat. Recreation and tourism are very important as well to the community. Agriculture, forestry, and recreation are important in the Town of Bashaw (where the pipeline would cross).

Historically, members of the St. Croix Band of Chippewa have utilized the Yellow River as a rice gathering and hunting and fishing grounds. Campsites and villages have been documented along the river.

c. Archaeological/Historical

In a letter dated December 26, 2001, the State Historical Society reported that there are no structures located within the area of the proposed project that are listed in the National Register of Historic Places. Further, the Society was not aware of any structures along the project route that may be eligible for inclusion in the Register. The letter included a recommendation for an archaeological survey of undisturbed areas along the route.

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

Sawyer Creek is a Class I Trout Stream, and is also classified as an Outstanding Resource Water under Wisconsin Administrative Code NR 102. This is the highest level of protection given to surface waters under state law. The State of Wisconsin owns 722 acres of land along and adjacent to Sawyer Creek and the Yellow River. This property is managed as the Sawyer Creek Fish and Wildlife Area for public recreational use.

There are several spring ponds in the area, especially along the Yellow River. The State owns the land around three of them. Two of the spring ponds which drain into the Yellow River are located within the Tozer Springs Wildlife Area and are managed for recreation. Two large spring ponds are located within the Sawyer Creek Fish and Wildlife Area and drain into Sawyer Creek. Some of these ponds have a mixture of native and stocked trout.

The wild rice beds mentioned above should be included here as a special resource also. There are also beds north (upstream) of Green Valley Road as well as the beds between the discharge point and Swan Bridge (downstream of Hector Dam Road). Further downstream, there are also beds in Rice Lake (on the Yellow River) in Burnett County. Wild rice is listed as "S3" rare to uncommon in the state as indicated in the Wisconsin Natural Heritage Working list.

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

15. Physical (include visual if applicable)

Terrestrial Resources:

During construction, there would be potential for dust emissions, noise, and soil erosion along the entire route. If permits are issued, they would require appropriate management practices to minimize nuisance and hazard conditions from construction

equipment and exposed soil. With proper management, this would not be a significant impact. It would be short-term and localized to the construction area. It would end when construction is complete and exposed soil is re-vegetated. Without proper site management, soil erosion into wetlands, Sawyer Creek, feeder streams, and the Yellow River could be more significant and longer term. The effects of suspended material entering streams are discussed in more detail in item 16 below.

Clearing of woody vegetation along roads as necessary for a maintenance and excavation corridor would result in a slight increase of open grassland through those areas. Where the line passes through continuous forest, clearing of the woody vegetation would result in a total increase of 8,300 lineal feet of forest edge and decrease the total area of adjoining closed canopy forest. Vegetative composition of the forest floor in those locations would change from shade tolerant native species to shade intolerant non-native species. Pipeline excavation would result in the temporary condition of exposed soil creating an increased erosion hazard until such time as the corridor is smoothed over and the new seeding established sufficiently to resist the forces of wind and water. Pipeline excavation would also disrupt the roadbed of New Knapp Rd. and (during some portions of construction) traffic would need to be temporarily rerouted. These impacts are not considered significant.

Installation of the discharge pipe outlet, concrete apron, and rock riprap chute would displace native vegetation and soil at the site, creating an artificial structure in a riparian area that was previously in a natural state. Aesthetic appeal of the spring-fed backwater discharge site and adjoining riparian area would be lessened by the installation of the discharge pipe, concrete apron, and riprapped channel. Some people would also find the flow-induced channelization of the spring-fed backwater area objectionable from a visual perspective. This would be a long-term change in the landscape, although localized just to the diversion outlet site.

Aquatic Resources:

Hydrology and Groundwater of the Shell Lake Basin: Removal of water from Shell Lake could cause a shift in the long-term water level cycle. The proposed project is designed to substantially minimize, but not eliminate, the chance of flood damage. Over the years, Shell Lake has experienced years of high water elevations and years of low water elevations. While this project would allow for moderation of the high ends of the cycle, it would not alleviate (and could compound) low water level problems in drought conditions. As mentioned in item 2 above, the USGS study report (published in 1999) concluded that withdrawing lake water during high stage elevations would have the effect of depressing lake levels further during low stage elevations.

After the start of a diversion, it would take time for the lake level to stabilize, as excess water stored in the water table upgradient of Shell Lake would then discharge to the lake. Removing water from Shell Lake could also result in a proportionate lowering of the adjacent groundwater table, lakes, intermittent streams, and wetlands upgradient of the lake (Round Lake, Ripley Lake, etc.).

There is still uncertainty over *how* significant this lowering would be. The diversion system would not be operated if the lake level recedes to 1220.8 feet MSL. The drawdown would only be lowering recent high peaks, not removing water below "normal" 1990s levels. This is essentially "peak shaving", rather than artificially removing several feet to low level or drought level conditions. Limiting the drawdown to a "maintenance" level should have less of a lowering effect on drought levels. However, it would take considerable study to verify or quantify this premise, and there are so many variables involved that it is unlikely the results would be very conclusive. The effect of the impact on lake levels would be long-term, since the lake level cycles up and down over many years.

Navigation Hazard: Placing the intake structure on the bed of Shell Lake could pose a navigation hazard in very low-water conditions. The City would place hazard markers around the structure if the lake level drops to 1219 or below. This impact would not be significant, because it is localized to the intake area and does not affect a majority of navigational use on the lake. Whether the impact is long-term or short-term would depend on how often lake levels drop to 1219 feet MSL, and how long these lower levels persist.

Wetlands, Dry Runs, and Streams Along the Route: These waterbodies could be affected by construction runoff when there is exposed soil along the route. Filter cloth would be installed to prevent movement of sediment into these areas. The degree of impact is described under "terrestrial resources" above. Also, laying a pipe adjacent to wetlands or perched groundwater tables could result in dewatering of these areas. Proper pipe placement, proper compaction of fill, and installation of anti-seep collars could minimize or prevent these effects. Any impacts from erosion would be of short duration and minimal in degree or extent due to the use of various erosion control measures.

Spring-Fed Backwater: During the initial diversion, there could be scouring of the existing channel. An estimated 300 to 400 yards (wet, in-place volume) of flocculent bottom sediment would be scoured from the channel bottom and redistributed into the river. This could create a temporary plume of high turbidity. The channel banks are composed of floating wetland material.

These banks are likely to be undercut and eroded, resulting in additional redistribution of sediment and floating vegetation mats into the river.

Water temperatures in the backwater would also be altered. The groundwater inflow maintains warmer winter temperatures and cooler summer temperatures than the river and Shell Lake. This temperature pattern would be changed by the discharge of Shell Lake water, depending on the volume of the discharge, and the amount of river water (if any) backing up into the spring area. While the backwater area would be directly affected, these impacts are not considered significant.

Yellow River: The flow in the river is highly variable based on time of year and weather conditions. At the 20 cfs diversion rate, the river elevation would increase somewhere between 1 to 3 inches depending on other seasonal variables. The City's consultant estimates that the additional 20 cfs (maximum) from the diversion would raise the river level approximately 0.1 feet (1.2 inches) at the Hector Dam Road bridge (1.8 miles downstream of the outlet point).

This increased river stage would decline as distance downstream increases. If the discharge were curtailed at times of naturally high flows (like snow melt or immediately after large rain events), the added flow would not materially increase the risk of flooding on the stream. The frequency and duration of water diversions would determine how long increased river elevations would be maintained.

Physical changes could occur to the shape of the Yellow River channel during and after discharges. The slightly higher river level would result in more wetted area on the banks, and the possibility for more bank erosion. Also, the lake water would be relatively low in sediment, increasing the river's capacity to carry sediment. These effects are not expected to be significant, because the river stage would rise only slightly in the reach of river below the discharge site. Raising the river elevation is not considered significant because it is localized to a short section of the river below the outlet and is short-term in duration.

The additional volume of water entering the Yellow River system from Shell Lake could have an effect on lake levels in Yellow Lake (28 miles downstream in Burnett County). There have been frequent high water concerns on the part of lakefront residents in recent years. Representatives from the City of Shell Lake met with Yellow Lake property owners in late 2001 to discuss the Shell Lake proposal, and are aware that the project could have a bearing on the problems at Yellow Lake.

A downstream dam regulates levels on Yellow Lake. However, abundant aquatic plant growth (between the lake and the dam) can obstruct the water flow, complicating water level control. The dam owner is trying to address concerns through operational changes. Proper management of the dam should allow any increased flow to be passed on without serious impacts on Yellow Lake levels. Permit conditions for the Shell Lake diversion project could include a requirement that the City of Shell Lake notify the dam owner when diversions start and end, and the volume that would be discharged during the event.

Temperature and Dissolved Gases: Water temperature and dissolved gases at the intake level on Shell Lake are generally similar to river conditions and stay within a desirable range for the river's warm water fish community throughout the year. The relatively short one to two-hour trip through the underground pipe would have little effect on water temperature but could impact dissolved gases.

The shallow river environment is subject to faster, more dramatic, daily and seasonal temperature extremes than the lake at intake level. There would be times in spring and summer when the discharge water could be 10 or more degrees cooler than ambient stream temperature and in the fall discharge water could be 5 to 10 degrees warmer than stream for a several weeks. Winter temperatures would be 1 to 5 degrees warmer than stream.

A thermal plume would form downstream from discharge point because waters of different temperature and density resist mixing. The discharge plume at times could follow along the stream bank and be visible as clear lake water flowing parallel to the darker river water. At other times, the plume might spread across the river bottom or river surface depending on the relative density of the lake water vs. the river water at the time. The plume generally would disperse and mix with the river within a couple hundred yards. Under some conditions, the plume might not be fully dispersed for a mile or so, but in no case could the effect extend beyond the riffle at the Hector Dam Road bridge 1.8 miles downstream.

Water flowing through a confined pipe could be subject to super-saturation of dissolved gases. Super-saturation, particularly of nitrogen, could cause health problems for fish attracted to the discharge plume. Saturation levels under 115% would not likely result in problems to fish and aquatic life at the discharge site. Saturation between 115 and 125% in the discharge could result in chronic fish health problems like blindness, circulatory problems, gill tissue damage and related bacterial infections, and ultimately death. Saturation over 125% could result in rapid mortality of fish near the discharge site or thermal plume.

If the system works as anticipated, it is likely that the percent gas saturation of the water would increase as it moves down the pipe but probably not above the 115% level where problems begin. Some direct monitoring of dissolved gases at various flow rates and temperature extremes, as well as examining fish for symptoms, would be necessary to verify this. Dissolved gas problems (if they occur at all) are likely to be an infrequent event influenced by flow rates and weather factors. If the monitoring indicates problems, they could be corrected through operational changes, proper maintenance, or structural modifications of the outlet channel.

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

Terrestrial Resources:

Manipulating Shell Lake levels as proposed would result in an increase of exposed shoreline and a decrease in water depths adjacent to existing near shore areas. If allowed to naturally revegetate, plants that would increase the available foraging area for waterfowl, herptiles and small mammals would likely colonize exposed sediments. An increase in shallow water with resulting submergent and emergent vegetation growth would result in an increase in foraging and/or escape cover for waterfowl, herptiles, furbearers and wading birds. An increase in foraging and escape cover could result in a slight relative increase in population numbers for some of those species. There would be no noticeable effect on bald eagle nesting and brood rearing capability for those birds using the lake.

Wildlife that utilize portions of the pipeline corridor as a habitat component could be temporarily displaced or discontinue use of a portion of their home range during the construction phase. If construction occurs during nesting or brood rearing season, productivity of some individuals for a species would likely be lost or delayed for that year. Affected species could be from any of the animal classes previously described. Loss of life for some individual wild animals, especially small mammals, herptiles, and flightless birds would likely occur during pipeline construction due to excavation, grading, and trench filling activities. None of these impacts would affect wildlife species populations to any significant degree. If the pipeline is constructed during the early spring or fall when reptiles and amphibians are moving to or from common hibernation sites, the impacts of pipeline construction could result in high mortality in certain localized areas. However, these effects would not be significant in the context of the whole project area.

Clearing a corridor through the area of intact forest along the northern one quarter mile of pipeline route would enhance the use of this location by wildlife species that prefer abruptly changing habitat types. Deer, ruffed grouse, some songbirds, bear, and cottontail rabbits are examples of species that would benefit from a grass/forb corridor through a forest. Forest fragmentation is not an issue in this area due to the common interspersion of woodland, active cropland, old fields, and surface water.

Clearing and grading of the pipeline corridor would expose bare soil that could easily be colonized by exotic terrestrial plant species. Spotted knapweed is a common invader that is present throughout Washburn County and could easily expand along the entire pipeline corridor. Around Shell Lake, exposure of shoreland (that was previously inundated) could also result in the regrowth of those areas by both native and exotic plant species. Purple loosestrife (a very prolific invader of lake, river, and wetland communities) could get a foothold and expand around the periphery of Shell Lake. It would be important for these areas to be brought back to native shoreland buffers to minimize colonization by exotic species.

Aquatic: Biotic Communities

Shell Lake: Changing the water level in Shell Lake would result in very few biological consequences. The lake has been documented at 1221.0 feet in the past and returning the lake to this level should have very little overall impact to the biotic community.

The amount of aquatic vegetation (emergent and submergent) could increase in some areas. Shoreline areas that have been inundated for the past number of years would now be out of the water. Rootstocks and seeds of emergent species (ones where part of the plant grows above the water surface), that prefer periodic or seasonal inundation, would now have the necessary habitat to grow, whereas before they were covered with water throughout the year. Submergent species (growing under the water surface) may have been able to expand their growth areas (in past years) due to the sustained water elevation. During periods of drawdown or large fluctuations in elevation, submergent species have a problem gaining a foothold. These techniques are used for aquatic plant management by either drying out the plants (drawdown) or flooding the plants (water deeper than rooting depth). When a body of water's elevation doesn't fluctuate, the submergent species have a better chance of establishing populations than the emergents.

The past up and down water cycles have had impacts on the fish community and aquatic life. In recent observed water level peaks, northern pike, largemouth bass, and bluegill increased (as adjacent wetland and low lying terrestrial vegetation became inundated) and walleye reproduction declined. These impacts are not good or bad, just biological responses to a changing environment. The proposal would result in longer periods of stable or declining water levels with riparian/littoral conditions similar to those of the 1970's. A high density, but slow growing, walleye population dominated the fish community with few panfish during that period.

The water inlet structure is designed with the intention to keep water velocities at less than 1 foot per second at the intake ports. The reduced velocity and small port opening would prevent the lost of adult gamefish into the pipe. Some fry, fingerlings, and small forage fish as well as zooplankton, algae, tadpoles, and invertebrates would be unavoidably exported during water diversion operations. This could create some subtle changes in the aquatic community but not significant ones. A natural lake with an outlet suffers similar losses without adverse effects on productivity.

Spring-Fed Backwater Conditions: The habitat of the spring-fed backwater would also be changed. The degree of change would depend on the volume, velocity, and duration of each diversion event. The area would look much like that of a flowing tributary stream during discharge periods. At the maximum discharge allowed (20 cfs) soft bottom sediments could be scoured out, and the existing invertebrate and submergent aquatic plant community could be washed to the river. The surrounding channel edges would likely begin to fail under the pressure of the discharge. Also, the floating bog mats in the backwater are not very cohesive and pieces would likely break off and float away. If diversion events "ramp up" (start out at very low volume and slowly increase up to the maximum allowable level) and "ramp down"(slowly decrease), these impacts due to volume and velocity could be lessened.

The seasonal and yearly use of aquatic life in this area would be altered. What is normally found there at different times of the year would change. Flushing of sediments could have impacts on the use of the areas by hibernating frogs and turtles. As sediments are removed, those species that prefer flocculent sediments would be displaced to other locations, or if they are already in a torpid state (sleepy or hibernating) they could perish. Use of the spring-fed backwater as a breeding and brood rearing area for some species of frogs could be greatly diminished or cease in some years depending on the timing of discharge. Erosion of the wetland fringe (adjacent to the spring-fed backwater) by the force of discharge water would reduce available habitat for herptiles, small mammals, and furbearers. Resulting channelization due to the erosion of this fringe would also reduce the use of the area by these species due to its straight-line configuration that minimizes natural stream "edge". These impacts would be repeated every time a discharge is started or increased in volume. Continued loss of individuals could be a long-term, localized effect. However, other individuals from upstream or downstream on the river and from other parts of the backwater area would likely migrate back into the area after each diversion period is over.

Fisheries, Habitat and Aquatic Life in the Yellow River: Results of the discharge to the Yellow River could have multiple impacts. This diversion connects Shell Lake to the Yellow River and provides transport for water and aquatic life between the two water bodies. It adds another source of inflow, fish species, plants, nutrients, and contaminants (if any), to the Yellow River.

The initial discharge would suspend fine material from the spring-fed backwater. Suspended materials increase turbidity, which could reduce gill function and make it difficult for sight-oriented species to feed. Suspension and re-deposition of sediments could interfere with fish spawning, release nutrients, lower dissolved oxygen levels, cover or shift macroinvertebrate habitat, and decrease light penetration necessary for photosynthesis. Nutrients (and contaminants if there are any) in the sediments could dissolve in the water column and affect water quality in the vicinity of the discharge, as well as in downstream waters where the particles settle out again. These effects would be short-term and localized to a short section of the river below the spring-fed backwater. The amount of suspended matter moved would be a relatively small part of the annual sediment transport load in the river.

Once the mechanical effect on sediments subsides, the discharge of comparatively clean, sediment free water into the Yellow River would have little impact on fish and aquatic life in the river. Any impacts would largely be limited to the general discharge area. Winter and mid-summer discharge could have modest benefits to the local fishery by augmenting flow and moderating water temperatures when the stream environment is most harsh. Fish of many species would be attracted into the discharge area because of the current or temperature preferences.

The greater redhorse is a state-listed threatened species. The diversion of water is not anticipated to have any significant effects on the habitat or life cycle of this fish. The diversion would not degrade any spawning, nursery or adult greater redhorse habitat.

Algae in the diverted lake water would provide a food source to aquatic organisms in the Yellow River. This should not adversely affect the aquatic community, since the Yellow River Flowage is about 3 ½ miles upstream and is a substantial source of

planktonic algae to the river. The macroinvertebrate community in the river would already contain a significant component of organisms adapted to filtering planktonic algae.

The pipeline could potentially allow movement of exotic or non-indigenous species between these water bodies. The Yellow River has several fish like carp, sheephead, and two crayfish species that would be undesirable additions to Shell Lake. Fortunately, nothing would be able to move up the pipe very far when it's flowing because of water velocity. There is a remote possibility that rusty and purple crayfish (which have recently invaded the Yellow River system), could move up the pipe at times when the discharge is not occurring. However it is more probable that they would gain access to Shell Lake by moving up Sawyer Brook or the Clam River and into the City of Shell Lake's storm sewer system.

There are no significant concerns over the spread of exotic species from Shell Lake into the Yellow River. At present there are no plant or animal species in Shell Lake that are non-indigenous to the Yellow River. Shell Lake harbors only one known exotic plant species (Curly-leaf pondweed). This plant is already well established in the Yellow River watershed. There are also numerous public access points on the river where watercraft users could inadvertently introduce exotic species from another waterbody. If something new invades Shell Lake, the operation of the discharge might have to be modified or discontinued until control measures are implemented. However, it would be far more probable that new species to the area would first be established in the river system because of numerous access points and more fertile habitats.

There are concerns regarding the stands of naturally-occurring wild rice downstream of the discharge area. Wild rice germinates in the spring (usually April) when water /sediment temperatures reach about 43 degrees F. The next growth step is a floating leaf stage. Wild rice is generally in the floating leaf stage on most northern waters from about mid-June through early July. This is the most critical stage for disturbance of the seedlings from high water or wave action. The leaves are buoyant at this stage and the shallow-rooted plant could be easily torn from its hold in the soft soil by an increase in water depth. While adapted to riverine conditions, the plant would also be susceptible to uprooting by an increase in water velocity at this stage even if the water level fluctuation is not sufficient to tear it away from its mooring. Wild rice seems to be best adapted to stable or declining water levels throughout the summer months. Controls could be needed on the timing, volume, and duration of water diversions to prevent uprooting and inundation from occurring. The seasonal pattern of the diversion should be designed to avoid water level increases during the wild rice's floating leaf stage. A decrease in the size of the wild rice beds on the river, or loss of an annual seed crop would be significant, although localized, effect on a unique resource.

Wild rice is also reported to be sensitive to the copper and manganese concentrations in lake, stream, and river water. Monitoring results submitted from the City in November, 2001, showed no detectable levels in samples from the river and the spring-fed backwater (using laboratory levels of detection sensitive to 7.7 parts per billion for copper and 5.3 parts per billion for manganese). The sample from Shell Lake showed no detectable level for copper, and a manganese concentration of 9.3 parts per billion, which is greater than the lab's level of detection (LOD), but less than the level of quantitation (LOQ). Sample results in the range between the LOD and LOQ are usually considered as showing that the substance is present, but the exact quantity is not reliably accurate. At these very low levels, it is doubtful that a significant risk would be posed to wild rice due to copper and manganese concentrations in the diverted water.

Aquatic: Water Quality

The impacts to the water quality of Shell Lake after discharge are not a concern. Shell Lake has a highly variable water level and the water quality of the lake has remained exceptional over the years.

The water being removed from Shell Lake would contain low levels of mercury. Whether the mercury is methylated or not depends on what time of the year the diversions occur and at what depth the intake is located (methylated mercury is the most toxic form). During summer months, methylation could occur in the hypolimnetic (bottom) layers of the lake due to the anoxic (low oxygen) conditions, and the anoxic characteristics of the bottom substrate. Since water would be drawn from above the hypolimnion, the mercury being discharged would be dominated by non-methylated form(s).

Once the mercury enters the Yellow River, methylation is unlikely to occur since the dissolved oxygen concentration in the flowing portions of the river exceeds that of most lakes. The amount of oxygen is greater due to the movement of water. Generally, lakes contain between 1-2 nanograms of mercury and rivers contain 5-10 nanograms of mercury. Recent sampling results submitted by the City bear out this statement; a sample result for water from Shell Lake was 1.8 nanograms/liter, and the sample result for the Yellow River (just upstream of the spring-fed backwater) showed 7.5 nanograms per liter. The spring-fed backwater water test showed 0.47 nanograms per liter of mercury. No mercury was detected in any of the sediment analyses from the lake, spring-fed backwater, and river areas. The discharge of Shell Lake's water would be expected to dilute the mercury concentration in the Yellow River.

The temperature of water entering from Shell Lake and being discharged into the spring-fed backwater could have some consequences between the months of June and September. The temperature of the lake water during these months is between warmer than the temperature of the backwater. The discharge of 20 cfs into this area would immediately and continuously flush the cold spring water out when discharges occur between June and September. As a result, this could cause the loss of the habitat values of this spring-fed backwater, such as the associated macroinvertebrate community and refuge for coldwater species.

There are no anticipated, detrimental consequences related to temperature impacts to the Yellow River during any time of the year. The dilution factor (volume and velocity) of the Yellow River is large enough that there would be no noticeable changes to the overall temperature. As the spring-fed backwater and river currently exist there is no detectable difference in temperature in the river above and below their confluence.

The dissolved oxygen coming from Shell Lake would have no impacts on the spring-fed backwater or the Yellow River. The D.O. is consistently between 5 mg/L and 12 mg/L (at a depth of 10 feet) which is adequate to support a full range of aquatic life in a warmwater system.

Little data exists on the nutrient concentrations of the Yellow River near the proposed discharge site. Samples collected from the Yellow River Flowage in Spooner about 3½ miles upstream show total phosphorus concentrations generally range from 30 to 60 micrograms per liter (ug/L). Total phosphorus concentrations at the discharge site could be higher due to additional phosphorus sources between the flowage and the proposed discharge site. Additional potential sources include runoff from portions of the City of Spooner, the discharge from the DNR fish hatchery in Spooner, seepage from the Spooner wastewater treatment ponds, and nutrients from agricultural runoff.

Total phosphorus concentrations in the discharge water from Shell Lake would only be about 13 ug/L, which is considerably lower than existing concentrations in the Yellow River. While this would slightly increase the total load of phosphorus the river transports, the net effect should be reduced phosphorus concentrations in the river and in the downstream lakes (Rice Lake and Yellow Lake). In effect, the cleaner water from the lake would dilute the higher phosphorus concentrations in the river and lakes, yielding a lower mixed concentration.

Spring total nitrogen concentrations in Shell Lake average about 0.38 (mg/L). Summer sampling from the Yellow River Flowage in Spooner in 1992 showed an average total nitrogen concentration of 0.48 mg/L. Samples from the proposed diversion outlet location on the river could be higher in nitrogen than the results from upstream flowage in Spooner, as there are other sources of nutrients entering the river between these locations (see sources listed above). Therefore, nitrogen concentrations in the river and downstream lakes are also likely to be reduced by the addition of water from Shell Lake.

17. Cultural

a. Land Use (including indirect and secondary impacts)

The land use would change at the outlet location near the spring-fed backwater. This area is presently a wild, undisturbed, wooded setting. If the pipeline is constructed, the wooded area would be part of a municipal utility site, with a concrete outlet structure and a riprap channel. This would be a localized, long-term effect confined to the outlet site.

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

During construction, nearby residents could experience temporary inconvenience due to traffic rerouting (as needed), and noise and dust from heavy equipment. Longer term, the City and its residents and visitors would have the diversion system for control of high water levels. This should help alleviate present concerns over property damage, loss of tax base, suppressed tourism, recreation, etc.

The existence of the diversion system could create a false assumption that the lake level would never exceed 1221.0 and possibly foster development that still could be vulnerable to the high water levels. In the long-term (once the water cycle takes a down turn again), it would be very important to protect the lake through strong zoning efforts including: preventing filling and development of the exposed beaches, and requiring restoration of natural shoreland buffers (for fish and wildlife habitat, water quality, and scenic beauty). Zoning ordinances could need to be strengthened and enforced to prevent future building in flood prone areas.

Winter recreation on Shell Lake could be affected if water is drawn off from below the ice. The intake area would need to be barricaded for public safety (the ice around the intake structure would be thinner than normal and most likely unsafe for

people to cross). At the drawdown rate of 20 cfs, an estimated 9-inch drop in lake level (due to a diversion) could occur during the ice season. It is not unusual for natural elevation drops of that magnitude over winter because no runoff events (rain or snowmelt) are occurring. Such gradual level changes should not affect ice safety away from the intake area. The diversion could be discontinued or decreased during winter recreation months, or steps could be taken to inform the public, if there is a perception of safety problems.

c. Archaeological/Historical

The State Historical Society has recommended that an archaeological survey be performed on portions of the route. Any necessary survey work would need to be completed prior to construction. The results of that survey would dictate what protection or preservation measures would be needed for any archaeological finds.

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

No significant impacts are anticipated on Sawyer Creek. Management practices for construction along streams must be followed to protect this trout stream.

No impacts are anticipated to the spring ponds in the area, with the exception of those mentioned for the spring-fed backwater at the outlet of the diversion pipe.

Wild rice beds could be affected (as described above). The timing and volume of annual diversion events could be tailored to protect the rice during the growth stage that is most vulnerable to fluctuating or increasing water levels.

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

- Localized disruption and inconvenience from construction.
- Potentially lower water levels in Shell Lake during future low water cycles and drought conditions.
- Possible minor navigation hazard in Shell Lake near the intake point in very low-water years.
- Transport of nutrients, mercury, and other contaminants (if any are present) from Shell Lake to the Yellow River. By adding water volume from Shell Lake, the trace quantities of these substances dissolved in the lake water are hence transferred to the river.

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.

Primary Effects:

- Changes in channel configuration, habitat values, and hydrology in the spring-fed backwater and the Yellow River would be long-term. Even if the diversion is discontinued for a long period of time, changes in the backwater and river channels and their aquatic life would persist (until another disturbance further alters them).
- Temperature impacts on the spring-fed backwater and loss of cold water refuge would be long-term if diversion events are frequent.
- The effects of sediment transport on water quality, habitat, aquatic plant and animal species, and downstream waters could have acute effects in the short-term and chronic effects in the long-term.

Secondary Effects:

- Changes in the lake and the pipe route due to construction would be short-term during the time it takes to build the pipeline and the time after for revegetation.
- Changes to the hydrology of Shell Lake, the upstream watershed, and the localized groundwater could be long-term, depending on the duration and frequency of diversion events in the next (and future) decades.
- The intake structure navigation hazard during low lake levels would be a sporadic, but long-term effect.
- Introduction of nutrients and mercury to the Yellow River system, although not significant, would be long-term.
- The potential for introduction of exotic species to the Yellow River would be long-term also.

Most of these effects would be localized either to the lake, pipe route, spring-fed backwater, or immediate area below the discharge in the Yellow River. Less localized effects (reaching farther downstream) would include influences on downstream rice beds and impoundments from sediment transport (from the velocity of the discharge entering the river), nutrient and mercury addition from the lake, and possible introduction of exotic species. These are not considered to be significant effects overall.

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).

- Changes to the hydrology of Shell Lake could be considered as an effect on a geographically scarce resource, since Shell Lake is the largest landlocked lake in the state of Wisconsin. Also, it is classified as an outstanding resource water and is a very valuable recreational resource.
- The wild rice beds in the Yellow River are ecologically-sensitive, scarce resources with cultural significance. Their size, distribution, and productivity could be affected by the project.

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

- Changes in channel configuration in the spring-fed backwater and the Yellow River are somewhat reversible. If several years elapse between diversions, floating bogs and plants along the edges of the channel areas would grow back.
- Temperature and habitat impacts on the spring-fed backwater and loss of cold water refuge could be reversed over time (if the discharge is curtailed), as groundwater should continue to discharge here. It would take time to re-establish the vegetation along the edge of the ponded area and channels if the present stream course is disturbed.
- Changes in the lake and the pipe route due to construction would be short-term during the time it takes to build the pipeline and the time after for revegetation. This is readily reversible in a short time frame.
- Changes to the hydrology of Shell Lake, the upstream watershed and the localized groundwater could be reversed somewhat by stopping diversion of water. However, in a drought situation, the water previously diverted could not be returned to the lake.
- The intake structure navigation hazard during low lake levels could be reversed by removal of the structure.
- Introduction of exotic species, nutrients, and mercury to the Yellow River system would be long-term and irreversible.

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.

Shell Lake Level: Removal of water from the lake could result in proportionately lower lake and groundwater levels during future drought conditions or low lake level cycles. However, the cumulative effects of such lowering are unknown or speculative at this time. In any future droughts, the lake could reach lower levels in a shorter time frame than what would have occurred if no diversion were present. The significance of this cumulative effect is not known.

Spring-Fed Backwater: Repeated diversion cycles would significantly alter the channel configuration and habitat values of this area. More channel cutting and substrate disturbance would likely occur each time a diversion is initiated. Although this effect is significant to the localized backwater area, it is not significant in terms of the overall project.

Yellow River: Significant cumulative effects could occur on the distribution, size, and productivity of wild rice beds if the diversion is not operated to protect the rice at its most vulnerable growth stage. Addition of nutrients and sediment transport, although cumulative, are not expected to be significant.

Other Planned or Proposed Activities in the Area: No other diversions of this type (or to these water bodies) have been proposed to the Department at this time. If permits were issued for this project, they would only allow the presently-proposed use of the diversion structure. The merits of any additional or other types of diversions would have to be evaluated (on a case-by-case basis) through the applicable permitting and environmental analysis processes.

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?

Shell Lake Hydrology: The specific groundwater flow patterns around Shell Lake (associated with different lake levels) are largely undocumented. There have been two short-term monitoring projects that demonstrate an apparent change in ground water inflow and outflow (immediately adjacent to the lake) depending on lake levels. There is a lack of specific information documenting any possible effects that could occur by attempting to maintain lake levels within a narrower and lower range. The uncertainties of how the diversion would possibly affect groundwater levels, wetlands, and lakes above Shell Lake, would be extremely difficult to predict.

Outside of monitoring the entire groundwater system for an extended time frame, the Department is not aware of any study or analysis technique that would eliminate or reduce these unknowns. Further, such a study to predict or identify these effects could not presently be designed and carried out within a reasonable period of time. As mentioned above, since the lake is not being drawn down below the present-day high levels, the effects (though not quantifiable at this point) are not expected to be significant.

Yellow River: Effects on the Yellow River wild rice beds, and possible effects of dissolved gases on fish and aquatic life are not entirely known at this time. These effects would not necessarily be significant if diversion events are operated as proposed. Structural and procedural changes could be made to eliminate or minimize these effects.

Archaeological and Historic Significance: The State Historical Society has recommended that an archaeological survey be performed at undisturbed areas along the route. Before construction begins, the findings of such a survey would need to be evaluated and appropriate preservation measures would need to be implemented.

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.

- Construction accidents could result in injury to workers or the harmful release of fuel (through spillage onto soil or into waterways), etc. Good housekeeping, proper fuel storage, and safety practices during construction could help prevent these accidents from occurring.
- Heavy rains during construction could cause soil erosion into Shell Lake, wetlands, Sawyer Creek (an Outstanding Resource Water), other streams, and the Yellow River. This could cause turbidity in the waterway, resulting in nuisance conditions for fish a aquatic life, along with other potentially harmful effects. Proper stormwater management practices would need to be implemented and maintained to minimize and avoid these hazards.
- Errors in regulating discharge flows (from Shell Lake) with the telescopic valves – too high a flow could be discharged. The piping system could deliver 41 cfs, but this environmental analysis is based on a diversion of 20 cfs. All of the factors evaluated would need to be reconsidered to determine anticipated impacts at a higher flow (particularly related to river channel integrity and flood capacity). Calibration and monitoring of the discharge flow and the river stage are needed at regular intervals to be sure the volume diverted stays within the design parameters and permit-prescribed limits. Protection of the control structures from vandalism and tampering would also be needed, such as a locking mechanism on the telescopic valve, etc. Permit conditions would limit diversions to a maximum of 20 cfs.
- Pipe failure along the corridor could result in a significant washout of soil to a waterway (Sawyer Creek would be particularly threatened being closeby a significant part of the pipe length). Pipe failure could also result in potential loss of a roadbed, causing a serious traffic hazard and damage to the pipe itself and to nearby properties. Electronic flow and pressure sensors (with pressure loss alarms) could be installed at strategic points along the route to warn of a sudden volume change.

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.

The removal of water to maintain lake level is not unprecedented in Wisconsin. Currently, several other water diversion projects are either in the planning, permitting, or implementation stage in the state. The nature of the lake, a seepage lake with no outlet to relieve high waters, has so few comparable situations that this project is not expected to set a significant precedent with broad, state-wide application.

Diversion of water from Shell Lake to the Yellow River does not remove any water from the Yellow River watershed or from the larger St. Croix drainage basin. A portion of the present groundwater flow from Shell Lake to the Yellow River would occur (on an accelerated basis) through the pipeline. This does not set a precedent of moving water to another watershed (or another state) which has been of concern in other diversion proposals.

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.

- Future Shell Lake Water Levels: Some residents of Shell Lake and surrounding areas are concerned that removing water from the Shell Lake watershed during periods of high water would result in lower water levels during drought conditions.
- Project Costs: There is concern that the project would only benefit a limited number of people (those lakeshore homeowners who are subject to flooding) at the expense of the lake and river ecosystems.
- Effects on the Yellow River Ecosystem: Concern has been expressed that additional flow to the Yellow River would alter the natural cycles of the river, increase erosion, and affect wild rice populations.
- Effects on Yellow Lake: Yellow Lake has a dam on the outlet of the lake. Water levels are maintained by the operator of the dam, with prescribed maximum and minimum levels. There are periods in the summer when water cannot be discharged due to conditions downstream from the lake. Concern has been expressed, that if discharge from Shell Lake is not properly timed, a negative effect on Yellow Lake water levels would result.

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.)

- Take no action to relieve high water levels on Shell Lake: If no measures are taken to control the lake level, it could continue to fluctuate within the natural cycle for the lake, with an annual 1% chance that the lake level would reach the regional flood elevation of 1226 MSL. The level of the lake could get even higher as evidenced by a lake level of approximately 1228, which occurred in 1900. Anecdotal information has the lake reaching even higher levels (1232.5 feet MSL in 1882).

  Lakeshore property owners would continue to face loss of dry shoreland, as well as threats to structures and property during high water cycles. This has a detrimental spin-off effect on property values, salability, tax base, tourism, and recreation. Without good riparian stewardship and enforcement of zoning rules, filling of lakeshore would continue, cumulatively forcing water levels still higher, and destroying littoral habitat.

- Extend the discharge pipe out into the main channel of the Yellow River: The present route (putting the outlet in a spring-fed backwater tributary to the river) was selected to avoid placing the pipe in wetlands near the river's edge. The installation of the discharge piping would disturb the bed of the spring-fed backwater and its outlet to the Yellow River. Water quality, thermal, and biotic impacts to the spring-fed backwater would be eliminated if the outlet were in the river.

  However, in the Yellow River, the discharge pipe would be a navigation hazard due to the 30" pipe diameter and the discharge of 20 cfs at a velocity of approximately 8 feet per second. More sediment movement would likely occur due to the water velocity at the discharge point and the deeper sediments in the river proper as compared to the spring-fed backwater. Any exposed pipe would be visually objectionable to recreational users of the river.

- Discharge to the Yellow River at another location: The upland discharge point nearest to the proposed pipe route appears to be on DNR-managed land in the Sawyer Creek Fishery Area. A discharge at this point (which would flow overland to the Yellow River) would eliminate effects on the spring-fed backwater. Sediment movement would be similar to that at the planned discharge point.

  A discharge at this location would require three borings under Sawyer Creek, increasing the cost of the project by approximately $210,000. There would also be increased costs for additional piping to reach the site. Existing forestland in the Sawyer Creek Fishery Area would be affected on a permanent basis, as a 20-foot wide access corridor would need to be maintained. Maintaining such a corridor in agricultural lands would not be necessary, as pipeline inspections would be made at a time when crops are either dormant (forage) or after harvest for corn, wheat, oats, and other seasonal crops that are currently grown along the proposed route.

The integrity of the Sawyer Creek streambed could be jeopardized during the construction of the pipeline. The pipeline would be more likely to incur frost damage as the soil environment at the stream crossings is wetter, and therefore more subject to frost action which could damage the pipeline. Such damage would be impossible to locate until a blowout of the pipe occurred.

Another location was considered initially in the project. This involved diverting the water from the north side of Shell Lake, along the old railroad grade, into a wetland connected to Randall Lake near Spooner. The present route is a shorter distance with a steeper gradient, and could be constructed at lower cost. There were also concerns over property ownership and securing easements along the rail grade.

- Diverting water to another water body: Diverting water to Sawyer Creek has already been eliminated from consideration because of potential impacts to the stream. Regardless of what water body may be proposed, there are still the concerns listed above related to physically taking water out of the lake. There are also likely to be very similar concerns to those related to either the Yellow River or Sawyer Creek with a diversion to any similar water body. Others water bodies have informally been considered by the City or the Department, and considered as unfeasible options (such as Clam River due to temperature impacts on native trout, and Long Lake west of the City due to water level and nutrient problems).

- Diverting water to dry acreage: An initial drawdown to a dry run (north of Lind Avenue and east of USH 63) was tried in the spring of 2001. This raised the local water table and affected monitoring wells at the City's wastewater treatment system. There was also concern of flushing groundwater contaminants farther downgradient of the discharge site. This alternative would require sufficient acreage to absorb a large volume of water without overflowing to a surface water or raising the groundwater table to a nuisance level. From investigation by the City, it does not appear that such an area exists within a reasonable distance from the lake.

- Moving threatened structures off the lakeshore: Moving the most threatened structures as water levels rise could be a viable option. The costs would be very high, and the project could require several stages if water levels rise to historic highs. Each time the lake level hits another high mark, another ring of threatened structures would need to be moved. This option would not necessarily require diversion of water from the lake, however it could be coupled with a diversion alternative.

- Flood-proofing threatened structures: The affected homeowners have the option of flood-proofing their individual structures. This would provide protection to the 100-year lake level adopted for use in the City's floodplain zoning ordinance, but would involve a significant amount of fill in environmentally-sensitive shoreland areas. Like the option above, this option could be done as a stand-alone measure, or coupled with a diversion alternative.

- Find an industrial or commercial use for the extra water: Use of the water in an industrial process would be one way to remove water from the lake without diverting it to another water body. However, this would require a process that used extremely large volumes of water without producing a proportionate volume of wastewater. Supplemental water would need to be supplied by wells in drought periods. This alternative also raises concern about removing the water from a local basin (such as large water bottling operations and diversion of water from the Great Lakes to other states). This option does not appear to be feasible at this time.

- Management and protection of the littoral zone and watershed. Wetland protection and shoreline buffer zone management would slow water level increases and reduce shoreline erosion on Shell Lake. This option alone may not alleviate the problem during a high water cycle, but could be coupled with whatever options are chosen for water level control and lake protection.

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 or event	Comment Summary or Action Taken
May 2001 to present	Department Staff assigned to this project • Ken Jonas-Wildlife Biologist • Kurt Roblek-Water Resources Specialist • Craig Roesler-Water Resources Specialist • Frank Dallam-Water Management Engineer • John Spangberg-Water Management Specialist • Larry Damman-Fisheries Biologist • Kathy Bartilson-Water Subteam Leader	Department staff performed field inspections, met to discuss the project proposal and permit applications, and made inquiries on technical aspects of the project for preparation of this Environmental Assessment.
May 2001 to present	Shell Lake City Administrator Brad Pederson, the City's Ad hoc Lake Level Committee, and Consulting Engineers from ECG	Numerous meetings and contacts were held with Department staff to discuss the project, resource concerns, and information and permit applications, etc. that needed to be completed and submitted.
August 14, 2001 and October 30, 2001	Great Lakes Indian Fish and Wildlife Commission (GLIFWC)	Meetings were held between GLIFWC, the St. Croix Tribe and Department staff to discuss the project and related resource concerns. The first meeting was held at the project site.
August 20, 2001	Beth Greiff-St. Croix Tribe	Letter submitted to the Department expressing concerns over the project.
August 23, 2001	Legal notice published for project permit applications.	Numerous comments were received from the public expressing either support for the project or concern. Two requests for contested case hearings were received.
November 2, 2001	Peter David-GLIFWC	E-mail communication posing questions and expressing concerns over the project.
December 26, 2001	Chip Harry L. Brown III, Wisconsin Historical Society	Letter submitted to the Department recommending an archaeological survey be conducted along the project route. This letter was sent in response to a Department request for a review of historical preservation sites.

Project Name: Shell Lake Water Diversion to the Yellow River County: Washburn

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.

Draft # 5

DEPARTMENT OF NATURAL RESOURCES

SUMMARY OF PUBLIC COMMENTS AND DEPARTMENT RESPONSES ON THE ENVIRONMENTAL ASSESSMENT FOR THE PROPOSED SHELL LAKE DIVERSION PROJECT

INTRODUCTION

The Environmental Assessment (EA) on the proposed Shell Lake diversion project was released for public review on February 1, 2002. Copies of the news release were provided to the local media for publication. Hard copies of the EA and news release were provided to all those individuals who had previously requested a copy. Copies of the same were provided to the Administrator of the City of Shell Lake for distribution from his office. Copies of just the news release were sent to all seasonal residents (250 +) on Shell Lake. The EA and news release were made available on the Department's external website as well.

The formal public comment period for the EA ended on February 25, 2002. A total of 51 separate contacts had been made as of this date. Out of this total, 34 different individual parties provided comments (either by phone, in-person, or in writing) on the EA. The Department received 13 contacts from individuals requesting a copy of the EA and had six contacts with general questions about the process. During the entire month of February, Department records indicate that the website containing the EA document was downloaded 1,855 different times. The public comment period was formally extended until March 25, 2002 to three separate parties because of an e-mail glitch early in the original comment period that resulted in these individuals not receiving the EA as requested. Only one of these parties provided comments during the extended time period. Two separate parties provided written comments within 10 days after the close of the original comment period (i.e. February 25th). These comments were accepted due to the fact that the Department had been in contact with these parties prior to the close of the comment period and that the comment period had already been extended for other individuals.

This summary document constitutes, where noted, any and all formal amendments to the EA that was published for public review. No further documentation will be developed or sent out. Copies of this summary document have been sent to every party who provided comments on the EA as well as those other individuals who requested a copy.

RESPONSE TO GENERAL COMMENTS/ISSUES

Before responding to specific comments, it is important to address some common themes attendant to many of the general comments received. These issues are identified in bold type below. Outlined under each issue is the Department's response.

1. **General opinions expressing support or opposition and/or general environmental concerns for the proposed project**

   A number of comments were received that expressed general support/opposition or general environmental concerns about the proposed diversion project. We respect and appreciate these opinions, however, these comments do not provide any substantive information relative to the clarity, accuracy, and scope of the Department's environmental analysis presented for public review. All of the general environmental issues identified in these comments have been addressed in the EA. While these comments have been made part of the official public record, there is nothing further we can do with these comments.

   While not directly related to the environmental analysis process, it also should be noted here that current law limits the Department's ability to factor public opinion into every decision it makes. Many Department decisions, particularly on regulatory matters, must, by law, be based entirely on a technical analysis of whether or not the proposed activity would meet the applicable standards established in the laws and administrative rules approved by the state legislature. In these decision-making circumstances, public opinion is not one of the factors the Department can consider. In other words, if an applicant demonstrates through the submittal of required information that the substantive standards under the law can be met, the Department has no choice but to grant the permit(s). Granting of a permit does not mean Department staff necessarily agree with the proposed activity. In a number of cases the professional opinion or desires of staff would dictate otherwise. However, as part of the Executive Branch of state government, the Department cannot ignore or unilaterally change existing laws. We must operate within the constraints and standards of the law as provided to us by the Legislative Branch of state government.

2. **Questions on purpose and need for the project**

   Several commentors questioned whether a need for the project had been established, whether the project exceeded the City's riparian right of use of a public resource, or whether the purpose and need had been accurately articulated in the EA. The Department relies on the application materials submitted by and subsequent discussions with applicants for a permit to develop the description of purpose and need for all environmental analysis documentation. In many cases the Department will request and use additional information to further clarify the purpose and need of a proposed action, including where appropriate any pertinent historical or other background data.

   In this particular case, the municipal boundary of the City of Shell Lake extends around the entire lake. The City's interests are at stake with the high water levels and subsequent property damage that is occurring. The City, like other riparian owners around the lake, has

the right to make permit applications for projects that affect certain aspects of this water resource. The purpose and need provided in the EA were developed from the information provided by the City in their application along with other related documentation. We believe the description conveyed in the EA clearly and accurately describes the purpose and need of the proposed project.

3. **Questions on project costs**

A few commentors questioned the project cost estimates presented in the EA. In general, the Department relies on project cost information provided in permit applications as the basis for what is presented in an environmental analysis. While the Department requires cost estimate information to be realistic and reasonably current, in most routine regulatory matters and environmental analysis work, the need for pin-point accuracy of cost information has no bearing on Department decision-making.

Cost estimate information is provided in environmental analysis documents to give the reader some additional perspective on the scope of a proposed project. We believe the cost estimate information provided in the EA is sufficiently accurate to meet this purpose. However, this estimate only reflects initial project construction costs. The City has since provided us with additional information on costs for annual operation and maintenance. They estimate that the operation and maintenance costs for this proposed project would be $2,000 – 3,000 per year and would largely depend on the need for any additional management required as permit conditions and/or other agreements necessary to do long-term monitoring. It is anticipated these funds would be budgeted out of the City's general fund. The EA is hereby amended to reflect this additional cost estimate information on anticipated operation and maintenance costs.

4. **Department influence on project design**

Some of those commenting pointed out that the EA identifies a long history of involvement by the Department with the City to seek potential alternative solutions to high water problems. These commentors subsequently questioned whether the Department could thus develop an objective and unbiased EA.

The long-term involvement of the Department with the City of Shell Lake is nothing unique or unusual. We routinely work closely with many prospective applicants for permits, sometimes for many years. From the Department's perspective, it is important to work closely with project applicants early and often throughout the planning phases of various proposals. We believe this is critical for several reasons. First, our early involvement enables us to steer and direct the design of many projects in ways that will minimize or avoid environmental damage. Secondly, this early involvement further reduces inevitable delays, costs, and frustration to applicants that might otherwise develop project designs that are incomplete or unacceptable. Most applicants appreciate this.

For this particular project proposal, the Department has and will continue to work closely with the City of Shell Lake just like we do with many other applicants for all types of project

proposals. It is our responsibility and obligation to develop a factual, unbiased environmental analysis of the proposed diversion project as required under the law. To the best of our professional ability, Department staff have completed such an analysis.

5. **Misunderstanding of EA process and requirements**

Some individuals who provided comments questioned why the Department did not provide more detailed analysis in the EA on social and economic concerns. Other commentors questioned the general level of detail in the EA as well. As noted above, some commentors expressed their "vote" in favor or opposition to the proposed project. Lastly, some of those commenting conveyed disappointment that the EA did not clearly identify the Department's position on the proposal and was biased in favor of the project.

The expression of these comments points to some misunderstanding of the purpose and intent of the environmental analysis process. The state's environmental policy is spelled out in WEPA and requires the Department, as well as other state agencies, to consider the environmental effects of their actions to the extent possible under their statutory authorities. WEPA imposes procedural and analytical responsibilities on the Department and other state agencies, but it does not provide authority to protect the environment. The Department has substantial authority to regulate environmental pollution and alteration to waterways. However, the standards we can apply in exercising these authorities are defined in various regulatory statues and administrative rules. For many Department regulatory programs, these standards do not include social or economic concerns. In turn, while the rules guiding development of environmental analysis documentation require general disclosure of social and economic concerns to the extent known or reasonably anticipated, the need for preparation of environmental analysis documents cannot be based solely on anticipated social or economic impacts.

WEPA provides an informational process through the development of environmental analysis documents. EA's disclose impacts and address alternatives. They are designed to provide a full, factual disclosure of anticipated beneficial and adverse impacts. EA's don't stop projects, don't approve projects, and don't modify projects. They inform. WEPA does not mandate particular results or particular decisions in particular cases but simply exists to ensure that environmental effects of a particular project are identified and evaluated during the planning stages. WEPA does not prohibit unwise decisions, only uniformed ones.

Lastly, a few commentors expressed the opinion that, overall, the EA was either too technical or too general. This is a difficult issue to address given the wide range of interest, knowledge, and understanding for potential reviewers of an EA. Some people like and want lots of technical details while others prefer general summaries in plain text. We are also legally bound under WEPA to provide certain technical details (i.e. the EA has to be an analytical document) as well as an analysis that is written in plain language. In developing this EA, Department staff tried to strike a balance for the target audiences. We tried to provide explanation of technical terms in the narrative of the text where appropriate. We also referenced and attached more technical details in some attachments for those people who might want this information.

RESPONSE TO SPECIFIC COMMENTS

Following is a synthesis of all the specific comments received on the EA along with the Department's responses. The responses take several forms including presentation of new information along with associated revisions to the EA analysis (where noted) as well as explanations of the Department's perspective. To aid the reader, comments/responses have been grouped under several main issues or topics as indicated below. Each paragraph under the comment section represents a separate, individual comment for that issue.

A. **Shell Lake Issues**

1. **USGS study**

Comment:

The 1998 USGS study was apparently a "hydrologic budget study" designed to gain a better understanding of the hydrology of Shell Lake and possible long-term effects of withdrawing water from the lake (page 5 of EA). What were the results of the study regarding the stated purpose?

Response:

A summary of the study conclusions is provided in the third paragraph on page 4 of the EA. To ensure the results of this study are included, we hereby amend the EA to include the final USGS study report as an additional attachment to the Department's analysis.

Comment:

The final USGS study report in early 2000 concluded that a strong, direct correlation existed between direct precipitation/runoff and lake levels. Why is there a strong positive trend (0.81 in./yr.) in the 66 years of lake level data that is not evident in the precipitation data?

Response:

We believe that your statistical analysis is correct and that it does agree with the conclusions presented in the USGS study report. There is no doubt that there is has been a trend of increasing water levels over the last several decades with each successive time period experiencing higher levels than during the previous time period (roughly every 10 years with some minor variation in any given year). The USGS report stated that generally, as precipitation increases or decreases, there is an accompanying response in the water table and lake stage (i.e. level). The report goes on to state that lake-stage increases substantially more than the water table during periods of high precipitation (i.e. there is more lag time for changes in water table levels than surface water elevations as would be expected). We believe the strong trend in water level increases from your analysis is also evident in the precipitation data which supports the USGS study results (**see related responses under subsections #2, #3, and #4 below**).

2. **Lake Levels and ordinary high water mark**

Comments:

The potential adverse impacts of the project to Shell Lake, its lakebed, and its adjacent wetlands are not adequately addressed in the draft EA. Although the draft EA notes that the DNR previously set the ordinary high water mark (OHWM) for Shell Lake at 1221.8 feet mean sea level (MSL) at an administrative hearing in 1994, the proposed project would actually maintain water levels at only 1221 or eight-tenths of a foot (0.8 ft.) lower than the current OHWM. This would apparently result in a loss of substantial amount of the current lakebed – in effect a ceding away of the public trust to private parties who have unfortunately built private homes on wetlands at elevations below the natural ordinary high water mark. In other words, the project would result in the privatization of a portion of the lakebed and thus the public trust. Wouldn't it be better to consider other alternatives to this ill-conceived diversion project, such as using the money to buy out the most severely affected properties, so that the buildings can be removed and wetlands restored?

Although the draft EA discusses fluctuations in the water levels observed over the years in Shell Lake, it is not as clear as it could be about those fluctuations and about the fact that the current OHWM is arguably set much too low based on the physical evidence and legal criteria normally applied in setting an OHWM. Indeed, as I understand it, there is substantial evidence that the OHWM for Shell Lake should be much higher than it was set by the DNR in 1994. For example, ice ridges along the lakeshore would certainly suggest that the OHWM should be set at 1226 MSL, not 1221.8 MSL as referenced on page six of the draft EA. If the OHWM was set at this level, a further lowering of the lake would simply add insult to injury, because it would cede away even more of the public trust to the wetland homeowners than has already arguably been ceded away by the setting of the OHWM at its current artificially low level, set in 1994. This is an issue that must be discussed and evaluated by the DNR in the context of this project and in the final EA (or, preferably EIS) for the project. This is because of the DNR's duty as the trustee of the public trust resources at issue in this case, including the lakebed of Shell Lake. To not fully address all of these issues, including the questionable validity of the current OHWM elevation at Shell Lake in the context of this project, would arguably constitute an abdication of the DNR's trust responsibility under the Public Trust Doctrine of the Wisconsin Constitution.

If the ice-ridge water level is at 1226 feet MSL (Pg. 4 of EA), why is the ordinary high water level set at 1221.8 feet (Pg. 1 of EA)? If housing permits are based on the ordinary high water level, that level should reflect reality. If the true ordinary high water level is at 1226, then according to the EA, 189 homes or properties (Pg. 2 of EA) are on the lakebed. The ordinary high water level must be reassessed.

Response:

As indicated in the EA, the ordinary high water mark (OHWM) for Shell Lake was set at an administrative hearing back in 1994. The Department worked with the City of Shell

Lake to establish that OHWM elevation through a separate process as provided for under the law and applicable administrative rules. That legal process included opportunities for anyone to voice concerns and express their views concerning the proposed elevation to be established. Individuals who disagree with that OHWM determination certainly have legal options under the law to pursue further review of that decision. Reassessing the OHWM based on recent high levels is an option the Department and the City can consider through revision to the City's shoreland zoning ordinance.

At the time an applicant submits an application to the Department for a permit, the existing laws and rules in place at the time are applied to that particular proposal. The Department is not at liberty to subsequently change the decisions made under those laws/rules and apply the new criteria or standards to review of an application already submitted. Likewise, the Department must use the existing standards and criteria in place at the time of an application for any necessary environmental analysis on the proposed project for which the application has been submitted. We are not at liberty, nor is it the purpose or intent of the environmental analysis process, to address new or different standards in an EA that might or could be applied to a particular project proposal. For Shell Lake, the existing OHWM has been established through other procedures and must serve as the basis for this analysis.

Comments:

We must fully expect there will be a long term continual rise in lake level unless positive means are put in place to allow excess water to be diverted in an intelligent manner. Global warming and the associated rainfall may not be universally recognized, but all local weather observers in this area agree there has been a dramatic 10 degree rise in average summertime dew points over the last 20 years. This can be expected to increase precipitation amounts considerably such that if no other schemes are in place, the level of Shell Lake will rise almost without limit until some surface spillover is encountered.

With the data in Attachment 3, one could make a projection of future lake levels with a reasonable level of certainty based on calculating the average mean level increases over the last 65 years. A cursory analysis indicates a gradual increase in average mean lake level of about 0.1 foot per year over this 65-year period. This rate increased to about 0.2 foot per year over the last 22 years (since about 1979). Based on this and adding the fact that short term perturbations of about 2.5 feet have occurred in the periods of 1950, 1983, and 2001, it is highly probable that we could see a high water mark in excess of 1226 feet in the next 10 years.

Response:

Yes, we agree with these comments. The historical data does appear to indicate that there is currently an ongoing cycle of increasing water levels for Shell Lake. While it is difficult to speculate on future water levels, there is no doubt that the lake water elevation could certainly continue to rise over the next decade as indicated in the USGS study report and the EA. It should also be noted here again as stated in the EA that the proposed project is designed to merely try and remove excess water during peak levels above the ordinary high water mark elevation (termed as "peak shaving" by some). To

use an analogy familiar to all of us, the project as proposed is not designed to operate as a "bathtub plug drain" where you simply "pull the plug" and the water goes down relatively quickly. The large size of the lake and associated volume of water along with the small, discharge rate proposed would require longer-term continuous operation of the siphon discharge to produce noticeable elevation changes on the lake. Even with the proposed diversion in place and operating, lake levels could continue to rise and cause additional flooding damage.

Comment:
The assessment states that "this proposal is intended to alleviate high water conditions in Shell Lake." I find this statement as well as a number of other such statements in the assessment to be leading. The facts show that the water levels experienced over the past years noted as "high" in this document are well within the natural fluctuation of the water levels in Shell Lake. Further, statements such as "The City of Shell Lake has applied to the Department of Natural Resources for a permit to divert water from Shell Lake to the Yellow River in order to control high water levels" appear to be a misrepresentation of the situation. A more factual statement would be that the diversion is meant to artificially manipulate the water levels in Shell Lake to support past and future development of the near lakeshore area, including natural lakebed.

Response:
Yes, the term "high" is relative to various comparisons one could make. This term as used in the EA is not meant to mislead anyone. The proposal is to relieve high water conditions currently being experienced around the lake, and yes, this proposal would be an artificial manipulation of water levels to hopefully protect current developments around the lake (also see response above on Purpose and Need). The term "high" as used in the City's application and the analysis in the EA is meant in the context of relatively more recent, modern-day times (i.e. last 70 - 75 years). The EA fully acknowledges and presents the best available historical record on lake elevations. There certainly is historical evidence that water elevations were considerably higher. However, in our judgment it is unreasonable and unrealistic to define high water levels of modern-day time relative to elevations experienced in the late 1800's/early 1900's. While there may be those individuals who wish we could rewind the clock of history, the setting and land uses of that previous time period were dramatically different than more current, modern-day times. Further, a number of structures around the lake that have been and/or are currently threatened by high water were legally constructed in this more modern-day era according to the setbacks under zoning in place at that time. At that time, those rules seemed more than adequate. One can certainly look back now and say that those past zoning rules around the lake were incorrect or did not provide adequate protection, but that does not change the decisions that were made to construct homes and cabins at certain locations.

Comment:
I was reading over the EA on the Shell Lake diversion and was struck with the strong positive trend in annual high water level plot (pg. 29, Attachment 3). I was curious if this was due to increases in annual rainfall over this time period (1936 – 2001). I took annual

rainfall totals from the Spooner Experimental Station data and over-plotted them on the Shell Lake high water level plot in the EA. The rainfall shows virtually no trend over this 66-year time period. I calculated the high water trend, subtracted it from the data, and plotted that over the scaled rainfall. They matched up pretty closely as one might expect. This suggests to me that the rise in high water level is NOT due to natural causes. I then broke down the water level data into time histories of varying lengths to see how the trend may have evolved over time. The entire record has an average annual increase in high water level of 0.81 inches, or about a four and a half-foot increase over the entire 66 years. Below are the results from the trend calculations for the different time periods:

66 year rate of increase = 0.81 in./yr.
last 60 year rate of increase = 0.75 in./yr.
last 50 year rate of increase = 0.78 in./yr.
last 40 year rate of increase = 1.36 in./yr.
last 30 year rate of increase = 1.56 in./yr.
last 20 year rate of increase = 1.80 in./yr.
last 10 year rate of increase = 2.90 in./yr.

These results suggest that the cause(s) for the water level increases have been accelerating their effects over the past 40 years, and especially over the last 10 years. This would be consistent with the assumption that increasing development along the lakeshore, with it's accompanying expansion of impervious surfaces has led to increased direct runoff into Shell Lake. I strongly suspect that a lack of a shoreline vegetative buffer strip and inadequate storm drains have led to the current problems.

Response:
Yes, there is no question that land use within the immediate watershed surrounding the lake has changed over the years. Developments resulting in more impervious surfaces have certainly increased at least the speed of direct runoff from precipitation into the lake. We also agree that over time previously existing vegetative buffer strips around the lake have been lost that accentuate not only the speed of runoff into the lake but also reduce the filtering capacity of nutrients and other pollutants carried by runoff waters. However, regardless of whether water inputs to the lake occur from direct precipitation on the lake itself or indirectly through resulting runoff in the immediate watershed, all of this input is the result of precipitation. All of the studies done to date, including the most recent USGS study, indicate a direct correlation between precipitation and lake level responses without differentiating how the water gets into the lake. We believe your analysis supports the general conclusions of past studies (**also see previous response under section A.1. above**).

Comment:
The engineering plan is to maintain Shell Lake's water level at 1221.0 + or – 0.8 ft. Who will monitor the lake to ensure the city maintains 1221 instead of 1220.2 ft.?

Response:

The City of Shell Lake would be responsible for monitoring maintenance of lake levels within the prescribed operating range identified as a permit condition. The Department routinely issues permits for control structures on waterbodies that provides for a maximum/minimum operating range with a general target level somewhere in between. In many cases, such an operating range is necessary because the limitations of equipment, time, and cost do not permit maintenance of a precise water level elevation and is unrealistic. In addition, for most cases where such operating bands are used, the minor fluctuations in elevation do not create any significant resource concerns. The issue of whether such an operating band and specific max/min elevations are acceptable in this proposal would be addressed as part of any permitting decision for this project.

3. **Lower lake levels during drought periods**

Comments:

There are no plans to replace water that is pumped out. Suppose they pump to the 1221-foot level and a dry condition occurs for a few years as it did 15 – 20 years ago when the lake was down to approximately 1219 feet. At that time the whole town got scared and thought the lake would dry up. So they diverted several water run-off ditches to put water back in the lake. That is what caused this high water now. Had that water not been diverted to Shell Lake, the level would not be this high.

Paragraph (2) in section 21 on page 19 of the EA states, "Removal of water from the lake could result in proportionately lower lake and groundwater levels during future drought conditions or low lake cycles……. The significance of this cumulative effect is not known." Once again in a familiar theme throughout the DNR's Environmental Assessment they admit in writing that they have absolutely no idea what the possible harmful long-term limnological consequences might be to Shell Lake during future drought cycles as a direct result of the diversion project. The DNR admits in this paragraph that they do not know what happens to a landlocked lake such as Shell Lake during a drought cycle after it has been artificially drained over a period of time. A possible ecological consequence could be that DNR-induced lake diversion would disrupt Shell Lake's natural cycle of runoff and groundwater seepage resulting in artificially low lake levels for unnaturally prolonged periods of time. The DNR has not met the requirements for granting a permit under Section 30.18 and Section 281.35(5)(d)(6).

The Environmental Assessment does not adequately consider the effect of the system in dry years. The lake level currently fluctuates from year to year, and the USGS study demonstrates that the lake level will be artificially lower in years when conditions are dryer and the system is not operating. The EA concedes that this will be an effect and further concedes that there is uncertainty as to how significant this effect will be. Since extended low water levels in the Shell Lake basin have a significant affect on fish and wildlife, this section appears on its face to concede that the risks have not been properly analyzed. A better understanding of the hydrology could lead to a significantly better understanding of what is likely to happen in drought conditions.

The draft EA states on page 14 that, "…. removing water from Shell Lake could also result in a proportionate lowering of the adjacent groundwater table, lakes, intermittent streams, and wetlands up gradient of the lake (Round Lake, Ripley Lake, etc.)." However, it then acknowledges that, "…. there is still uncertainty over how significant this lowering would be." Thus, the DNR cannot reasonably conclude that the impacts on these water resources will be insignificant.

This project will manipulate the aquatic resources in Shell Lake, but the impacts of this manipulation have not been thoroughly addressed in this assessment. The artificial manipulation of the water level of Shell Lake will have a significant impact on the lake and local hydraulic system. It is stated that by taking off the upper end of the normal fluctuation the lake will make the lower states of the fluctuation lower. This enhanced stage may have significant effects on areas of Shell Lake like the south bay. This enhanced low may cause the local hydraulic system to also experience a lower than normal stage affecting wetlands, smaller lakes, and springs.

Diversion will depress lake levels further at times of low water levels (USGS 2000 study), but the city has a history of actively modifying low water levels by diverting water into Shell Lake. Will this constant manipulation of a natural fluctuation continue? How does the city propose to address the lower than natural water levels when they occur? The EA states that the long-term effects of lowering the lake's high water levels are unknown (Pg. 12 of EA). The EA's conclusion of no significant effect cannot be stated with any accuracy if the effects are not known.

The issue of low lake levels and the effect of lake water discharge on long term lake level reductions are not properly addressed. No account was made of evaporation which would seem to render previous discharges irrelevant after an extended period of drought, the lake level being largely determined by the then current precipitation levels rather than discharges performed many years prior to the drought period. This should not be a difficult calculation.

Response:

The EA addresses this issue to the extent of our knowledge and ability to gather pertinent information through consultation with other professional experts. As indicated in the EA, the most recent USGS study concludes that withdrawing water during high lake levels would have the effect of depressing lake levels further during extended drought periods (i.e. than would otherwise be expected without the diversion) during dryer conditions when lake levels are lower. We still concur with that general conclusion. Additional discussions with USGS staff have provided some further information on the anticipated effects during drought when water is artificially removed at higher elevations (**see related responses below regarding groundwater hydrology**).

USGS staff have indicated that the ratio of water removed would be roughly equate to the amount of additional lowering effect on water levels during drought periods. This ratio is not exactly one-to-one because of all the variables at work, but it is close. In other words, for every foot of water removed artificially during high water periods, one could expect a

corresponding additional decrease of about a foot during drought periods. The drought effect could actually be slightly less than a foot. Lastly, while there has been no specific study or analysis on the effects of additional water inputs to the lake, the opposite effect could be a work here. Specifically, the diversion ditch constructed 60 years ago also represents an artificial manipulation of water levels. This ditch diverted some runoff water from the Clam River basin into Shell Lake that would otherwise have never been present. Any potential effects from that diversion into the lake would likely be limited because the diversion ditch represents a relatively small percentage of the total water inputs in the overall lake water budget. This effect has been further reduced with the more recent installation of ditch plugs on two separate occasions. However, the fact remains that there already has been past artificial manipulation of lake levels, and the long-term operation of the diversion ditch could have contributed to higher water levels than would otherwise have been seen without the diversion ditch in place.

The proposed project is not designed to radically reduce water levels over a relatively short amount of time nor is it designed to radically reduce the lake level more than a few feet. Therefore, we do know that potential adverse effects from the proposed project would not be to the degree or extent that one would expect with these other more drastic water removal scenarios. Based on the additional information from USGS staff, it appears the worst case scenario would be that for every foot of water removed through a diversion, we could eventually expect a corresponding additional foot decrease in lake level during extended drought periods. We cannot predict all the potential diversion scenarios and likewise cannot predict all the potential drought effects. Further, during extended drought periods it would be extremely difficult to differentiate the potential effects from water removal by diversion from the effects incurred under "normal" drought conditions. The effects of drought on lake biota would have already taken place by the time you reach the "normal" low level for a particular dry period. Therefore, we would expect that any additional decreases in lake level caused by the effects of diversion would not create additional significant adverse effects.

While there certainly could be further studies and analyses on this question, in our judgment there is currently no known study design over any length of study period (i.e. years) that could predict specific, conclusive results on the precise degree or extent of this additional lowering effect. In other words, this is the best information available on this potential effect. This drought effect could be viewed by some as significant, and it is from their perspective. We hereby amend the EA to reflect this additional information and clarification on the drought effect issue.

Comment:

If the water level in Shell Lake becomes too low and the property owners want more water in the lake, what will happen? I know that the outflow pipe ends short of the river, but what is to prevent an extension added on so the pipe reaches the river, pumps installed, and water pumped from the Yellow River back into Shell Lake. I realize that the system as it stands is gravity fed, but if the City of Shell Lake has enough influence to get this project built, then it stands to reason that if lakeshore owners see their docks six feet out of the water that they will want the lake level raised. I know this system is only

supposed to drain off high water, but the technology is in place to reverse the flow back to the lake so that an even level can be maintained.

Response:
We do not wish to speculate on those future conditions or what proposals might be presented to solve low water problems. There are simply too many unknown variables. The proposed diversion system is based entirely on a gravity flow design. Therefore, it is not feasible to reverse flow in the pipe without some form of pump. Additionally, we do not know if this is even possible from an engineering standpoint. Given the distance that would be required to pump water, the cost for design and construction of a pumping mechanism along with the cost to operate such a system would essentially be prohibitive. Further, any such proposal would require additional review and permit approval from our Department that would certainly focus on protecting resources associated with the Yellow River.

4. **Groundwater hydrology related to surrounding lakes/wetlands/inlet streams/contamination sources**

Comments:
Paragraph (a) on page 20 of the EA states, "The specific groundwater flow patterns around Shell Lake……..the uncertainties of how the diversion would possibly affect groundwater levels, wetlands, and lakes above Shell Lake, would be extremely difficult to predict." There are at least two possible negative environmental consequences that could occur from the diversion of water from Shell Lake as a direct result of this admitted ignorance of the subterranean water routes and permeable glacial drifts that dynamically connect all bodies of water in the region: 1. Unacceptable lowering of higher elevation lakes such as Ripley Lake and Chain of Lakes; 2. Potential altering of existing regional water flow patterns resulting in artificially increased lake levels in Shell Lake and the failure of the diversion project. The DNR references two monitoring projects that document changes in groundwater inflow and outflow depending on lake levels. The DNR then admits a lack of information documenting any possible effects from attempting to maintain the lake level within a narrow range or lower the lake level. One major possible environmentally hazardous effect from diverting 13 million gallons a day from Shell Lake would be contamination of the lake by creating a greater than normal inflow of groundwater containing unacceptable levels of phosphates, nitrates, fertilizers, pesticides, mercury, and other potentially lethal industrial byproducts based on the use of surrounding areas for industry, septic fields, pasture land, and crop land. In effect, diverting water from Shell Lake would turn the lake into a giant vacuum sucking in unacceptably high levels of surrounding groundwater toxins by creating a massive volume of low pressure. Because this lack of any specific hydrological data on the part of the DNR, the Environmental Assessment is inadequate because it does not allow the DNR to unequivocally conclude that the proposed withdrawal of water from Shell Lake will not have a significant detrimental effect on the quality of the waters of the state. This is a requirement for granting a permit under Section 30.18 and Section 281.35(5)(d)(6).

The draft Environmental Assessment fails almost completely to properly analyze the hydrological effects on the region surrounding Shell Lake that may be a result of the project. It draws an erroneous conclusion by overlooking an obvious factor (the rise in water table level associated with the rise in lake level) that should have been considered. Because of this oversight, the EA is inadequate because it does not enable the DNR or an administrative law judge to conclude that the proposed withdrawal of water will not have a significant detrimental effect on the quality of the waters of the state. That is a requirement for granting a permit under Section 30.18 and Section 281.35(5)(d)(6). It further calls into question the entire project, because it is not possible to determine that the system has adequate capacity to perform its intended function unless the groundwater flow charge is fully considered.

When the proposed diversion system is operating, it will change the flow of water between the lake and other surface waters and subsurface waters. At the present time, there is a certain equilibrium that is maintained. Subsurface water and surface water flows into and out of the lake depending on the relative pressure of water in and out of the lake. Data from the 1999 USGS study seem to indicate that the current net flow is out of the lake. Water will flow toward an area of lower pressure. Operation of the diversion system will lower the lake level, and doing so lowers the pressure of the water at the lakebed. The result is more flow from groundwater (which is at the same pressure as before) into the lake (which now has a lower pressure). Likewise, stream flow may be increased if the level of the receiving body becomes lower relative to the source body.

The EA appears to address the issue of altered hydrology on page 20. The second paragraph notes that the lake will not be drawn down below the present-day high levels, and therefore, the effects are not expected to be significant. This conclusion is erroneous because it ignores the fact that the groundwater levels and other surface water levels can be expected to be higher in periods when the lake level is higher. Higher groundwater levels mean more pressure forcing water into the lake, which is a fundamental alteration from the current situation. Since the EA notes (page 20), “two short term monitoring projects that demonstrate an apparent change in groundwater inflow and outflow (immediately adjacent to the lake) depending on lake levels”, a reasonable basis exists to conclude that the project will result in a greater inflow of groundwater into the lake. Certainly the groundwater contribution to the lake, currently estimated at 13% (page 2 of EA), will be significantly higher.

I own property on Shell Lake and am very interested in what has been done to ensure that other surrounding lakes will not be adversely affected by lowering the water level of Shell Lake. When Shell Lake is high, so are all of the other surrounding lakes. If Shell Lake is lowered, it will follow that other surrounding lakes will also be lowered. Does the study include any impact on other lakes besides the Yellow River?

The EA states (pages 14, 20, & 21) that no one knows for sure what will happen to surrounding lakes and water tables when the water diversion takes place. Can computer groundwater simulations be used to find out?

I quickly reviewed the documentation and don't see any data pertaining to other surrounding lakes. Is it possible to lower other area lakes by lowering Shell Lake? If true, it could put other lakes in jeopardy if not monitored. I have property on a much smaller lake, Little Ripley. Myself and others on three adjacent lakes are very concerned that lowering the water level in Shell Lake will lower our lakes. We were told that underground aqueducts connect all of us together. Can you confirm if this is true and if the DNR plans to monitor all surrounding lake depths while pumping Shell Lake? Some property owners are already talking about applying for grant money to purchase an aerator for the lake.

The project will pump huge volumes of water out of the landlocked Shell Lake basin to maintain a 1221.0 msl elevation during long term wet cycles which could later prove to be disastrous during extended dry cycles. Proportionately lower lake and groundwater levels during future drought conditions would certainly develop which would cause all kinds of user and property value problems. I also fear that the very fragile cold water habitat of the nearby Sawyer Creek trout stream could be in jeopardy during extended dry periods not to mention the damage that would be done to the in-lake habitat and ecosystem itself.

This huge water diversion project would definitely adversely affect groundwater levels, wetland areas, and small lake integrity above Shell Lake within the watershed during drought periods.

Response:

We thank you for these comments. These are very important issues, and have been the subject of much review and discussion since the application was submitted for the proposed diversion project. Department staff have had further discussions with professional experts in the field of groundwater hydrology, including USGS staff, since the EA was published for public review.

Shell Lake is best defined as what is termed a "mounded, seepage lake." While these types of lakes are not common, there are other similarly characterized lakes in the state including two just southwest of Shell Lake in northwestern Barron County (Kirby Lake and Waterman Lake). These types of seepage lakes in Wisconsin tend to have large, natural fluctuations in water levels over time. Currently, it appears that across western Wisconsin these types of lakes are generally experiencing higher lake levels.

Water tends to move out of these lakes into the shallow groundwater system in what is termed "downward gradients." In simplest terms, groundwater gradients are created where there is a difference in head (i.e. difference in elevation) between adjacent water bodies. It is important to recognize that relatively short-term changes in water elevations can change the flow of water across these gradients. Therefore, there are times at certain locations around Shell Lake where water may be flowing across these gradients toward the lake. It is also important to understand that water tends to move at relatively slow rates across these gradients compared to what we normally see for surface water movement.

For Shell Lake, it appears that water is generally being lost all over (i.e. in three dimensions) through these downward gradients. The conductivity and permeability of bottom lake sediments is very low, and therefore limits the amount of groundwater seepage directly downward in the lake. The strongest gradient toward the shallow groundwater aquifer occurs on the north end of Shell Lake where water tends to move in a downward, lateral fashion away from the lake. While there may be short-term shifts in these groundwater gradients, in general, there is not much groundwater inflow to Shell Lake. The general water budget for Shell Lake shows that total inflows are largely made up of two, basic sources - direct precipitation (64 %) and runoff (36 %). Total outflows from the lake consist of evaporation (60 %) and groundwater seepage (40 %). The amounts of runoff inputs and groundwater seepage outputs do not change drastically over time. However, as successive years go by where the precipitation inputs continue to exceed evaporation outputs, the result is a continued rise in water elevation.

We do not anticipate the proposed diversion would result in direct effects to other lakes and wetlands in the immediate watershed basin around Shell Lake. These are essentially smaller mounded, seepage systems within the larger Shell Lake basin that behave similarly, although on a much smaller scale, to what is generally described above. While there is some hydrologic connection between these lakes and wetlands with Shell Lake, we believe this connection is through slow moving groundwater gradients that more directly correlate with general groundwater elevations in the area rather than surface water elevations.

Likewise, we would not expect the proposed diversion to stimulate or accelerate the drawing of additional pollutants into the lake. Septic systems, if properly installed, should be sending treated wastewater away from the lake and not into the shallow groundwater zone. The same would be true for any other existing source of contaminant in the groundwater around the lake. If groundwater gradients were changed in such a way that they would create a gradient toward the lake, these pollutants would not likely reach the lake because of the slow rate of groundwater movement and that, as described above, this condition would be relatively short-term. Even under any remotely possible scenarios, this groundwater inflow gradient could be easily reversed by halting pumping should any new contamination sources be discovered. Lastly, it is important to note here that the proposed diversion is designed to potentially remove peak water only down to a target elevation of about 1221.8. The lake was at that elevation only two years ago in the summer of 2000. We are not aware of any pollutant or contamination concerns created when the lake was at this elevation which is the same as what is being proposed for the diversion project.

Lastly, we also do not believe that the proposed diversion would act to increase or somehow accelerate stream flow discharges to the lake. Each surface water tributary to the lake has a given amount of drop or gradient that delivers water to the lake during given runoff events. We do not see how the proposed diversion would alter these conditions.

Comments:

The consequences of the change in hydrology include the following possibilities:

- Any contaminants present in the groundwater layer will migrate into the lake as evidenced by the transport of atrazine from the old Coop site to the monitoring wells during the test pumping last summer. This may include pesticides, solvents, petroleum products, and other contaminants present in the soil.
- Nutrients, including nitrogen compounds and phosphates present in the soil or in surface waters that feed the lake will migrate into the lake. This will accelerate the eutrophication of the lake and will increase the number of incidents of algae bloom which have become more common in recent years.
- The increase in flow from groundwater may render the entire project ineffective. As designed and at full capacity of 20 cfs, the project would take 65 days to lower the lake level by one foot if there is zero rainfall, zero inflow from surface streams, and zero migration of groundwater (using the lake size of 2580 acres from page two of the EA). None of those factors is likely to be zero, and in a high water period the groundwater component is likely to be quite large, but no one knows how large. When the fact that the system cannot be used during flood conditions because of the conditions on the Yellow River is considered, there is a real question about whether the system will do what it is designed to do.

There is almost no data concerning the contaminant levels in the groundwater near Shell Lake. Nor is there a good understanding of the extent to which groundwater migration will increase as the lake level is drawn down. The USGS study uses coefficients that are obtained by what factors fit the data best rather than by hard data.

Response:

Regarding the comments on groundwater migration as well as contaminants and other pollutants, please see the response above regarding groundwater hydrology. In addition, the Department is aware of some contaminated sites in and around Shell Lake. The EA is amended to clarify that these sites do exist, but it is not the purpose of the EA process to deal with these issues. WEPA only requires that these issues be made known and considered in the analysis. The Department has other regulatory responsibilities to identify, characterize, and remediate sites with certain types of soil and/or groundwater contamination. These contamination issues can and should be handled through those other regulatory procedures, and therefore, should have no direct bearing on decisions related to the proposed diversion project.

Regarding the comments on diversion discharge rates and length of time it would take to remove certain amounts of water, please see the responses above under #2 regarding lake level issues. The third paragraph in section #5 on page 5 of the EA clearly indicates the difference between statements of a theoretical nature versus reality. Yes, the proposed diversion would require operation over a considerable length of time to remove even a foot of water. Yes, this could take considerably longer if there are greater amounts of precipitation during operation of the diversion. And yes, operation of the diversion could be halted under certain flooding conditions on the Yellow River.

We believe the EA contains descriptions that clearly and accurately address all of these issues in sufficient detail.

5. Water inputs to lake

Comments:
Scope of discussion in EA seems a little lacking in several areas: a.) contribution of water to lake from diversion ditch – any plans to completely block this off?

The EA does not address blocking off the entire diversion ditch dug in 1942 from Clam River basin that was partially plugged in 1986. This should be the first action the City of Shell Lake undertakes to reduce lake water levels. The EA also notes that in 1936 the City of Shell Lake created a channel to Welsh Lake to increase Shell Lake's water level. This channel must also be blocked before any action is taken to remove water from Shell Lake.

Response:
Yes, as outlined in the EA, the City of Shell Lake has plugged-off portions of the diversion ditch on two occasions in the past. We also understand that the City long ago considered options to further plug and/or completely fill this ditch. These opportunities still presently exist. However, further plugging of the diversion ditch would require the City to deal with alternative means of handling this runoff water (i.e. water has to go somewhere). Secondly, the diversion ditch only contributes 3% of the total water inputs to the lake and has little overall effect on lake levels. In other words, the City could expend all the time and costs necessary to plug the diversion ditch, and there would still be the current high water problems. Therefore, this is not viewed as a reasonable or feasible option to solve the lake level issue and therefore, not a wise use of City resources. The EA is hereby amended to reflect this additional clarification relative to alternatives considered (**see responses below under section E. regarding alternatives**).

6. **General**

Comment:
Believes EA is in error where it says shoreline habitat may be increased with reduced water levels on the lake – as water level drops, the amount of shoreline (i.e. perimeter) actually decreases.

Response:
Yes, you are correct. The first paragraph under section #16 on page 14 of the EA says reducing water levels through the proposed diversion would result in an increase of exposed shoreline and a decrease in water depths adjacent to existing near-shore areas. We did not mean to imply with these statements that the actual perimeter of the shoreline would increase but rather increase exposed areas along the shoreline. The EA is hereby amended to reflect this clarification.

Comment:
The EA points out that Shell Lake is an Outstanding Resource Water. In addition, it is a unique lake because it is the largest lake in Wisconsin without an outlet. What is proposed is a major change in the ecology of the lake with very large unknown consequences. Permits should not be granted (and cannot be legally granted) until the consequences are fully analyzed. The EA falls well short of that.

Response:
The EA process includes sufficient opportunity for public review and input. The analysis cannot be finalized until that step in the process is completed. This is an iterative process. We routinely amend environmental analysis documents as a result of additional information resulting from this important public participation step. As evidenced by our responses elsewhere in this document, we have continued to gather additional information and amend the EA accordingly to ensure that we have a complete analysis of anticipated consequences. Regarding comments on the relationship of completing this analysis relative to granting of permits, please refer to the discussion under #5 in the "Response to General Comments/Issues" section above.

Comment:
Historic change in lake depth was not addressed in the EA. We've heard that there used to be a thermocline in the lake, but now there is never one present. Is lake depth decreasing due to sedimentation which is forcing water surface elevation to increase? Could lake bed core samples provide a clue?

Response:
Yes, lake depth has and will continue to change basically the same amount as any change in surface elevation. Also, there is no question that sedimentation has and will continue to deposit materials on the bed of the lake over time. However, this is a very slow process, especially for a lake the size of Shell Lake, that will not dramatically effect lake depths or water elevations to any measurable degree over anyone's lifetime. The scope of this change can only be measured in more geologic time frames. There is no evidence from lake level depth measurements that this has changed in any way that could even remotely affect lake level elevations. The EA is hereby amended to reflect this clarification.

The issue of stratification (i.e. thermocline) in the lake is addressed in the fourth paragraph under the section on Aquatic Resources on page 9 of the EA. Wind and other weather factors largely determine if a thermocline will form in any given year. Wind can mix the water from top to bottom preventing a lake from separating into layers of different temperature.. The size and shape of lakes has a large bearing on the general effects of wind. Larger, rounder lakes, such as Shell Lake, have greater exposure to the effects of wind action from all directions. Therefore, it is no uncommon for no thermocline to form in Shell Lake.

Comment:
The control structure is on private land. Who controls the control structure? What agreement will there be with the landowner? What if the private land changes ownership?

Response:
The City of Shell Lake would be responsible for all of the structures associated with the proposed diversion. It is up to the City to negotiate appropriate land use agreements with all current and any new, future private landowners where the control structure, pipeline, and discharge structure would be constructed.

Comment:
The EA states there will be no diversion from Shell Lake at times of high river flows. But those are exactly the times Shell Lake would need to be lowered to prevent structure flooding. The diversion won't prevent flooding, it will only impact the duration. All the property damage issues listed in the EA of property values, salability, tax base, tourism, and recreation will remain.

Response:
Yes, the proposed diversion would not be allowed during certain times of high flows in the Yellow River as stated in the second paragraph under section 5 on page 5 of the EA. It also should be noted here again, as stated in the first paragraph under the section on "Aquatic Resources" on page 12 of the EA, that the proposed project is designed to merely try and remove excess water during peak levels above the ordinary high water mark elevation (termed as "peak shaving" by some). To use an analogy familiar to all of us, the project as proposed is not designed to operate as a "bathtub plug drain" where you simply "pull the plug" and the water goes down relatively quickly. The large size of the lake and associated volume of water along with the small, discharge rate proposed would require longer-term continuous operation of the siphon discharge to produce noticeable elevation changes on the lake. Even with the proposed diversion in place and operating, lake levels could continue to rise and cause additional flooding damage.

Comment:
The EA states changing the water level in Shell Lake would have little impact on lake biota but how does altering the natural high/low cycle of the lake affect biota? The EA states that walleye populations would probably increase but the high mercury content of Shell Lake walleye over 15 inches makes them unsuitable food for pregnant or child-bearing aged women or for children younger than 15. The EA, in using increased walleye populations as a positive result of the diversion, fails to mention the health effects of eating Shell Lake walleye. How will the increased stabilization of water levels affect local strains of species that have evolved in a system with tremendous water level fluctuations?

Response:
Sections #15 – 19 in the EA (plus the amendments referenced in this document) contain fairly specific explanations of what effects we anticipate on biota from altering the

natural high/low cycle of the lake. The first paragraph on page 15 under section 16 in the EA describes anticipated effects on the fishery of Shell Lake from more stabilized water levels as a result of the proposed diversion. The anticipated changes would be subtle, limited in degree, and not significantly change the fishery of Shell Lake. It needs to be made clear that we do not view these subtle changes as necessarily adverse or beneficial. They are just biological responses to a changing environment as noted in the EA. Yes, there have been past mercury consumption advisories for mercury in Shell Lake walleye. Currently, there is a general mercury consumption advisory for walleye as well as other fish species in all waters statewide (which would include Shell Lake), but there is no specific size limit consideration for Shell Lake walleye. We do not see any link between mercury in walleye, the potential subtle changes in the walleye fishery of the lake from the proposed diversion, and the potential health effects of walleye consumption. Any present or future consumption advisories would remain the same regardless of any changes in the fishery of Shell Lake from the proposed diversion.

Comment:
The EA states that the water quality of Shell Lake will not be affected by diversions because natural water level fluctuations in the past have not affected the water quality. How many years of water quality studies are available to confirm this? In addition, natural fluctuations are caused by precipitation, run-off, evaporation, and groundwater seepage. Natural fluctuations will result in corresponding concentration changes in water chemistry. Are those naturally cycling changes necessary to sustain lake biota?

Response:
There have been several past studies on Shell Lake that, at least in part, provided documentation of water quality. That information coupled with the annual, ongoing, self-help lake monitoring program (since the mid-1980's) provides the basis for these statements in the EA. We know from all the studies and records that there was no evidence of water quality problems when the lake was at or near the target elevation of 1221.8 feet as proposed in the application for the diversion project. Due to the large size of the lake and relatively minimal reductions (i.e. maximum of only two or three feet) that could result from the proposed diversion, we do not anticipate any significant effects on water chemistry that could affect lake biota. The EA is hereby amended to reflect this clarification.

Comment:
The subject of possible erosion during construction is addressed in the EA, but in the "need" section there is no mention of the erosion experienced during high water levels or the attendant nutrient loading and sedimentation of the lake. Is this not considered significant in the Department's view?

Response:
Yes, you are correct. We failed to specifically address erosion related concerns during high water levels. The first paragraph under section #2 on page 2 of the EA summarizes the need for the proposed diversion based on information provided by the City to the Department as part of their application. This paragraph contains a reference to the

discussion of alternatives in section #25 of the EA. This erosion issue should have been addressed as part of the "No Action" alternative (**see responses on alternatives under section E. below**).

Comments:
I am concerned about water quality in Shell Lake since the high water could affect septic system performance in the areas not connected to the city's wastewater system.

I have personally witnessed the visual effects of serious Shell Lake surface water contamination from the air last June (2001) obviously due to high water on the non-sewered sides of the lake. I have also seen the effects on the homes and lives of neighbors. If high waters are unchecked, I believe it will seriously affect property values.

Allowing continued flooding of the existing development around the lake will have many negative effects, including sewage contamination from existing and abandoned septic systems, contamination from the flooded and abandoned buildings, contamination from the extensive ground fills around the lake, the drastic eye sore of dead trees and flooded/abandoned houses around the lake, hazards from abandoned and flooded structures near the ever changing shorelines, and not the least, substantial economic damage to a majority of the lakeshore properties both in personal loss and loss of tax revenue for the city (many properties would be totally flooded out to the road).

Response:
Yes, there will continue to be property damage and associated environmental concerns from ongoing flooding due to high lake levels. These issues are addressed under alternatives in section #25 on page 21 of the EA (**also see responses on alternatives under section E. below**).

Comment:
The project intake structure would obstruct navigation in Shell Lake and will be detrimental to the publics' interest in both waters of Shell Lake and the Yellow River.

Response:
Yes, the EA addresses this issue under the heading of "Aquatic Resources" in section 15 on page 12. At an elevation of 1221.8 feet, the distal end of the intake structure would be approximately 280 feet out into the lake from shoreline. At an elevation of 1221, the top of the structure would be about five feet below the water surface. This five feet of freeboard would ensure navigation is not materially affected. Deeper draft boats (eg. sailboats) would need to use caution when operating near the structure. The Department would require marker buoys to be placed at the end of the intake structure out in the lake as well as where the structure begins to emerge above the water surface about five feet from shore. The City has proposed to remove the exposed end of the intake structure should the water level ever drop below an elevation of 1218 feet. The EA is hereby amended to reflect this additional detail.

B. **Pipeline Design/Route**

Comment:
Scope of discussion in EA seems a little lacking in several areas: a.) impact to wetlands where pipe will be laid; and b.) erosion control concerns where pipe will be laid under tributary to Sawyer Brook.

Response:
Information under the headings of "Terrestrial Resources" and "Aquatic Resources" in section 15 on pages 11 and 12 of the EA addresses anticipated impacts to wetlands and the tributary to Sawyer Brook from installation of the pipe. The proposed route was selected to avoid direct and indirect impacts to wetlands. The stormwater construction site permit would require use of best management practices to prevent erosion and runoff during construction.

Comment:
Sawyer Creek and adjacent spring ponds support unique cold water ecosystems. How will warmer lake waters impact them?

Response:
Sawyer Creek is identified as part of the affected environment in the EA because tributaries and drainages leading to this stream would be crossed by the proposed pipeline. Anticipated impacts to these drainages from pipeline construction are addressed in the EA as described in the responses above. We are unclear as to what is meant by the reference in this question to impacts of warmer lake water on Sawyer Creek. The proposed diversion would discharge lake water to the Yellow River, not Sawyer Creek.

Comment:
One cannot help but be struck by how the proposed winding path of the pipeline itself carefully avoids crossing any DNR-managed lands adding significantly to the cost and complexity of the project. If the DNR is confident the diversion project presents no risk to the quality of the human environment, then why not let the pipeline be buried on their managed lands which would be a more expedient route to the Yellow River?

Response:
The City did consider a pipeline route option that crossed Department owned lands that are part of the Sawyer Brook Fishery Area in the early planning stages for this proposal. Department staff indicated we would be willing to consider potential route options across this state property. However, this would require some additional review and consideration by our local and central office staff in balancing the relatively limited interests of the City against the broader interests of the general public with respect to management objectives for this property. We further advised the City that there were portions of the Fishery Area property that were purchased with certain types of federal money that restrict future uses of that land. This issue would have required additional review as well. More importantly, after further engineering review, the City concluded that this route (irrespective of additional Department reviews/approvals) would require three additional borings of pipe under Sawyer Creek and result in an additional $200,000 in project costs. The City subsequently decided not to

pursue this route option any further. The EA is hereby amended to reflect this additional information on this route alternative.

Comments:
The 30-inch discharge pipe has the capacity for twice the proposed flow rate of 20 cfs. We recommend that the original estimates of potential damage to the ecosystem be recalculated using the maximum discharge rate.

Why is the discharge pipe 30 inches in diameter for 20 cfs? A 30-inch diameter pipe will allow 41 cfs discharge. Who will monitor discharge to ensure 20 cfs? Why isn't the pipe 15 inches in diameter?

Response:
This is the smallest pipe diameter available that could carry the maximum 20 cfs discharge. A 24-inch diameter pipe would not be capable of handling this maximum discharge rate. Yes, the 30-inch diameter pipe proposed in the project design could carry more water. We understand that the larger size pipe also addresses other engineering concerns such as changes in direction (vertically and horizontally) over the long distance of the pipe and velocity of water flowing in the pipe. The City would be required to monitor and maintain records of both the intake structure settings and discharge rates.

Comment:
Is it possible for agricultural run-off/drainage to filter into the diversion pipe?

Response:
The proposed diversion pipe would be a completely sealed system. Unless there were unexpected leaks or breaks in this system, there is no way for water or sediments along the route to enter the pipe. It is in the City's best interests to ensure this does not occur because it would limit operational capacity of the pipe to move the intended lake water. Given proper engineering, use of quality materials, and proper construction/maintenance, we believe the risks associated with this issue are minimal and insignificant. We hereby amend the EA to reflect this additional clarification on significance of risks.

Comment:
The pipeline route through continuous forest will generate an additional 8,300 feet of forest edge. This will be a permanent change in order to maintain the pipeline. How many of these impacts can occur before they are significant?

Response:
Much has been studied and written in recent years on the issue of forest fragmentation. Yes, the cumulative effect of repeated, similar actions could result in significant effects on forest related resources in certain areas. However, we believe this issue is not really relevant to the area in question. The anticipated effects from forest fragmentation are addressed in the third paragraph under the subheading "**Terrestrial Resources**" in section 16 on page 14 of the EA.

Comment:
The EA states that de-watering of wetlands or groundwater tables can be prevented by proper pipe placement, compaction of fill, and use of anti-seep collars. Are these methods part of the engineering plan?

Response:
The Department can and would develop specific permit conditions requiring certain measures to be used (such as those mentioned in the EA as examples) that are necessary to protect wetlands from erosion and potential dewatering.

Comment:
While the present plan represents a significant improvement from the City's original proposal which would have devastated the trout spawning habitat in the headwaters of Sawyer Creek, it is not without potential impacts to the stream. Our primary concern is the potential for siltation and ruination of trout habitat from construction runoff and possible flooding where an unnamed Sawyer Creek tributary crosses New Knapp Road on the eastern edge of Section 14, Town of Bashaw. This tributary crosses USH 63 as a dry run north of Bashaw Valley Greenhouse at the Samson farm site and continues (after another tributary joins it from the northeast) as a year-round spring-fed stream through lowland habitat westward across New Knapp Road. While this tributary has not been formally classified as trout water by the DNR, anecdotal reports indicate it is a spawning ground for trout which eventually make their way downstream to Sawyer Creek. Before the permit is issued, we ask that the DNR address the following questions:

a. Has the tributary in question been surveyed to determine the presence of young-of-the-year trout and other evidence of spawning activity? If not, the tributary should be surveyed to make such a determination.
b. If the tributary is found to be spawning habitat, construction should not be allowed during times when trout eggs or alevins are present. If construction is allowed at any other time, appropriate measures to protect this spawning area during construction and after should be imposed, and the DNR should assign a named monitor who should report his or her findings.

Response:
The particular tributary in question has not been specifically surveyed by our Department to determine the presence of spawning or young trout. However, Department staff have personally observed trout spawning activities in this tributary stream. The EA addresses the need to provide adequate erosion control during construction to protect this resource. The Department can and would provide adequate protection through permit conditions including certain erosion control standards and timing of when construction would be allowed in this area because of observed spawning activities and the fact that this is a tributary to Sawyer Creek which is classified trout water. The EA is hereby amended to reflect this additional information and clarification.

Comment:
Who will maintain the pipeline after it is built? The Town of Bashaw should not be responsible and landowners should be compensated if there's a pipe break and property damage occurs.

Response:
As applicant for the project, the City would be responsible for maintenance of the pipeline once constructed and liable for any damages.

C. **Yellow River Issues**

1. Property Flooding

Comments:
We are home owners who live on the Yellow River and are against the City of Shell Lake to construct a pipeline to divert water from Shell Lake into the Yellow River to lower the lake. We will be directly affected by dumping water into the Yellow River and have many concerns – property flooding, road flooding, environment issues, flood insurance (or inability to obtain flood insurance), and inability to sell our home because of man-made water dumping. Any plan to divert water from Shell Lake into the Yellow River will affect all property owners who live on the river and those who live near Beaver Pond Creek. What environment issues would this cause?

Every time we have heavy rains and/or heavy snow melt, Beaver Pond Creek and Green Valley Road is flooded, at times making it impassable. We don't need more water. We need to fix the water flooding problems we now have with our roads. Any water pumped into the Yellow River could cause the river level to rise causing flooding that could or may close Green Valley Road. How would emergency vehicles, school buses, and everyday traffic get through?

I guess the people of Shell Lake do not care about their neighbor's problems as long as their high water problems are fixed at the expense of others. Dumping water in someone else's backyard is not the answer. It would only create unknown problems in the future. Are the people of Shell Lake ready to pay for the problems that could be created by pumping their high water problems into someone else's backyard? Can anyone guarantee that there will not be other high water and/or flooding problems for the homeowners who live along the Yellow River? Who will be responsible for any flood damage to our home or property if our home is flooded? If we can't get flood insurance, we will not be able to sell our home and/or property. In that case I feel the City of Shell Lake should have the responsibility of buying it. If our home or property were flooded, we would expect the City of Shell Lake to buy our home at today's fair market value so we could build elsewhere out of the flood area. We need a guarantee and reassurance in writing from DNR and the City of Shell Lake that our home and property will be compensated for any flood damage the pipeline may cause and/or create. If any flood damage occurs to home and property who will take the responsibility and pay compensation to the home owners?

Response:
The property, resources, and infrastructure you describe in your comments are well above the proposed discharge site along the Yellow River and are not considered part of the affected environment for this project.

2. Volume and duration of discharge

Comment:
In general, the draft EA utterly fails to discuss what the predicted volume or duration of the water discharge from Shell Lake to the Yellow River will be. Therefore, it is impossible for the Wisconsin Department of Natural Resources to conclude, as it has in the draft EA, that the impacts of the proposed project will be insignificant.

Response:
Yes, you are correct. We did not discuss the predicted volume or duration of water discharged to the Yellow River. It is impossible for anyone to predict actual volume and duration of anticipated discharges because there are so many potential variables that would control these factors. These variables include such things as the actual lake level at any give time, time of year when diversions might/might not be allowed, rainfall, water levels on the Yellow River, etc. Given all the variables, there are essentially an infinite number of scenarios that could result in some form of water diversion. In the EA, Department staff tried to characterize anticipated results/impacts from the maximum discharge rate (i.e. a best or worst case scenario depending on your interests/perspective). We conclude that this "best/worst case" scenario would not result in significant effects. Any other discharge rate/duration scenario would certainly result in fewer impacts, at least to some degree, than those anticipated under the "best/worst case" scenario addressed in the EA. The EA is hereby amended to reflect this clarification.

Comment:
The EA states that "ramping up and down" the diversion rate would lessen the impacts on the spring-fed backwater. Ramping would not prevent the scouring of the backwater. With the sediments gone down river, anything living in them or dependent upon them would also be gone.

Response:
Yes, you are correct. The EA analysis says lessen, but it does not say it would prevent any and all anticipated impacts associated with scouring caused by the discharge. These effects are clearly and completely described under section 5 on pages 5 –6 and again under the subheading of "Aquatic: Biotic Communities" in section 16 on pages 14 – 15 in the EA.

Comment:
Who will monitor the Yellow River level to insure discharge does not take place at high river levels?

Response:
As previously stated in the responses above, the City would be responsible for monitoring the discharge and ensuring such discharges do not occur when flood flows are present in the Yellow River. The Department can and would develop specific permit conditions requiring operation of the discharge at rates that avoid adding water either during or immediately preceding/following (i.e. build in a buffer) anticipated flood flows on the river. Legally, the City cannot discharge additional water into the Yellow River that would result in flooding of property along the river and certainly would be liable for any damages.

3. Discharge velocity & sedimentation (scouring/erosion)

Comment:
The draft EA states on pages 14 – 15 that there could be "scouring of the existing channel" of the Yellow River and that, "…. water temperatures in the spring-fed backwater would also be altered." Yet the draft EA provides no factual information to support its subsequent conclusion that these potential impacts are not considered significant. Without any factual basis, this conclusion is simply unreasonable.

Response:
The issues of changes in river channel shape and temperature are clearly and completely addressed in sections 15 and 16 on pages 12 – 17 of the EA along with specific descriptions relative to the significance of these anticipated effects. Lowering the velocity of water at the discharge structure as proposed and gradually increasing (i.e. ramping) the volume diverted would minimize the degree and extent of scouring.

Comment:
The proposed discharge velocity at the end of the rock channel is 1.4 fps. The maximum flow in the backwater outlet channel in October 2001 was 0.1 fps. If paddling a canoe disturbs the substrate, increasing the flow 14 times will scour the back bay, completely altering the aquatic environment. The EA estimates 300 – 400 yards of bottom sediment will be scoured. Banks will be undercut and eroded (this will be ongoing) and floating vegetation mats will be washed into the river. According to the EA, these changes are "somewhat reversible" (Pg. 19 of EA). But once this alteration occurs, even if diversion stops, backwater sediments and therefore the ecosystem will not be restored in our life spans.

Response:
Yes, you are correct. The EA thoroughly addresses these anticipated effects and clearly acknowledges that some of these will be long-term and in fact, permanent changes.

Comments:
Where will the backwater sediments settle out in the river?

Another concern we have is that of sediment being deposited upon the bed of the Yellow River. At the present time I can stand on my dock and see clear sand any place below

me. With our property being this close to the outfall, I believe we will receive the bulk of the sediment generated at the outfall.

Response:
The anticipated effects from sediment transport, including location and extent, are addressed under the subheading of "Fisheries, Habitat, and Aquatic Life in the Yellow River" in section 16 on page 15 and further in section 20 on pages 18 – 21 of the EA. Sediments flushed from the discharge area would be sorted by size and weight. Sand particles closer to the discharge point would move only a short distance and resettle into the soft sediments within the backwater area. Larger organic particles may initially form a sandbar-like deposit near where the backwater area intersects the river channel. That deposit would subsequently be carried away and distributed more evenly downstream across the channel area as a result of higher runoff events in the river. The finest organic could travel some distance downstream but would eventually settle to the bottom in calm water areas and/or stick to vegetation in these areas. The section of river above Green Valley Road down to Hector Dam Road has very little change in gradient and acts almost like a flowage because of the constriction at the old dam site. Most sediment should settle out in this section of the river. The EA is hereby amended to reflect this additional description of sediment transport.

Comment:
A discharge at 20 cfs will raise the river level 1 – 3 inches. What, if any, will be the velocity increase?

Response:
Yes, we failed to address anticipated effects on velocity in the main river channel. The EA indicates that the estimated velocity of diverted water leaving the end of the rock channel below the end of the discharge pipe would be 1.4 feet per second (fps). The EA also identifies that the maximum velocity in the outlet channel of the spring-fed backwater area leading to the main river channel was measured in October, 2001 at 0.1 fps. Velocity varies with slope and channel characteristics at any given point. Velocity measurements can vary greatly across the width of a river channel due to many factors such as the presence of vegetation, rocks, stumps, etc. The stretch of the Yellow River through the proposed discharge site has a relatively flatter gradient than other parts of the river. It also has slower velocities due to the "impoundment effects" from the constriction created at the site of the old Hector Dam. Given the anticipated discharge velocities, we do not anticipate significant increase in velocity in the main river channel. There would be a small increase of velocity in the "mixing zone" below the point where water enters the main river channel. This additional increase in velocity would quickly dissipate as water moves a short distance downstream. The amount of initial increase in velocity and distance observed downstream would vary depending on river flow and amount of water being diverted. The EA is hereby amended to reflect this additional description of anticipated effects on velocity.

Comment:
The EA states that after the initial scouring of sediments the discharge of Shell Lake water into the Yellow River would have "little impact on fish and aquatic life in the river" (page 15 of EA). That assessment is inaccurate because water quality differences will always be present.

Response:
The reference referred to in the text of the EA actually says, "Once the mechanical effect on sediments subsides, the discharge of comparatively clean, sediment free water into the Yellow River would have little impact on fish and aquatic life in the river. Yes, there are differences in quality of water in the lake versus the river as clearly outlined in the EA. The EA also goes on to indicate that the general quality of water in Shell Lake is very good and is of comparable or better quality than that of the Yellow River. For some water quality parameters we expect there could be small positive effects on river biota as noted in the EA. Hence, water quality changes will have little impact on fish and aquatic life.

Comment:
According to the Environmental Assessment conducted by the DNR, erosion of riverbanks and potential changes in the river channel are a possible effect of the diversion of water from Shell Lake into the Yellow River. If erosion or changes in the river channel adversely affect our property, including our home, what remedies will be offered to us to mitigate these effects?

Response:
The EA addresses these potential stream channel changes as noted in previous responses above. As also stated above in previous responses, the City would be liable for any damages caused from flooding that would result in property damage. The Department can and would develop specific permit conditions requiring operation of the discharge at rates that avoid adding water either during or immediately preceding/following (i.e. build in a buffer) anticipated flood flows on the river.

4. Spring-fed backwater area and Yellow River biota

Comment:
What species use the backwater area for spawning or nursery or other life cycles? Since it will be completely altered, it should be checked in the field for endangered, threatened, and special concern species.

Response:
Terrestrial and aquatic animal species present in and around the Yellow River system (including the spring fed backwater area) are clearly and completely described under section 12 on pages 8 – 11 in the EA, including endangered, threatened, and special concern species. The EA goes on to clearly indicate, for example, that the greater redhorse (state threatened species) is found in the river but not in the spring fed backwater area. Further, the habitat requirements of endangered, threatened, or special

concern species known to be present in other parts of the Yellow River were compared to those habitat conditions currently present in the spring fed backwater area. No critical habitat needs of those species are considered present in the backwater area. In addition, Department staff made visual observations in and electro-shocked the area. No gamefish and very few fish of any species were found in summer, fall, or winter months, even when many of the species found in the river were present in areas adjacent to the backwater area. The only fish species observed in the backwater area were mudminnows, blacknose shiners, and common shiners. This backwater area may have more habitat value for amphibians and reptiles than for fish, but there is little evidence that this area provides any critical habitat for those species either. The EA is hereby amended to reflect this additional information and clarification.

Comment:
How many micro-environments like this backwater can be lost before the biota of the river is affected? How many have been lost already?

Response:
The second paragraph under the subheading "Spring-Fed Backwater Area" on page 10 of the EA indicates there are other similar areas along this stretch of the Yellow River in Washburn County. We are not aware of any of these areas being lost in more recent, modern-day times nor are we currently aware of potential future threats to other similar areas at this time. In other words, they are not in short supply (i.e. this isn't the only or last one on the river) nor does the area in question for this proposed project contain certain unique resource values that other similar areas along the river do not. The cumulative effect from repeated losses of these types of spring-fed areas would eventually result in adverse effects on the biota in this reach of the river.
The issue of potential cumulative effects from additional proposed diversion projects to similar spring-fed areas along the river is addressed in section 21 on page 19 of the EA.

Comment:
Page 17 of the draft EA discusses potential adverse impacts to aquatic life in the Yellow River and spring-fed backwater where water from Shell Lake would be discharged. These include potential impacts to fish, frogs, turtles, and aquatic plants. However, these impacts are not fully evaluated and there is very little factual information provided on them in the draft EA. Since these are public trust resources, the DNR has what is essentially a fiduciary duty to fully address the likely impacts to these resources. This is because the DNR is the trustee of these resources and is "the central unit of state government to protect, maintain, and improve the quality and management of the waters of the state, ground and surface, public and private." See Wis. Stat. 281.11; see also, Art. IX, Section I, Wis. Const.; and State v. Bleck ((Wis. 1983); Muench v. Pub. Serv. Commission (Wis. 1952). Because of the DNR's duty as a trustee over these resources for all of the citizens of the state, it must fully address these impacts in the final EA or, preferably, in a much-expanded environmental impact statement (EIS) for the proposed project.

Response:
Section 12 on pages 8 – 11 of the EA contains a detailed description of existing plant and animal species present in the Yellow River system, including the spring-fed backwater area (**see responses above in this section on additional clarification of species present**). Sections 15 and 16 on pages 11 – 17 of the EA contain a clear and complete analysis of reasonably anticipated impacts on these resources. We believe the EA fully addresses these issues in sufficient detail.

5. River water temperatures

Comment:
The EA states that water temperature and dissolved gases are similar between the Shell Lake intake level and the Yellow River (Pg. 13 of EA). This is inaccurate if the discharge temperatures are 5 – 10 degrees or more different from the Yellow River temperatures. The EA does not specify temperature units on page 13, paragraph 9 – both Celsius and Fahrenheit are used in the document. Temperature differences of 5 degrees Fahrenheit are lethal for all states of walleye. Temperature shock is not addressed in the EA for any species. Mobile species or mobile life cycle stages might be able to avoid the temperature plume, but non-mobile species or life cycle states (such as eggs and larvae) would be subject to temperature shock.

Response:
The reference referred to in the text of the EA (on page 13) actually says, "Water temperature and dissolved gases at the intake level on Shell Lake are generally similar to river conditions and stay within a desirable range for the river's warm water fish community throughout the year." We believe this is an accurate statement in the context provided. The next two paragraphs in this same section go on to further explain when and under what conditions we would expect some differences in temperature of water in Shell Lake and the Yellow River along with a description of the extent of the anticipated thermal plume in the river.

The EA does address the anticipated effects of these temperature changes on fish and aquatic life under the subheading "Fisheries, Habitat and Aquatic Life in the Yellow River" on pages 15 –16. The 5 – 10 degree temperature range provided was intended to give the reader some sense of the magnitude of anticipated temperature differences. This amount of change is expected in a relatively small area where water is mixing. The size of the mixing area and downstream distance cannot be precisely quantified because they will change based on the volume of lake water being discharged, amount of river flow on any particular day, and normal diurnal temperature changes in river water. The mixing of water with some differences in pH, conductivity, and other water quality parameters occurs at most any tributary discharge to a river. This is only a problem if water quality parameters for incoming water is outside acceptable tolerance ranges for aquatic life which we conclude would not be the case here.

Exposure to a 5 – 10 degree Fahrenheit temperature difference is common in nature and not, by itself, lethal to fish or other aquatic life in open environments. As an example, the

temperature and flow of Sawyer Creek at its confluence with the Yellow River (just downstream of the proposed discharge location) are very similar to what would be the case with this proposed discharge. The most critical period for thermal shock would be at the start or conclusion of a diversion event. Temperature shock also is most critical when combined with other stresses. Because the flow would be ramped up or down slowly, water temperature changes would be subtle rather than sudden as discharge water mixes with river water. We are also not aware of any other stresses that would make temperature shock a critical issue here.

Lastly, you are correct in pointing out that we failed to specify temperature units in this section of the EA. The temperature units should have been described as being in Fahrenheit.

We hereby amend the EA to reflect this additional information and clarification as described above.

Comment:
There is no provision for treating water diverted from Shell Lake to match the water quality of the Yellow River. Basic water quality parameters of pH and conductivity are not addressed. Temperature is inadequately addressed as no measurements of the Yellow River were taken. The EA contradicts itself in two separate discussions about water temperature. On page 17, it is stated that there are no anticipated detrimental temperature impacts during any time of the year. But on page 13, the EA states that discharge water could vary 5 – 10 degrees (no units used) or more in spring, summer, and fall.

Response:
Regarding the comments on temperature, see the response above. With respect to existing water quality parameters for the Yellow River, you are correct in that we failed to identify a full range of basic parameters. Recent and historical water quality data for the Yellow River above and below the proposed discharge point are available, but we believe most of these are unnecessary to even consider matching given some fundamental differences between lake and river water. A lake has relatively stable parameters compared to a river which can vary moment by moment. Matching the water quality of Shell Lake water to that of the Yellow River would require the additions of things normally considered as pollutants such as phosphorus, nitrogen, and lime or acid. Getting the right mix is both impossible and unnecessary given the natural range of variation in river water quality. For example, at one time the conductance value for river water was 200 while in Shell Lake it was 24. These values indicate significantly higher mineral content and biological productivity in the river, but neither condition is in any way toxic or detrimental to aquatic life. Depending on the flow rate, the proposed diversion could dilute conductivity down to 179, but the difference between that value and 200 is inconsequential considering the natural range of values in the river.

We hereby amend the EA to reflect this additional information and clarification on water quality parameters. This additional information does not materially change the remaining analysis provided in the EA.

6. Mercury transport

Comment:
The effects of adding more mercury to the Yellow River system on Yellow Lake mercury levels are not addressed. Shell Lake water may dilute the mercury concentration in the Yellow River, but the total amount of mercury will increase. This mercury can be expected to be methylated in Yellow Lake's less oxygenated water.

Response:
The anticipated effects from mercury transport are thoroughly addressed in the second and third paragraphs under the subheading "**Aquatic: Water Quality**" in section 16 on page 16 of the EA. The EA further acknowledges that some mercury would be transported into the Yellow River system. We are not aware of any studies that link increased levels of mercury to a subsequent increase in methylation for open environments.

Comment:
According to the Environmental Assessment conducted by the DNR, mercury levels are significantly higher in Shell Lake than in the Yellow River. Walleye from Shell Lake contain above-average levels of mercury (resulting in advisories for limited consumption), whereas walleye in the Yellow River have fairly low mercury levels (no advisories regarding consumption are necessary). What long-term health effects will occur to residents along the Yellow River due to increased levels of heavy metals (mercury) in their immediate environment? Why would the introduction of higher mercury levels into the Yellow River not be considered a significant environmental issue and cause for concern?

Response:
The EA indicates that mercury levels in water are lower (not higher) in Shell Lake than in the Yellow River. As further indicated in the EA, a recently measured level of mercury from Shell Lake was 1.8 ng/l and the level for the Yellow River (just upstream of the proposed discharge site) was 7.5 ng/l. Mercury levels in the proposed discharge would not pose an increased health threat from exposure to residents along the Yellow River.

Mercury concentrations in fish are higher in Shell Lake than in those from the Yellow River. Factors other than mercury availability determine what the concentration will be in fish flesh, which is why fish from Shell Lake can higher concentrations of mercury when levels in water are lower. The EA is hereby amended to reflect this additional clarification.

7. Wild rice beds

Comments:
There was no mention of how much suspended sediment will move down the discharge pipe. Will wild rice beds in the Yellow River be impacted?

This project will manipulate the aquatic resources of the Yellow River, but the impacts of this manipulation have not been thoroughly addressed in this assessment. The Yellow River supports a number of quality wild rice beds that will be impacted by the proposed discharge. Silt from the scouring at the discharge location and water level fluctuations will be deposited where the water flow slows at the rice beds. Water level fluctuations during the floating leaf stage of the rice will also have a detrimental effect on the rice. The timing of the discharge is not clear in the assessment.

Floating vegetation mats from the backwater will probably lodge against the wild rice, blocking sunlight and preventing germination.

As owners of frontage on the Yellow River, we feel this project will directly affect us. One of the first concerns we have is for the wild rice bed directly adjacent to our property. This bed of rice is one of the largest and finest on the Yellow River. We have seen what the introduction of water from a different source will do to wild rice in Sawyer County. What will the introduction of the water from Shell Lake do to the wild rice in the Yellow River? This has not been adequately addressed in the environmental assessment. If the wild rice is destroyed, the vast amount of wild birds and waterfowl will not be attracted to this area. This infringes upon our rights and other users of those resources to enjoy this natural beauty.

I am concerned that the additional volumes of water to the Yellow River will adversely alter the wild rice beds downstream of the discharge structure.

Response:

The third paragraph under the subheading "Fisheries, Habitat and Aquatic Life in the Yellow River" on page 15 of the EA references the fact that relatively clean, sediment free water from Shell Lake would be discharged into the Yellow River. It is anticipated that the only sediment moving down the discharge pipe would be from normally suspended sediments in the lake water column. Water quality data collected for Shell Lake from an 11-year period of study indicate the average total suspended solids to be less than 2 mg/l, which is considered to be minimal. In addition, a gravity discharge system (such as proposed) does not tend to pull as much sediment as in a pumping system. The proposed gravity system would draw water from the top of a pipe in an area of relatively firm bottom substrate. Therefore, we would not expect any significant contributions of sediment into the Yellow River solely from lake water.

Regarding potential impacts on wild rice beds in the Yellow River, information presented under section 16 on pages 15 – 16 of the EA clearly addresses anticipated effects on wild rice with respect to sediment transport, floating vegetation, changes in water levels and flows, and potential contaminants. To further clarify, we would expect that floating vegetation mats from the spring fed backwater area would be broken off in smaller pieces. During the germination stage for wild rice, stems are soft and floating. River currents would quickly move any dislodged, smaller pieces of dislodged vegetation on downstream.

We hereby amend the EA to reflect the clarifications described above.

8. Dissolved gases

Comment:
Page 16 of the draft EA discusses the fact that dissolved gas could impair or even kill fish, yet the draft EA simply concludes that this won't happen if the "system works as anticipated." By this logic there would never be a need for an EA or EIS for any project if the proponent of the project simply asserts that there would be no adverse impacts if the project works as anticipated and the DNR accepts it at face value. However, it should be obvious to DNR by this time that the environmental review process under Wis. Stat. 1.11 (WEPA) must go beyond the acceptance of such assertions and sweeping generalizations and consider, through a good faith analysis, what types of impacts would be expected if the project fails to work as anticipated by its proponents. This, of course, includes the consideration of "available alternatives" to the proposed project. See City of New Richmond v. Wisconsin Dept. of Natural Resources (Wis. Ct. App. 1988).

Response:
It is impossible and unreasonable to expect that any environmental analysis address potential impacts from any and all remotely possible failures. In addition, as noted in previous responses above, the Department does not have the authority to review the engineering design parameters for many project proposals (such as this proposal) and thereby provide approval on the capability of structures to operate and function successfully under all conditions. However, through our experience we recognize that structures can and do fail sometimes even with the best of engineering designs. Therefore, many of the statements in our environmental analysis documents are provided in ways that attempt to clarify the Department's extent of authority or responsibility. We believe this sort of presentation represents a clear, factual disclosure of anticipated impacts within those contexts. Regarding the comment about alternatives, please refer to responses on alternatives in section E. below.

Comment:
Treatment of diversion water for super-saturation of nitrogen is not necessary according to the EA as long as the "system works as anticipated", and the EA proposes retrofitting the system if problems occur. Who will be doing the monitoring and on what schedule? It is preferable to build treatment for dissolved gases into the system before first use to prevent environmental impact.

Response:
Please refer to the immediate response above regarding statements of "if the system works as anticipated" found in the EA. The Department believes that water moving through the pipe system would be subjected to compression forces that would tend to elevate dissolved gas levels enroute. These forces would clearly not be of the same magnitude as large dam discharges where fishery problems have been documented. There is no reason to anticipate the pipeline itself would cause a problem, however, there

may be times when water at the lake intake as well as in the Yellow River are already slightly super-saturated from natural causes. As previously indicated in other responses above, the City would be responsible for monitoring potential effects from the proposed discharge, including effects from dissolved gas saturation and will be responsible for any corrective actions necessary. Monitoring would be required daily during any water diversions. The Department also would intend to monitor the situation to ensure the range of values remains within acceptable saturation percentages. The EA is hereby amended to reflect these additional clarifications.

9. Levels and flows in river

Comment:
As long as the diversion is practiced, the river elevation fluctuation will be affected by increasing the number of days of high flows and decreasing the number of days of lower flows. The river level will be more constant instead of naturally variable. How does that affect the river ecosystem?

Response:
It is impossible to predict all the potential diversion scenarios as noted in previous responses above. Therefore, we cannot predict the number of days some amount of additional flow (at any given time this could vary from a few cfs all the way up to the maximum of 20 cfs) would be added to the river. It is important to differentiate here between increased levels versus increased volume caused by the diversion. As indicated in the EA, we expect the proposed diversion would result in some minor increased levels for a short distance downstream of the discharge point. So, yes, there could be higher levels in a short stretch of the river than would otherwise normally exist without the diversion. However, we know this would not create increased number of days of high flows in the sense of something close to flooding situations because diversions would not be allowed immediately preceding/following or during flood flows. We do not believe any minor increases in water elevation would significantly affect the river system because these situations would be of relatively short duration and extent. In addition, the river would continue to experience natural flow variation from precipitation and runoff in the upstream watershed that would completely overshadow any possible effects from this small change in elevation. The proposed diversion would contribute some total additional volume of water into the Yellow River system. Again, as with elevational changes, we believe the potential additional volume is relatively small when compared to the total volume of water in the Yellow River system. Therefore, we do not anticipate any significant effects from the total volume added to the system either. The EA is hereby amended to reflect these clarifications.

Comment:
The EA contradicts itself on page 13 when it states, “This increased river stage would decline as distance downstream increases.” But, also on page 13, concerns about water levels on Yellow Lake 28 miles downstream are addressed.

Response:
The first statement in the second paragraph under the subheading "Yellow River" on page 13 of the EA is referring to increased levels. The fourth paragraph under this same section is referring to increased volumes. Please refer to the response immediately above that clarifies these differences.

Comment:
The proposed diversion system offers the unique ability to control the lake level within reason. However, it will also maintain the Yellow River level during periods of low water while minimizing high lake and river water levels. The water quality drained into the river is superior to that existing, and the nature of the diversion system is such that the chances of exotic river species propagating upstream into Shell Lake are non-existent given the necessary throttling points.

Response:
Yes, the EA fully addresses these issues. Thank you for your comment.

10. Indian burial grounds

Comment:
There are Indian burial grounds along the Yellow River in the vicinity of Rice Lake. Has there been any study of this area to ensure that flooding will not occur, disrupting burial sites? Also, the wild rice beds that are threatened by the proposed project have cultural significance to the Indian community that cannot be dismissed or discounted.

Response:
Yes, we are aware of these Indian burial grounds. However, they were not mentioned in the EA because we do not believe they are part of the environment potentially affected by the proposed diversion. As stated in several responses above and in the EA, the City would not be allowed to divert water during flood flows in the river. Therefore, the diversion would not increase flood flows beyond what normally and naturally occurs on the river now. The issue of potential effects on wild rice beds in the river has been addressed in the EA and responses to similar questions above.

11. General environmental concerns

Comment:
This project will manipulate the aquatic resources in the spring pond area and discharge creek to the Yellow River, but the impacts of this manipulation have not been thoroughly addressed in this assessment. Short and long term impacts to the spring pond area and discharge creek that currently carry the 0.06 – 0.17 cfs of spring water to the Yellow River need to be assessed. The addition of 20 cfs to these areas will surely have permanent impacts on the spring pond area and discharge creek and cause siltation down river not to mention destroy the current spring pond ecosystem. To state that the spring pond is a spring-fed backwater directly connected to the river is again misleading to the

public reviewing the document. Even in high water situations, the spring water would tend to back up in this area, spring water that is cooler than the river water.

Response:
These issues have been fully addressed in the EA and previous responses above.

Comment:
The EA states there will be no significant adverse environmental effects from the diversion, but:

a. The river flow rates used in the EA are estimates. They should be actual in order to draw conclusions.
b. The river temperature in October 2001 was 43 degrees Fahrenheit at the backwater outlet. What is the river's temperature throughout the year? Are there any actual, rather than estimated, data?
c. Blandings turtle and bull frogs (state threatened and special concern species) MAY hibernate in the affected area (the affected area of the Yellow River was not surveyed for species present). How will winter diversions affect them? How is Blandings turtle and bull frog biology affected by diversion at all times of the year?
d. Macro-invertebrates in the affected section of the river have not been surveyed
e. Mussels have not been surveyed in the affected area. Sediment settling could kill them.
f. The EA states the "effects on the Yellow River wild rice beds, and possible effects of dissolved gases on fish and aquatic life are not entirely known at this time (Pg. 20 of EA).

Without this data, how can the conclusion of no significant impact be reached?

Response:

a. The river flow rates presented in the EA were actual rates measured with a flow meter. Such guaging is still considered to be an estimate due to variations with different types of equipment and flow rates across a given river channel configuration.
b. See responses above on temperature.
c. See responses above regarding effects on fish and aquatic life in the spring fed backwater area and Yellow River.
d. Based on our general knowledge of the macro-invertebrate community in the Yellow River system, we do not believe the scope of the proposed diversion has the potential to affect this resource. Therefore, they were not surveyed.
e. Again, based on our knowledge of mussel populations in the Yellow River system, we do not anticipate any potential significant effects on mussels, including sedimentation (see related responses on sediment transport above)
f. See related responses above on these issues.

We believe there is sufficient information presented in the analysis to conclude there would not be significant effects on these resources.

Comment:
If a permit is issued for this project:

a. Diversion during wild rice floating leaf stage cannot be allowed. The St. Croix Tribe should be notified before any diversions in June and July so that the stage of rice development can be verified.
b. Diversion cannot be allowed if the Yellow River is at or above the ordinary high level.
c. Diversion cannot be allowed without notifying the Yellow Lake dam owner.
d. Shell Lake shoreline owners must be required to bring back native shoreline buffers. The permit must forbid filling and development of shoreline.
e. New invasions of exotics into Shell Lake that are not also in the Yellow River must require discontinuing the diversion until modifications can be put in place to prevent transport to the river by the pipeline.

Response:
All of these issues have directly and/or indirectly been fully addressed in the EA. These comments relate more specifically to the permit decision making process rather than the environmental analysis process. The Department can and would consider all of these issues relative to potential permit conditions which could be necessary to minimize or avoid impacts to these resources.

Comment:
We are concerned as to what our alternatives will be if this project takes place and we see the gradual environmental decline of the river. How do we document this decline? Do we sue the City of Shell Lake? Do we do nothing and simply suffer because of someone else's problems?

Response:
As indicated in previous responses above, the Department is responsible for ensuring adequate resource protection through necessary permit conditions should the decision be made to grant a permit. The City is liable and responsible for damages incurred as well as subject to potential enforcement action should they fail to operate within the parameters of any permit.

Comments:
Our major concern is that we recently asked a DNR representative if the Department could assure us that there would be no environmental damage to the Yellow River. He could not. If the state agency, which is entrusted to protect our natural resources, cannot assure us that there will be no environmental damage with this project, how can it even consider issuing permits for this project?

What will this do to property values for those of us that live down river if it comes to pass that this water drainoff from Shell Lake has an adverse effect on the river that wasn't known about beforehand?

Response:
As indicated in previous responses, the Department must operate within the authority given to us. As with many of the projects we regulate, we are not responsible for some of the aspects (eg. engineering) that go into a project design. We are not in control of every aspect of these types of projects. Therefore, we cannot make any ironclad guarantees, for this project or many others where we have regulatory authority, that there will be absolutely no environmental damage.

Comment:
The majority of the 365 cabins surrounding the shoreline of Shell Lake were built 25 to 50 years ago, before modern septic systems were available. Many have not been upgraded to today's standards. Also, a majority of the septic systems surrounding the lake belong to seasonal residents and may not have been well maintained over the years. We have seen examples of infrared photography on similar lakes that show the seepage of raw sewage from these older type septic systems into lake water. We are concerned that the diverse species in the Yellow River habitat, which is already downstream from Spooner, will not survive in their present abundance if seepage from many antiquated or poorly maintained septic systems is allowed to enter the Yellow River system. Of further concern is the fact that the Yellow River flows north to Yellow Lake and eventually empties into the St. Croix River.

The current proposal calls for lowering the water levels in Shell Lake each year through an artificial pipeline system, primarily during the spring and fall months. These are exactly the same times of year when the cabin owners surrounding Shell Lake apply fertilizer and herbicides to their lawns, creating chemical runoff into the lake and, as proposed, into the Yellow River. How will fish spawning be affected when fertilizer/herbicide flows down the river in the spring? As anyone who has canoed on the Yellow River in late July or August will attest, the river is already choked off by large amounts of weeds at that time. If additional fertilizer runoff is diverted into the flowage, one can only imagine the over-growth of weeds that will occur. Conservation efforts have already been made in northwestern Wisconsin to preserve or restore natural vegetation along shorelines as "buffer zones" against such fertilizer runoff. We have observed that the majority of lakefront properties surrounding Shell Lake have a "traditional lake cabin" appearance with large expanses of grass, lake of natural waterfront vegetation, and mowed lawn areas extending to the shoreline. By contrast, property owners in our area have made a concerted effort to preserve natural shorelines along the Yellow River. We are concerned about the quality of water that will be diverted into the Yellow River under this proposal.

Response:
These water quality issues have been fully and completely addressed in the EA and previous responses above.

Comment:
The Environmental Assessment published by the DNR acknowledges that there are threatened animal species (osprey, Blandings turtles, redhorse) and "species of concern"

(bullfrogs) in the Yellow River system, but also makes statements such as the following: "…. Possible effects of dissolved gases on fish and aquatic life are not entirely known." The same document acknowledges that wild rice beds may be adversely affected, a plant species that is considered to be "rare to uncommon" in Wisconsin. How can a state agency that is charged with the protection of the Wisconsin environment continue in good faith to endorse this project when threatened animal and plant species may be adversely affected?

Response:
The EA neither endorses nor opposes the proposed project. That is not the purpose of the environmental analysis process. As presented in the EA and many responses above, we believe the anticipated effects on the resources referenced, to the extent that they may occur at all, will not be significant.

Comment:
The Environmental Assessment describes detrimental environmental effects to the Yellow River from this project, including the "super-saturation of dissolved gases" such as nitrogen which could result in chronic fish health problems; temperature of water entering the Yellow River up to 10 degrees Fahrenheit warmer than the surrounding water, which will be fatal to cool-water species; and the increased ability of the river to carry sediment, causing problems for fish such as reduced gill functioning and interference with spawning. Because we, as average citizens, do not have easy access to biologists or biochemists for consultation about the long-term results of these conditions, we believe that further investigation is necessary and a full explanation of these conditions should be made to the public. The current Environmental Assessment simply dismisses these conditions as "insignificant" without any explanation that the average person can appreciate or understand. It is as if the DNR expects us to "take their word for it" without making the public fully aware of the possible consequences of the project.

Response:
The EA as well as previous responses above address all of these issues fully and completely.

Comment:
If this proposal is ultimately to be accepted, we respectfully request at least a three-year delay to accomplish the following: 1.) a comprehensive inspection of the septic systems of all lakefront cabins surrounding Shell Lake to ensure that current standards are met, mandatory upgrading of all septic systems that do not meet current standards and a system for future, ongoing inspections to ensure the maintenance of these septic systems; 2.) that all lakefront cabins surrounding Shell Lake be required to establish natural shoreline vegetation, with "buffer zones" of native plants to absorb and filter fertilizer runoff; 3.) that further research be conducted regarding the impact of the project on threatened species and "species of concern"; 4.) that further research be conducted to rule out the possibility of unintentional introduction of non-native plant/animal species into the Yellow River system via the proposed pipeline; 5.) that alternative plans be explored, such as diverting the excess water from Shell Lake for the irrigation of local farm fields.

Surely there are farmers in the area who would welcome the opportunity to irrigate their corn crops with a subsidized water supply. It is ironic that the route of the proposed pipeline traverses areas of agricultural land, yet no thought has been given to releasing at least some of the water here. We do not think that such alternatives have been given sufficient consideration.

Response:
All of these issues have directly and/or indirectly been fully addressed in the EA. These comments relate more specifically to the permit decision making process rather than the environmental analysis process. The Department can and would consider all of these issues relative to potential permit conditions which could be necessary to minimize or avoid impacts to these resources.

Comment:
Will this increase in water flow affect the weed growth problem in the river (i.e. will the river become more choked with weeds than it already is?). Each year in the summer months the river becomes more overrun with river grass and weeds that in August you can hardly see the water.

Response:
We do not anticipate the proposed diversion would create conditions stimulating additional new plant growth in the river beyond current conditions. The anticipated water quality impacts that relate to this question are presented under the section title "**Aquatic: Water Quality**" on pages 16 – 17 in the EA.

D. **Yellow Lake Issues**

1. **Effects on lake levels**

Comments:
Page 15 of the draft EA states that, "…. the additional volume of water entering the Yellow River system from Shell Lake could have an effect on lake levels in Yellow Lake (28 miles downstream in Burnett County). There have been frequent high water concerns on the part of lakefront residents in recent years." However, the significance of these impacts is not even addressed in the draft EA. This, too, is unreasonable.

Yellow Lake does not have a dam on its outlet. It's outlet consists of a free flowing, fast moving channel that flows into Little Yellow Lake and then into the Danbury Flowage and does not directly affect water levels on Yellow Lake. I'm not overly concerned over possible negative effects on Yellow Lake levels that would result from the diversion of the volumes of water indicated.

Response:
The Q 7,10 for the Yellow River at the dam in Danbury is estimated to be 130 cfs. In contrast, the Q 7,10 at the culverts on the Yellow River under Tozer Lake Road (near Spooner) above the proposed discharge site is estimated at 27 cfs. Thus, even at low flow

conditions, the river flow at Danbury is almost five times that at Spooner. Therefore, on a percentage basis, the addition of 20 cfs (maximum) from the proposed diversion would have less relative impact at Yellow Lake than upstream near the diversion site. In addition, the mean flow at Danbury (325 cfs) is at least twice that of the expected mean flow near the discharge site. In other words, a maximum 20 cfs discharge would be a lower percentage of the total flow leaving Yellow Lake than it would be near the diversion point on the river.

As indicated in previous responses above, the EA clearly states that there would be an additional volume of water entering the Yellow River system from the proposed diversion. This does not necessarily equate to changes in levels on Yellow Lake. We believe this additional volume can be managed through routine management of water at the dam below Yellow Lake. The Department can and would provide necessary permit conditions to ensure proper notification with the dam owner on anticipated discharges from the diversion pipe as indicated under the subheading "Yellow River" on page 13 in the EA.

We hereby amend the EA to reflect the additional information and clarifications described above.

2. **Hydropower dam operation**

Comments:
Concerned about more water in Yellow River system from proposed Shell Lake diversion given that there have been high water problems in recent years on Yellow Lake due to problems with operation of the hydropower dam. Also concerned in general about weeds and poor water quality in Yellow Lake.

Concerned about adding water to Yellow Lake given the high water problems they have had from operation of the hydropower dam.

The Yellow River, originating near Spooner, flows north and west to Big and Little Yellow Lakes continuing to a dam and hydrogenerating complex and then discharges into the St. Croix River near Danbury. The dam controls the flow of water through this complex for two distinct purposes – first to maintain the water level of the lake and secondly, to generate electrical power. The lake level is regulated with a license authorized by the Federal Energy Regulatory Commission (FERC). Maintaining the lake level consistent with the FERC regulation has been an ongoing problem with some initial documented complaints to the FERC and the DNR dating to the early 1970's. Throughout 2001, the lake level was consistently higher than federal regulations call for. In early spring there was rapid snowmelt and heavy rains resulting in heavy flowage of many rivers in the area including the Yellow River through both lakes. This resulted in significant flooding of Big and Little Yellow Lake as well as the Yellow River flowing to the dam. Throughout later spring and all summer, the water level remained four to five inches above the regulated level on the lakes. In mid to late summer while the water level of the lakes remained high, water levels farther downstream closer to the dam were

significantly lower than normal. Even though the natural conditions changed from very wet in the spring to very hot and dry in the summer, the lake river levels could be adequately maintained within the limits explicitly defined by FERC. As a result, a number of lakeshore property owners lost established shoreline and landscaping. Property owners along the Yellow River, due to the extremely low water down river, also lost use of the waterway and natural resource for which they are taxed. North American Hydro, Inc., operators of the dam, with the DNR have reported significant difficulties maintaining the water level and indicate three areas of contention that contribute to problems in maintaining the lake level: (1) the narrow bridge between Big and Little Yellow Lakes is thought to restrict the water flow from the big lake; (2) silt, sludge, and/or sand build-up in several areas is thought to restrict the water flow; and (3) weed growth downstream of Little Yellow Lake is thought to restrict flow. With over 30 years of experienced problems and most recently, the experience of 2001, there is serious concern with the influx of water from the project underway to alleviate high water of Shell Lake. If the levels of Yellow Lakes and River could not be maintained with the existing natural sources, it will be more difficult with the additional Shell Lake water. If the flow is significant enough to affect the level of Shell Lake, it will be significant enough to affect the level of Yellow Lake which is about the same size. The Lake Level and Licensing Committee of the Yellow Lake Sportsman's Club is working with North Amercan Hydro, the DNR, FERC, Corps of Engineers, and elected officials to express our concern over management of the water level in Yellow Lake. We would like your assurance that the issues mentioned above are accounted for in the Environmental Assessment for the proposed Shell Lake diversion project.

Response:

As previously stated publicly, the Department believes the issues associated with high water levels on Yellow Lake are directly linked to proper management of dam operations. We have notified the Federal Energy Regulatory Commission of our concerns and will continue to work closely with property owners on the lake to resolve the high water problems. Further, while we believe the proposed diversion will require some attention to managing the additional volume of water in the system at the dam, we do not believe the project would affect existing water levels on Yellow Lake in any measurable way (**see related response above on flows and dam owner notification**).

E. **Alternatives**

Comment:

Conclusions from the USGS study indicated groundwater inflow and discharge do not have significant, direct effects on lake surface elevations. The report concluded that during low stage elevations (drought periods), the effects from previous drawdowns would further depress lake levels. Did the City ever consider creating a second lake that would hold withdrawn water so it could be pumped back into Shell Lake during drought (partially addressed in EA on page 24)?

Response:
To our knowledge such an alternative was never given much serious consideration because the City never intended to divert water back into the lake as part of any proposal. We discussed this option briefly with the City, but it was subsequently considered not to be a practicable or reasonable alternative due to potential concerns such as size of area required, location, seepage losses, and cost (**see related responses below on WEPA requirements for consideration of alternatives**).

Comment:
Another disturbing fact is throughout this 15-year period no alternative strategies have been developed to deal with the issue of rising water and the structures built on the shoreline. Only variations of water diversion, Sawyer Creek, diversion pipe, etc., are taken seriously. On page 24 of the EA several alternative strategies are mentioned but no researched nor described. Why are some of these alternatives not being seriously considered? Many of us are extremely disturbed about the consequences of the proposed water diversion: potential lawsuits; environmental problems that can be anticipated and environmental problems that cannot be anticipated; stopping the natural rise and fall of the lake level that has been occurring since the time of the glaciers.

Response:
WEPA requires that the Department evaluate alternatives to the proposal including the anticipated impacts from such alternatives. WEPA only requires an evaluation of reasonable alternatives which has subsequently been determined by the courts to mean those that are practical and feasible from a technical and economic standpoint. Further, as indicated in previous responses above, the standards the Department can apply in exercising its existing authorities does not allow us to substitute an alternative to what is proposed. In essence, we do not have the authority to direct a project applicant to pursue a particular alternative or assure that the best alternative is selected for a particular project. We believe our EA contains an adequate and appropriate analysis of alternatives as required under WEPA within the constraints of our existing authority.

Comment:
FEMA along with other organizations have awarded a grant of $169,000 to move or flood proof three structures on the shoreline (described on page six of EA). What has been the result of moving or flood proofing of these shoreline structures? The data that are or have been received from the moving and flood proofing will be very valuable in developing one or more of the alternative strategies described on page 24 of the EA.

Response:
It is our understanding that to date, none of the three structures have been moved or floodproofed. In fact, we understand that the residents of two structures proposed for floodproofing under this grant have decided not to pursue this opportunity for reasons we are not known to Department staff. The third structure proposed to be moved is the City's shelter house. Construction is currently underway to complete this move.

Comment:
Alternatives to a diversion are mentioned but not assessed. Again, the situation is presented as "high water" when it is within the natural fluctuation of the lake. An alternative analysis using weighted criteria including regulatory acceptance, economic, and environmental impacts should be included in the assessment.

Response:
This type of alternative analysis using weighted criteria for certain standards is not required under WEPA (**see related response above in this section**).

Comment:
Moving houses is a better option. Houses were moved off the Namekagon River when the National Riverway system was adopted.

Response:
Yes, moving structures out of the way of rising water would be one way to deal with the high water problems. Moving threatened structures off the lakeshore is an alternative identified and addressed in the EA.

Comment:
The report addresses many issues in detail that seem less important than the consequences of doing nothing to control the lake level which was not addressed.

Response:
Yes, we failed to provide a more full disclosure of anticipated consequences resulting from the "no action" alternative. Taking no action to control the lake level would result in additional resource and financial impacts. For the lake habitat, waves would erode the shoreline and destroy important habitat for fish and aquatic life at and near the water's edge (i.e. littoral zone). This same habitat is likewise affected or destroyed when riparian property owners try to correct erosion and loss of water-front areas by adding fill on the lakeshore. Many tree species on the shoreline provide vegetative buffers and would die when their roots are submerged for extended periods of time. In addition, extended high levels that inundate lawns, septic systems, and out-buildings used for storage of fuels and garden chemicals would draw contaminants into lake water, and thereby, affect water quality. Financial impacts are both direct to property owners from damage incurred as well as indirect to the community in loss of tax base (from lost structures) and costs associated with repair/replacement of roads and utilities. We hereby amend the EA to reflect this additional description of anticipated impacts.

F. **Introduction of Exotics**

Comments:
Paragraph (2) on page 16 of the EA states, "There are no significant concerns over the spread of exotic species from Shell Lake into the Yellow River. At present there are no plant or animal species in Shell Lake that are non-indigenous to the Yellow River." This statement typifies the flawed "tunnel-vision" endemic to this entire environmental assessment. The

DNR's myopic view of this proposed diversion project is a static environment between just two bodies of water. The DNR fails to comprehend that this is in face a dynamic environment subject most of all to the vagaries of mankind. Thousands of boats from all over the United States and Canada are launched on Shell Lake each year because of its recreational popularity. If just one of these boats were to introduce a noxious exotic species into Shell Lake, it would be spread almost immediately to the entire Yellow River ecosystem. The DNR's entire report consistently fails to consider any potential havoc to this ecosystem as a result of human interference. Once again the DNR fails to provide an adequate response for preventing this potential ecological catastrophe in their Environmental Assessment. Again the DNR has not met the requirements for granting a permit under Section 30.18 and Section 281.35(5)(d)(6).

Shell Lake, as well as all lakes our county, are at risk for the introduction of exotic species (eg. Eurasian water milfoil). Will the intake pipe in Shell Lake be designed to stop the spread of possible invasive plants to the Yellow River?

The EA (page 18) identifies the presence of rusty crayfish in the Yellow River. Will pipe design stop the spread of nuisance crayfish upstream to Shell Lake?

We are concerned about the potential introduction of additional non-native plant and animal species into the Yellow River habitat. According to the Environmental Assessment conducted by the DNR, this is a very real possibility. We already have an abundance of purple loosestrife, an invasive, non-native plant. Since our area of the Yellow River is shallow and is primarily a "canoeing river", we have not been subject to the problems associated with larger boats that are often transported by trailer from one lake to another. As we understand it, this is a primary means of transmission of foreign species of plants and animals such as Eurasian water milfoil and zebra mussels. For example, if a Shell Lake resident has used his/her boat on the Mississippi River, we could be subject to an invasion of zebra mussels that will displace the native population of clams and mussels in the Yellow River, which could impact any number of species of birds and animals that rely on this food supply. If a boat transported from another lake contains even a small strand of Eurasian water milfoil, then the Yellow River could be infested, as well as Yellow Lake and the St. Croix River.

The pipeline would serve as a conduit for introduction of exotic species to either of the two water bodies.

Response:
Yes, the EA clearly indicates the proposed pipeline could serve as a conduit for transfer of exotic species between these two water bodies. The first two paragraphs on page 16 of the EA address anticipated effects from this potential transfer. In addition, the proposed intake structure would contain perforated pipe with only ¼-inch diameter openings. This would restrict opportunities for exotic animal species that might possibly be able to migrate up over four miles of enclosed pipe from entering the lake. Further, the discharge end of the pipe should be screened/covered during times of no discharge to eliminate entry into the pipe. The EA is hereby amended to reflect this additional information.

G. **Setting a Precedence**

Comments:

In their Environmental Assessment the DNR fails to reference a single existing case study or precedent to support any of their statements regarding the possible ecological impact of the proposed lake diversion project. This means the entire Environmental Assessment itself is based on nothing more than supposition and conjecture on the part of those who wrote it. It is not based on any documented facts.

If the permit for diversion is issued, a precedent is set for other towns to permit construction within a lake's natural levels of fluctuation. Further environmental manipulation would then occur to protect those structures. People don't plan in terms of the earth's natural cycles. We quickly forget what's gone if it interferes with what we want in the present. Nonetheless, the earth's cycles continue. Building permanent structures within a lake's normal fluctuation is a blind investment of resources. We need to learn this lesson, but we won't if we simply continue to manipulate the earth every time it gets in our way.

It should be noted that a similar proposal to divert water from Shell Lake into Sawyer Creek was defeated in the year 2000 by local residents in a contested hearing before an administrative law judge because of "potential ecological and environmental impact to the stream." Yet, Yellow River property owners are now expected to "live with" the same type of environmental problems.

This diversion project, if permitted, would not be a wise and healthy precedent to set.

Response:

The issue of precedence is addressed in section 23 on pages 20 –21 of the EA. To further clarify, in northwestern Wisconsin there are several past examples of artificial diversions that moved water from one body to another to relieve high water conditions (eg. Horseshoe/Echo Lakes in Barron County, Round/Tiger Cat Lakes in Sawyer County, and Long/Loveless Lakes in Polk County – ????ck. With Larry). Several years ago a diversion pipe was installed from Bass Lake to ???? in St. Croix County to relieve high water conditions. However, it is our understanding that lake levels receded shortly after installation, and the diversion system has never had to be used. More recently, two diversion proposals in southern Wisconsin have progressed as water levels continue to rise on several lakes and threaten structures. One of these proposed diversion proposals is for Devil's Lake near Baraboo in Sauk County. Devil's Lake is a seepage lake with no outlet similar to Shell Lake. The proposed diversion pipe for this project would move water to the Baraboo River system. This project is near final approval for construction. The other diversion proposal is for a system of three interconnected lakes (Fish, Mud, and Crystal Lakes) on the Columbia/Dane County line just east of Prairie du Sac. These are also landlocked, seepage lakes that have experienced rises in water elevation of 7 – 9 feet over the last 30 years. The proposed diversion pipe would move water (2 million gallons per day) over two miles to the Wisconsin River. Delays in legislative funding approval have currently stalled progress on this project.

All of these projects are similar to the proposed Shell Lake diversion in that water has been or would be removed artificially from a lake and moved to a separate, different water body. Given that water diversions to relieve high water conditions have occurred and are currently being proposed elsewhere in Wisconsin, the proposed diversion from Shell Lake is by no means unprecedented. It must also be noted here that the Department, in considering the current application or any similar water diversion proposals, must review each project on a case-by-case basis according to current water law in Wisconsin. In other words, each individual project must stand on its own merits.

We hereby amend the EA to reflect this additional information and clarifications as presented above.

H. **Tribal/Treaty Rights Issues**

Comment:
No where does the EA address impacts on the treaty protected rights of the St. Croix Chippewa Indians of Wisconsin to harvest animal and plant resources of the ceded territory. Diminution of the quality or quality of these resources is inconsistent with the Tribe's treaty rights.

Response:
You are correct. We failed to address the fact that this project lies within the Ceded Territory and has the potential to affect the protected Tribal treaty rights to harvest plant and animal resources, specifically fishery and wild rice resources. The EA addresses the anticipated impacts on those specific resources and concludes that no significant effects are anticipated. We hereby amend the EA to reflect this additional information and clarification.

Comment:
The Voigt Intertribal Task Force (Task Force) of the Great Lakes Indian Fish and Wildlife Commission (GLIFWC) submits these comments on the Department's Environmental Assessment (EA) regarding the proposed Shell Lake diversion project. These comments relate directly to the requirements set forth in what is commonly known as the Voigt case (Lac Courte Oreilles v. State of Wisconsin) and to the Department's commitment to deal on a government-to-government basis with the Tribes involved in that case. The EA notes that the proposed project may impact wild rice and other natural resources within the scope of the Tribes' ceded territory treaty rights. Consequently, the Department must adhere to the provisions of the Stipulation for Wild Rice Trial that require the Department to consult with the Task Force on and afford the Task Force the opportunity to participate in any Department decision that may affect ceded territory wild rice abundance or habitat. Moreover, the Department's long-standing policy is that it will consult with the Voigt case Tribes on a government-to-government basis on matters affecting their treaty rights. The proposed diversion certainly would affect those rights in Shell Lake, in the Yellow River, and other water bodies downstream from the point of discharge, and at points between Shell Lake and the Yellow River. The opportunity to provide comments on the EA neither meets the Department's obligations under the Stipulation, nor represents consultation consistent with the Department's policy. Therefore, the Task Force reserves it's comments on the substance

and adequacy of the EA as well as on the Department's ultimate determinations on this project until the requisite consultations with the Department take place.

Response:
It is the Department's conclusion that the scope of this project proposal and anticipated effects does not constitute an action requiring formal consultation under the provisions of the Voigt Intertribal Task Force. As documented in the EA, the Department has had previous consultation on several occasions with the St. Croix Tribe and Great Lakes Indian Fish and Wildlife Commission regarding the specifics of this project proposal. We will continue to offer opportunities for further discussions on this project as we complete our final permit reviews following completion of the environmental analysis process.

I. **Editorial Changes**

Comments:
There are several typographical errors in the EA as follows:

- The last sentence in the second paragraph under section 11 says. "….tributaries running into the Yellow River along it's length in this part of Washburn County." Shouldn't this be "…its length…" with no apostrophe?
- It appears the sixth sentence in the third paragraph under Wildlife Resource on page 8 is missing a word. Shouldn't this read, "There are two known osprey nests located within 1.5 miles of the project."?
- It appears the second sentence of the second paragraph at the top of page 15 uses the wrong word tense. Shouldn't this read, "…small port opening would prevent the loss of adult gamefish into the pipe."?
- It appears the second sentence of the first paragraph on page 17 has an extra word in it that does not belong there. Shouldn't this read, "The temperature of the lake water during these months is ~~between~~ warmer than the temperature of the backwater."?
-

Response:
Yes, you are correct. All of these are typographical errors in the EA. We hereby amend the EA to reflect the changes noted above.

J. **Need to Prepare an Environmental Impact Statement**

Comments:
Believes the Department should prepare an EIS because of several unknowns and assumptions: a.) EA says there's no record/study of fishery in spring-fed backwater area – this needs to be identified and addressed in the analysis; b.) EA indicates this is not a precedent-setting action because other projects with water diversions from landlocked lakes have occurred and/or are being considered in the state – need to identify what the impacts were/are likely to be from these other projects and compare to the proposed Shell Lake diversion project.

The DNR's final conclusion that no Environmental Impact Study is required is not supported by its own admitted lack of any fundamental understanding of existing hydrological

relationships in the inclusive ecosystem as well as any potentially harmful environmental effects caused by long-term lake water diversion. The DNR further admits in its report that any diversion of water from Shell Lake would be unprecedented in the state of Wisconsin because of the unique hydrology of this landlocked lake. This admitted lack of comprehensive hydrological survey or historical information by the DNR constitutes an unacceptable ecological risk for everyone in the St. Croix and the Chippewa River Systems that would be adversely affected by the construction of a 4 ½ mile pipeline and the subsequent diversion of approximately 1.5 billion gallons of water from Shell Lake to the Yellow River annually. Therefore, the Environmental Assessment should be withdrawn until a more complete study is undertaken, or a full Environmental Impact Study should be conducted forthwith.

This Environmental Assessment is ultimately inadequate because it fails to answer the critical question of whether or not the proposed lake diversion project will have any long-term negative effect on our Northwoods ecosystem. How the DNR can conclude that an "EIS is not required" after repeatedly admitting throughout its 24-page report that it does not have all the required information it needs to make a well-informed judgment on whether or not to grant a permit in this case is unfathomable to me. At the present time no one knows for certain what the long-term environmental consequences of the proposed pipeline project would be.

The Environmental Assessment should be withdrawn until amore complete study is undertaken. A full Environmental Impact Study appears to be appropriate.

The Shell Lake diversion project is at best an ill-conceived project and at worst a boondoggle in-the-making. It is also a project that has apparently resulted, at least in part, from what appears to be well intentioned but nonetheless "pork barrel" politics at the local, state, and national levels. The project would obviously cause significant adverse environmental impacts, many of which would likely be very significant. However, the DNR has failed to adequately review these potential impacts in the draft EA for the project and has, in effect, come up with a document that is really a political document with little scientific integrity. Consequently, before it is too late for anything but litigation over these issues, the DNR should go back to the proverbial drawing board and develop a much more comprehensive and credible EA or, preferably a full EIS, that fully addresses all of the issues. Additionally, based on the information currently available, it appears that the DNR should ultimately deny the proposed project because of the likely significant adverse environmental impacts it will cause to public trust resources in and adjacent to Shell Lake, as well as at the point of discharge and downstream in the Yellow River.

We object to the DNR's arbitrary move to use an abbreviated Environmental Assessment in this matter, rather than the more comprehensive process of an Environmental Impact Study. It appears that the DNR has assumed up front, prior to any scientific investigation, that the environmental impact of the proposed project will be insignificant. With this pre-conception on the part of the DNR, it is only logical that the Environmental Assessment is biased and based on the political agenda of the Department, rather than a true evaluation of the impact of the project on the environment. The mere fact that some Federal dollars have been

"captured" by the Shell Lake community to fund the water diversion project should not represent an "automatic endorsement" of the proposed project or lead local government to go forward without independent scrutiny of the environmental impact. It appears that the abbreviated Environmental Assessment process has been utilized to rush toward approval of the project before those concerned or affected (i.e. potential opponents) can become aware of the proposed project and the issues more carefully examined.

We agree with the decision that no EIS is required. If one is ever required, it must include the consequences of doing nothing to control the lake level.

I want to go on record as being opposed to the decision that an Environmental Impact Statement will not be required for this project. I don't believe that the proposed solution addresses the source of the problem. Furthermore, it is my opinion that the stated discharge rates will have a detrimental effect on the Yellow River and it's tributaries. I strongly recommend and support a thorough EIS investigation.

I would like to go on record at this time as being vehemently opposed to the proposed drawdown of Shell Lake and diversion of the lake into the Yellow River watershed. The threat of mercury contamination to the waters of the Yellow River, Rice Lake, and Yellow Lake from the pumping of millions of gallons of mercury contaminated water from Shell Lake as well as the destruction of wild rice beds along the river from fluctuating levels due to pumping from Shell Lake make an environmental impact study and Environmental Impact Statement of utmost importance.

Response:

It is a common public view that a particular problem would be solved if only the Department would prepare an Environmental Impact Statement (EIS). These particular "problems" are usually some type of unwanted project being proposed. In reality, WEPA only provides an informational process. EIS' and EA's disclose impacts and address alternatives - they don't stop projects, they don't approve projects, they don't modify projects – they inform. Another public view commonly expressed is that without an EIS the Department's environmental review is incomplete or inadequate. This perception has resulted in much unproductive debate and litigation. Preparation of an EIS does not give the Department any additional authority to deny or condition a particular permit. In many regulatory circumstances, an EIS would neither add anything of value to the Department's review taking place under the substantive environmental laws nor would it result in a different decision. Lastly, since EA's and EIS' are similar in both content and process, the distinction between these two instruments has become quite blurred over time. There are numerous examples where the Department has prepared comprehensive EA's that in previous years would have had a cover which read EIS. Likewise, there are examples of situations where the Department has prepared EIS' that would in other situations been labeled as an EA. The common sense approach that has been applied in more recent years is to develop an environmental analysis to the level of detail required to fully and adequately address anticipated impacts for a particular proposal, regardless of what we call it. We believe this approach is in keeping with the spirit and intent of WEPA and results in a more efficient, productive, and useful environmental analysis process.

Chapter NR 150, Wisconsin Administrative Code, provides environmental analysis rules and procedures for Department actions to comply with WEPA. NR 150 indicates that an EIS is required on major actions that would significantly affect the quality of the human environment. The meaning of this threshold is clarified by the definition of terms in the code as follows:

- Human environment – "Human environment" means the natural or physical environment and the relationship of people with that environment
- Major action – "Major action means an action of such magnitude and complexity that the action will have significant effects upon the quality of the human environment. It does not include actions whose significance is based only on economic or social effects.
- Significant effects – "Significant effects" means considerable and important impacts of major actions on the quality of the human environment

Over time these terms have been further clarified through court cases, our own experiences, and guidelines provided by CEQ (President's Council on Environmental Quality – guides and directs interpretation and application of the National Environmental Policy Act for which WEPA was patterned after). The terms used to define "major action" have been interpreted as follows:

- magnitude – the *extent* to which the action will cover various considerations → What is the scope of the project and anticipated effects (i.e. the range within which an action will display or manifest itself)
- complexity – complexity is a matter of *degree* (relative) → Is the project inherently complex? Is the project made up of so many different, interrelated parts or elements that it requires thorough study or expert knowledge to deal with it before an action can be finalized (i.e. permit decisions)?
- Notable or serious – must only satisfy one or the other, not both → Will the action attract attention to something of quality or significance? Is there anything about the action (eg. special features) that makes it worth remembering? If so, how much and are the attracting features worth pursuing in greater detail? Will the action require concern for management, policy, or ecological issues of consequence?

The key in making determinations on the need for an EIS rests with determining if significant effects (either beneficial or adverse) could result from a particular project proposal. As with defining what constitutes a "major action", terms used to define "significant effects" have likewise been interpreted over time as follows:

- considerable – considerable impacts are those that are large in number and cover a broad range of resources (i.e. *breadth*) and the effects are evident to some degree on a scale of none-little-some-major-irreversible (i.e. *depth*)
- important – determination of importance requires a judgment by which you ascribe *superior value or influence* to a particular effect (ultimately in total)
- long-term – effects are considered long-term if they are expected to persist for more than one generation (i.e 20 –25 years)

- significance varies with the setting of a proposed action
- determination of significance requires a consideration of both context and intensity. Context mean that the significance of an action must be analyzed in several contexts → society as a whole, the affected region, the affected interests locally. Intensity refers to the severity of the anticipated impact. Evaluation of intensity of various impacts requires a consideration of the primary and secondary effects relative to whether they are long-term versus short-term, the effects on geographically scarce resources, cumulative effects, uncertain or unknown risks, precedent for future actions, and controversy over any environmental effects, particularly those that affect public health and safety (these questions are required to be addressed in the section on significance in our environmental analysis forms)

Many individuals commented in the EA that they believed the proposed diversion project would cause certain significant effects. From a particular individual's perspective, certain potential impacts may be viewed as significant. We do not deny that something may be significant to someone, particularly when it affects them directly and personally. However, for purposes of WEPA we must consider significance in a broader perspective as defined above. There are many project proposals that will result in environmental effects for which the Department provides approval. WEPA simply requires that we identify those potential effects and determine which ones, if any, are likely to be significant. The proposed diversion project would result in certain environmental impacts as disclosed in the environmental analysis presented. However, based on the EA and the subsequent amendments herein, we do not believe any of the anticipated environmental effects would be considered significant. Therefore, we conclude that an EIS is not necessary.

Dated: May 22, 2002