

ENVIRONMENTAL ANALYSIS AND DECISION ON THE NEED
FOR AN ENVIRONMENTAL IMPACT STATEMENT (EIS)

Form 1600-1

Rev. 7-2006

Department of Natural Resources (DNR)

Region or Bureau
Northern

Type List Designation
NR 150.03 (8) (f) 1. a.

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., September 17, 2007.

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Applicant: Dairyland Power Cooperative

Address: 3200 East Avenue South, La Crosse, WI 54602

Title of Proposal: Dairyland Reservoir Fish Production Area Improvement Project

Location: County: Rusk City/Town/Village: Dewey

Township Range Section(s): T.35N.-R.5W. Sections 19, 20, and 30

PROJECT SUMMARY

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

Dairyland Power Cooperative (DPC) has applied to the Wisconsin Department of Natural Resources (WDNR) to dredge and redeposit approximately 22,000 cubic yards of coarse rock and gravel of Dairyland Reservoir lakebed material for the construction of submerged underwater fish habitat structures including rock humps and rock/brush humps. Additional rock materials would be brought to the project area from upland sources. In addition, various submerged tree top structures are proposed to be placed on the bed of the reservoir to increase fish habitat.

The construction would be take place during a scheduled 30-foot drawdown of the reservoir (Attachment B).

Approximately 15 rock humps, each averaging 700 cubic yards of rock with footprints approximately 35 feet by 75 feet, totaling

an area of approximately 0.9 acres, are proposed. Approximately 43 rock/ brush humps are proposed. The size of each individual structure is 45 feet by 75 feet. The total volume of rock proposed to be incorporated into all of these structures is 30,000 cubic yards. The volume of bush or woody materials is unspecified. Based on these numbers these structures are estimated to contain approximately 700 cubic yards of rock. The rock humps and rock/brush are proposed to be constructed in the existing 10 to 20-foot depth contour range. The constructed submerged reefs and brush bumps are proposed to raise the bed elevation to the 5 foot depth contour. These volume and acreage figures are based on the applicant's figures, the department is not able to verify these estimates due to the undetermined design of each specific structure.

Concrete blocks and cotton rope would be used to hold the tree tops in place separately and within the structures. Use of plastic or other non-biodegradable material would be avoided.

Multiple road surfaces are proposed to be constructed on the reservoir bed to access the various structure sites. Existing road beds are proposed to be used where possible. It is estimated that 1 acre of road surface area is proposed, a quantity of road materials in cubic yards was not provided by the applicant.

The size and configuration of the structures may be reduced or modified during final staking and surveying in order to comply with permit requirements. Final elevations of the completed submerged structures would be verified by GPS satellite survey technology by DPC. All excavating equipment would be power washed prior to arrival on the site to minimize the introduction of invasive species.

Erosion control measures, such as silt fence, would be implemented between the construction sites and the remaining open water areas.

This habitat improvement project would be a cooperative stewardship program between DPC, the Rusk County Land and Water Conservation Office, and local conservation organizations. Details of the location, design and construction specifications of the habitat structures are described in Attachment D.

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

The drawdown of the reservoir provides an opportunity for equipment access and work on the exposed flowage bed. The department has not identified the need to change the flowage bed profile. The addition of elevated edges within a waterbody would provide an area for aquatic organisms to inhabit. The stained water of the Flambeau River system limits light penetration within the water column and as a result, limits the depth at which rooted macrophytes can grow. Increasing surface area of the flowage bed within the photic zone has the potential to encourage additional rooted plant growth within the reservoir, provided suitable substrate and a source of plants to colonize the new sites exist. Recent "visioning sessions," conducted by Department fishery staff, have indicated that local anglers desire more opportunities to catch black crappie, yellow perch and bluegill. Increasing the habitat diversity and structural complexity of the reservoir would enhance the angling opportunities for these as well as other game fish species.

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

County shoreland and floodplain permit approvals
Chapter 30.12, 30.20, 283 WI State Stats., NR 102, 103, 115, 116, 216, 329, 345, 347, 500, 504
US Army Corps of Engineers Section 404 permit

PROPOSED PHYSICAL CHANGES (more fully describe the proposal)

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

Manipulation of terrestrial resources would include the modification of six access points to the lakebed. Modifications proposed are recontouring the existing slopes at the individual access points to accommodate heavy equipment usage. Rock and/or timber mats underlain with geotextile material are proposed to protect the shoreline during use. Once construction activity has ceased all access sites would be rebuilt to original slopes, heights, and materials and revegetated. Standard erosion practices would be used at all disturbed sites. Stormwater runoff control measures would be employed where required. Detailed drawings and relevant quantities of materials are referenced in the permit file.

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

Dairyland Power Cooperative proposes to work with the Rusk County Land and Water Conservation Department and local conservation organizations to dredge and redeposit approximately 22,000 cubic yards of coarse rock material from the Dairyland Reservoir lakebed to construct various fish habitat structures. The project plans and design have changed multiple times during the permit review period, these descriptions are the best estimate of the project proposal as described by the applicant and interpreted by department staff. The project area as proposed would occur over an unspecified acreage of reservoir bed. The proposed structures as named by the applicant include, rock humps and rock/brush humps.

Rock Hump: Approximately 15 rock humps would be constructed. The size of each structure is approximately 35 by 75 feet. Each would contain approximately 700 cubic yards of rock. The structures are proposed to be placed perpendicular to the shoreline. Based on the cross section of the plans provided by the applicant, the structures appear to extend from the 5 foot depth contour to the 15 foot depth contour or until 75 feet of length is reached. Eight structures are proposed to be placed at a location west and south of the Leonhard lane access site on the south shore of the flowage. Seven structures are proposed to be located north and east of the point road access site, on the south shore of the flowage.

Rock/Brush Humps: Approximately 43 rock and brush humps would be constructed. The size of each structure is approximately 45 by 75 feet and 3 to 8 feet in height. The structures would consist of two rows of rock with woody material in between. Approximately 700 cubic yards of rock is proposed to be used in the construction of each structure. The top of the structures are proposed within 5 feet of the surface elevation at normal pool. The locations of the proposed structures are: 3 structures south of the north access boat landing and adjacent to the dike; 7 structures located north east of the north boat landing access north and west of the river channel; 4 north of the community park boat landing just east of dike and south of the river channel; 4 northeast of the Krenzlock access site and south of the river channel; 15 west and north west of the point road access south and east of the river channel; 10 south west of the point road access north and west of the river channel.

Road construction on the reservoir bed: An unspecified linear distance of roads are proposed to be constructed to access the various project sites. Existing old roadbeds would be used where possible. Roads surfaces are proposed to be constructed with local aggregate stone (3-6 inch). This material is thought to increase interstitial spaces for the production of crayfish and invertebrates and would be left in place to provide fish habitat. Rock piles would be strategically placed along the edges of these road beds to further enhance the quality of this habitat.

Concrete blocks and cotton rope would be used to anchor the brush bundles and tree tops to the lakebed. Areas of the reservoir, which already contain unique habitat structure, would not be disturbed.

Plan and site drawings are presented in Attachment D

Construction would begin only after the individual sites have been approved and cleared for archaeological consideration by the State Historical Preservation Officer (SHPO).

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

No buildings would be necessary for the completion of the proposed project. Modifications to existing lakebed access points would include recontouring the existing slopes at the individual access point to accommodate heavy equipment usage. Rock and/or timber mats underlain with geotextile material would be used to protect the shoreline during use. Once construction activity has ceased, all access sites would be rebuilt to original slopes, heights, and materials and revegetated. Erosion control Best management Practices in compliance with a WDNR Stormwater permit would be used at all disturbed sites

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

Impacts to local air quality from the proposed project are expected to be minimal. Some fugitive dust may be created due to the excavation equipment if dry conditions persist. Because of the low elevation of the site, this is not expected to be problematic. There would be some increase in diesel emissions in the area due to the heavy equipment used during the construction phase of the project. These emissions would be temporary and should not pose any health concerns to local residents and/or animals.

Contractors would be briefed prior to construction activities on what action(s) to take in the event of a discharge of any hazardous substance. Spill kits would be available on-site during the entire construction phase of the proposed project. DPC also has a WDNR approved SPCC Plan in place at the FHS. Bermed fueling stations with impermeable barriers would be established at the

existing boat landing sites away from the lake bed. Portable fuel trailers (less than 1100 gal.) would be deployed at the stations as permitted under Department of Commerce regulations. A project dispatcher would be in radio and cell phone contact with fuel suppliers and operators to coordinate safe fuel transfer. Emergency spill contact numbers (local and DPC) would be given to all contractors and operators. A SPCC training update would be given at the contractors meeting prior to the project by the Dairyland SPCC coordinator. Details of the fueling procedure and spill response plan are included in the application.

The exposure and disturbance of the reservoir bed by equipment as well as the exposure of bed sediments to drying and sunlight may redistribute mercury and other sediment contaminants (metals such as Copper (Cu), Zinc (Zn), Chromium (Cr) etc.) in various forms which could potentially leave the site through surface and wind erosion, and re-suspension during reservoir refill. The volumes quantities of contaminants potential impacts have not been quantified nor are any estimates provided by the applicant.

8. Other Changes

No other changes are expected to occur as a result of the proposed project.

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

- Attachment A Regional Location Map of the Dairyland Reservoir
- Attachment B Plat Map of the Dairyland Reservoir
- Attachment C Topographic Map of Rusk County, Wisconsin Showing Occurrences of Rare Species and Natural Communities
- Attachment D August 6, 2007 project plans
- Attachment E Physical information for the seven proposed structure locations where core samples were collected.
- Attachment F Core sample analyses results.
- Attachment G Sediment Particle Size

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

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

Literature/correspondence (specify major sources)

- Dairyland Power Cooperative. 1999. Application for a New License for a Major Water Power Project More Than 5 Megawatts, Existing Dam.
- Rusk County. 2007. <http://www.co.Rusk.wi.us/>
- United States Fish and Wildlife Service. 2007. <http://www.fws.gov/>
- Wisconsin Online, Inc. 2007. <http://www.wisconsin.com/counties/Rusk/>
- Flambeau Hydro Station Construction Photos (1948 – 1965)
- Drawdown Photos (1984)
- Report on Primary Productivity, Nutrients, and Macrophyte Surveys on Dairyland Power Cooperative Reservoir
- Dairyland Reservoir Water Quality Data (2001 – 2006)
- Sediment Investigation Report (1997)
- Correspondence and Other Project Coordination
- Newspaper Advertisements and Legal Notices
- Permit Application
- Drawdown Management Plan
- FHS Spill Prevention, Control, and Countermeasures (SPCC) Plan
- WDNR fishery data file
- Consensus based sediment quality guidelines
- 1996 Upper Chippewa River Basin plan
- NRCS Soil Maps-Rusk County
- Choose wisely – A health guide for eating fish in Wisconsin. WDNR PUB-FH-824 (2007)

[X] Personal Contacts (list in item 26)

Field Analysis By: [X] Author [X] Other (list in item 26)

Past Experience with Site By: [X] Other (list in item 26)

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

The Dairyland Reservoir is located approximately four miles northeast of the town of Ladysmith, in Rusk County, Wisconsin. The Flambeau Hydro Station (FHS) structure is located in Section 30, T35N - R5W in the Dewey Township, which is near the county center.

The Dairyland Reservoir is a 1,952 acre impoundment on the Flambeau River at river mile 25.5, above the confluence with the Chippewa River. It occupies the area just upstream from the Ladysmith Project (owned and operated by Xcel Energy) in the City of Ladysmith and immediately downstream from the 380-acre Big Falls impoundment (also owned and operated by Excel Energy at river mile 36) about nine miles northeast of Ladysmith. The reservoir has a watershed of approximately 1,910 square miles. Direct drainage into the reservoir is 17.5 miles, of which 35 percent is agricultural and 65 percent can be deemed wild. As of 1971, public frontage on the reservoir was 0.34 miles, or 1.7 percent of the 20.4-mile shoreline. The reservoir has a shoreline development factor of 3.49, which is similar to other flowages in the region.

The Flambeau River with its North and South forks is the largest tributary to the Upper Chippewa River. The other major rivers in the basin include the Chippewa main stem, the east and west forks of the Chippewa, the Manitowish, Couderay, Elk, and Jump Rivers. The Upper Chippewa River basin extends from Bayfield, Ashland, Iron, and Vilas Counties in the north, to the mouth of the Holcombe Flowage in Chippewa County to the south. The Flambeau River originates near the Michigan border in Iron and Vilas Counties at an elevation of about 1,650 feet above sea level. The river then descends to an elevation of 1,115 feet above sea level at Ladysmith, in Rusk County, after having coursed through Ashland, Price, and Sawyer Counties.

The soils of the surrounding watershed are compromised mainly of silt and sandy loams. The two major soil series in the area are Alameda silt loam and Maplehurst silt loam. The flowage bed is expected to be comprised of similar materials.

The Dairyland Reservoir can be described as a typical flowage composed of three parts. The upper section is riverine, meandering for about three miles through an area of wooded hills, and has a steep granite shoreline giving a canyon-like appearance. The flowage in this stretch is generally not over 800 feet wide, is quite rocky, and has a noticeable current. The middle section is still narrow, but has less current, more sandy shoreline with beds of submergent vegetation, and is occupied by many residences. The lower section widens to almost a mile near the dam and has the appearance of a small to medium sized lake. The maximum depth of about 70 feet occurs near the dam. The shoreline is somewhat variable with banks that rise from a few feet to 80 feet above full pool level (full pool level is 1183.5 feet above sea level). Most of the shoreline is rocky and wetlands are limited to a couple of small bays and some low-lying shoreland that is found primarily in the lower half of the flowage. However, the largest adjacent wetland (61.5 acres) is located on the upper end of the reservoir. The pool level is maintained by DPC to within 0.5 feet of the full pool (except for the spring runoff drawdown). Downstream the pool empties directly into the Ladysmith pool creating a somewhat riverine reach for about 1800 feet.

The floodplain is within the flowage limits. Flooding does not occur within the reservoir because the dam is designed to pass floodwaters to 88,000 cubic feet per second (cfs). The flood of record occurred on September 16, 1994, when the instantaneous flow of approximately 24,100 cfs was recorded at the USGS gauging station (#05360500) near Bruce, Wisconsin. The 100-year flood prediction is 26,800 cfs and flows of 20,000 cfs were reached in 1903, 1906, 1914, and 1961. An Emergency Action Plan (the latest update was approved by Federal Energy Regulatory Commission (FERC) in 1998) outlines the areas affected by a dam failure and the emergency actions to be taken. This plan is filed with local, state and federal agencies, which deal with emergencies.

The principal uses of the Flambeau River near the reservoir are power generation and recreation. There are two upstream point source discharges to the Flambeau River, Flambeau River Papers and the Park Falls Municipal wastewater treatment plant. These facilities are located in Park Falls approximately 63 river miles upstream. This area has a long history of contamination from sulfite liquor which has reached the river via stream bank seeps and overland flow representing an ongoing threat to water quality in the river. Past disposal of spent sulfite liquor (from paper making processes) in unlined lagoons located downstream of Highway 13 were, and may continue to be a water quality issue for the North Fork of the Flambeau River.

There are 6 reservoirs on the Flambeau river system upstream of the Dairyland flowage; The Turtle Flambeau, Upper Hydro,

Lower Hydro, Pixley, Crowley, and Big Falls flowages. In 1989 the Department sampled sediment in the Flambeau River Flowages and found that the highest level of metals in surface layers of accumulated sediment at study sites were in the first impoundments below the industrial and municipal discharges in Park Falls. A second peak of elevated metals occurred in the Dairyland Reservoir. Pixley and Crowley Flowages had the highest surficial concentrations of mercury (Hg) with more than 2 mg/kg and 1.6 mg/kg, respectively. Dairyland flowage sediments sampled at the deepest location within the reservoir, had a mercury concentration of 1.3 mg/kg. In a sediment profile from the Pixley Flowage, mercury concentrations were greatest at the 0.75-0.95 meter depth, with 7.9 mg/kg dry weight (ppm) which is exceedingly high and the one of the highest known concentrations in Wisconsin at that time. The accumulation of mercury is due to historic discharges of a mercury based slimicide, phenyl mercuric acetate, that was used in paper making and from the deposition of airborne mercury. In 1971 the use of this mercury containing compound was discontinued in Wisconsin paper mills.

The 1989 study also looked at other metals in the flowage sediments. Arsenic (As), chromium, copper, nickel (Ni), lead (Pb) and zinc were all elevated in the various flowages above the Ontario Ministry of Environment guidelines lowest effect levels used to characterize these sediments. Dairyland Flowage exceeded the lowest effect level for arsenic, nickel, lead and zinc. Using today's Consensus Based Sediment Quality Guidelines (CBSQG), cadmium, lead and zinc were above the threshold effect concentration indicating an increased likelihood of incidences of toxicity and adverse impact to benthic organisms. The concentrations in mg/kg were: As 7.2; Cd 2; Cr 39; Cu 22; Pb 40; Ni 16; Zn 160.

Flambeau River water quality is generally good, with some exceptions. Dissolved oxygen concentrations are good except for the bottom waters of Pixley Flowage where low concentrations frequently occur during summer months. The river water is noticeably stained due to the presence of dissolved organic compounds, primarily supplied by wetland drainage. Nutrient concentrations are moderate.

The Dairyland Reservoir is a moderately stained soft water flowage. Bog drainage and runoff north of the flowage give the water a brownish tint and a neutral pH. Due to the lake-like nature of the lower reservoir, some summer thermal stratification is usually evident. A major upstream factor, which influences the water quantity, is the Turtle-Flambeau storage reservoir, which were built in 1926.

Sediment samples were collected in March 1997 and analyzed in response to the WDNR request for data on the sediments in the reservoir. The engineering firm of Short Elliott Hendrickson Inc. (SEH) conducted the sediment investigation. SEH probed 14 locations to determine and map the thickness of the soft sediments. A sample was collected from the deepest point and divided into upper and lower portions for analyses. The sample was analyzed for particle size, arsenic, cadmium, chromium, copper, iron, lead, manganese, mercury, nickel, selenium, zinc, oil and grease, percent solids, and total organic carbon. The reported concentrations for Hg (top/ bottom sample) were .408/.641 mg/kg. The concentrations of total organic carbon (TOC), zinc, arsenic, copper, and mercury exceeded the lowest effect level (LEL) of the Ontario PSQG's in the top and bottom samples. Lead exceeded the LEL in the bottom sample. Concentrations of Iron (Fe) and Magnesium (Mn) were in excess the severe effect level (SEL) in both top and bottom samples.

As a permit requirement for this project, DPC sampled Dairyland Flowage sediments in April of 2007 at seven proposed structure locations throughout the flowage. DPC was required to separate the sediment cores into non-parent depositional materials and parent materials for analyses. The samples were analyzed for TOC, sediment particle size, total polychlorinated biphenyls (PCB's), arsenic, cadmium (Cd), chromium, copper, lead, mercury, nickel, and zinc. Based on sediment particle size and TOC of these samples it was difficult to distinguish between non-parent and parent material. Sediment particle size consisted primarily of fine sand, silt, and clay for all samples. TOC values ranged from 2,670 to 64,300 mg/kg, with the majority of samples in the 3000 to 7000 mg/kg range. Mercury concentrations ranged from 0.0341 to 0.639 mg/kg. Other metal concentrations ranged from in mg/kg : As 1.2-5.0; Cd 0.052-1.4; Cr 12-40; Cu 4.4-31; Pb 3.0-24; Ni 6.8-22; Zn 23-179.

Additional sediment samples were collected by DPC on August 16, 2007 from the exposed reservoir bed and analyzed for mercury and total organic carbon. The sampling methodology for these samples is unknown. The samples were collected at sites of proposed structure locations and from the gravel and rock pile proposed to be dredged. Sample site selection methodology were not specified or reviewed by department staff. Surface mercury concentrations in these samples ranged 0.021 to 0.178 mg/kg TOC values ranged from below detection limits to 21,100 mg/kg. The samples from the gravel and rock pile proposed to be dredged had a mercury concentration range from 0.014-0.029 and a TOC range from 8,130 to 10,900 mg/kg (n=2).

Increasing concentrations greater than 0.18 mg/kg for mercury may cause acute and chronic toxicity to the benthic biota. The CBSQG's do not consider the potential for bioaccumulation in aquatic organisms and subsequent food chain transfers and effects to humans or wildlife that consume the upper food chain organisms. Where bioaccumulative compounds such as PCB's and mercury are involved, protection of human health or wildlife based end points could result in more restrictive sediment

concentrations than contained in the CBSQG's. Where these bio-accumulative compounds are involved, the CBSQG's need to be used in conjunction with other tools, such as human health and ecological risk assessments, bioaccumulation-based guidelines, bioaccumulation studies, and tissue residue guidelines to evaluate the direct toxicity and upper food chain effects of these compounds. Food chain models would need to be used to estimate safe levels of contaminants in sediments that would not result in accumulated levels in upper food chain organisms that exceed toxicity and tissue reference values.

Cadmium and zinc sediment concentrations at one of the sample locations exceeded the threshold effect concentration, indicating a potential acute or chronic impact to benthic organisms.

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

a. Vegetation

The narrow area along the reservoir's shoreline is fairly monotypic and wooded. Much of the land next to the reservoir is undeveloped and occupied primarily by aspen and northern hardwood forest types. Riparian forest occurs at the margin of the flowage with small amounts of scrub or shrub wetland at scattered locations. The forest cover along the shoreline has been designated a vegetative buffer zone to prevent erosion and add to the aesthetics. There are also scattered brushy openings within the hardwood forest as well as grassy openings created due to residential development.

Primary productivity, macrophyte, and nutrient surveys were conducted in the Reservoir during 1996 by Normandeau Associates, Inc. Plant growth, including algae and macrophytes, were reported to occur down to the 2-3 meters (6.6- 9.8 feet) depth contour. Twenty two aquatic plant species were identified in the surveys with *Vallisneria americana* listed as most abundant. In general, the greatest plant densities were found in depths of 1.5 meters (4.9 feet) or less and in depositional areas of reservoir meanders and in a broader zone north of Bunyun Hat Island. Rusty crayfish are present in the reservoir and may be impacting the plant species diversity as well as density. This may in part explain the abundance of *Vallisneria americana*, as this plant species is not a preferred food of rusty crayfish. The total acreage of the reservoir within the 10 foot depth (3 meters) contour or less and 5 feet (1.5 meters) or less respectively are 515 and 215 acres. Wild rice was introduced in 2004 as a habitat improvement project by local conservation groups. The introduced rice has become established in some littoral areas on the flowage.

b. Fish and Wildlife Resources

The fishery in Dairyland Reservoir and the impoundments and free-flowing segments of the Flambeau River has been evaluated in netting, electrofishing, and angler-use surveys several times. Intensive efforts in the early and mid 1990s yielded data to support applications to renew the federal licenses that authorize continued generation at three hydroelectric facilities on the lower Flambeau River. Recent information on the current status of the fish community and individual fish populations is scarce, however. WDNR captured 23 fish species in Dairyland Reservoir by netting and electrofishing in August and September 2004, including:

black bullhead	johnny darter	silver redhorse
black crappie	logperch	smallmouth bass
blackside darter	mimic shiner	troutperch
bluegill	muskellunge	walleye
channel catfish	northern pike	white sucker
common shiner	pumpkinseed	yellow bullhead
creek chub	rock bass	yellow perch
golden shiner	shorthead redhorse	

Species composition of the fish community was comparable to that in other nearby lakes and impoundments with similar characteristics.

Walleye, muskellunge, smallmouth bass, and yellow perch are the predominant sportfish species in Dairyland Flowage. In general, late summer netting and fall electrofishing samples reveal little about the abundance and size structure of adults in these four populations, but the abundance of fingerlings and yearlings in the fall electrofishing sample indicates that natural recruitment rates of walleye, smallmouth bass, and yellow perch are adequate to sustain a fishery without supplemental stocking. For instance, an electrofishing capture rate of 38.3 age 0 walleyes/mile in Dairyland Flowage in September 2004 was six times higher than the average catch rate of walleye fingerlings in 7 Rusk County waters classified as having natural walleye recruitment.

Stocking records of Dairyland Reservoir indicate that stocking of select species began in 1952 with the introduction of 14,829 walleye fingerlings (DNR unpublished records). Subsequent stocking of bluegill (*Lepomis macrochirus*), muskellunge, and walleye also occurred in later years. Since 1997 WDNR has stocked only muskellunge in alternate years at a rate of one large fingerling (10-12 inches long) for every two surface acres, except in 2001 when the stocking rate was one fingerling/acre.

We have no data to assess the current growth rate and condition of sportfish by quantitative indices. In 2004 adult smallmouth bass appeared to be noticeably plump in relation to their length.

The Dairyland flowage has a specific fish consumption advisory. Skin on fillets for walleye pike tissue samples were collected in June of 1985 and in April and June of 1997. Fish sampled in 1985 ranged in length from 13.2 – 21.6 inches, 12 fish in total were collected. Mercury values in ug/g ranged from 0.53 to 0.99 in 1985. Fish sampled in 1997 ranged in length from 12.4-24 inches, 10 fish in total were collected. Mercury values in ug/g ranged from 0.63 to 1.9. Fish tissue mercury concentrations increased from 1985 to 1997 in similar sized fish. For example, 1985 - fish in the 17 inch range had tissue concentrations of mercury ranging from 0.58 to 0.8 ug/g (n=4). In 1997 a 17 inch class fish had a tissue concentration of mercury of 1.4 ug/g (n=1). The fish sampled were not aged or sexed.

Site-specific studies of wildlife inhabiting the project area have not been conducted. However, information is available on the animals in the general locale of the project. Various studies and field guides, which document the geographical ranges of animals, were relied upon to develop a generic description of the wildlife resources in the area near the reservoir.

The reservoir shoreline is a typical aspen and northern hardwood forest and is quality habitat for wildlife species which prefer that habitat type. Small amounts of scrub or shrub wetland occurs at scattered locations. The forest cover along the shoreline owned by DPC has been maintained as a buffer strip to prevent erosion and add to the aesthetics. There are also scattered brushy openings within the hardwood forest as well as openings created due to residential development. The wildlife habitat includes a small amount of riparian bottomland, near-mature upland forest, grassy-brushy forest opening, and wetlands.

White-tailed deer (*Odocoileus virginianus*) is probably the most plentiful large animal resident species. Other mammals such as black bear (*Ursus americanus*), coyote (*Canis latrans*), badger (*Taxidea taxus*), fisher (*Martes pennanti*), and gray fox (*Urocyon cinereoargenteus*) are probable low density residents in the area, whereas, red fox (*Vulpes fulva*), skunk (*Mephitis mephitis*), woodchuck (*Marmota momax*), ground squirrel (*Citellus spp.*), gray and red squirrel (*Sciurus carolinensis* and *Tamiasciurus hudsonicus*), and cottontail rabbit (*Sylvilagus floridans*) are the more plentiful resident species. Small rodents that are likely present in good numbers include chipmunks (*Tamias spp.*), pocket gophers (*Geomys bursarius*), and several mice species (meadow (*Zapus hudsonius intermidus*) and whitefooted (*Peromyscus leucopus*), as well as shrews, voles (*Microtus pennsylvanicus*), and moles (*Condylura cristata*). Furbearers are also common along the shores of the flowage and include muskrat (*Ondatra zibethicus*), mink (*Mustela vison*), weasel, raccoon (*Procyon lotor*), beaver (*Castor canadensis*), and otter (*Lutra canadensis*). Bats are also known to inhabit the area, but the species have not been determined. The gray wolf has also been re-establishing its breeding range in this area of northern Wisconsin.

Bird species, both as residents and seasonal migrants, are plentiful on-site. More than 200 species could potentially be seen on site at one time or another. The most common resident species include black-capped chickadee (*Parus atricapillus*), blue jay (*Cyanocitta cristata*), common crow (*Corvus brachyrhynchos*), nuthatch, cardinal (*Cardinalis cardinalis*), goldfinch (*Carduelis tristis*), and several woodpeckers, (downy (*Picoides pubescens*), hairy (*Picoides villosus*), redheaded (*Melanerpes erythrocephalus*), pileated (*Dryocopus pileatus*), and red bellied (*Melanerpes carolinus*). Other seasonally abundant non-game species include American robin (*Turdus migratorius*), ovenbird (*Seiurus aurocapillus*), redwinged blackbird (*Agelaius phoeniceus*), and song sparrow (*Melospiza melodia*). Ruffed grouse (*Bonasa umbellus*) is the only resident upland game bird that is plentiful in the area and American woodcock (*Scolopax minor*) is the only migratory upland game bird present. Great blue herons (*Ardea herodias*) forage on the reservoir (nearest known rookery 15 miles northwest). Green-backed herons (*Butorides striatus*) nest (individually - not colonial) in the near riparian zone of the reservoir.

The mallard (*Aix platyrhynchos*) is the most abundant of the waterfowl species that frequent the area. Other waterfowl seasonally reside in the area and include woodduck (*Aix sponsa*), common loon (*Gavia immer*), hooded (*Lophodytes cucullatus*) and common merganser (*Mergus merganser*), blue-winged teal (*Anas discors*), and pied-billed grebe (*Podilymbus podiceps*) all of which might occasionally nest on the Dairyland Flowage. DPC has worked with the WDNR to develop waterfowl habitat on the island in Groothausen Bay, however records of usage are not kept. Other waterfowl, including Canada geese (*Branta canadensis*), common goldeneye (*Bucephala clangula*), and bufflehead ducks (*Bucephala*

albeola), may rest or feed on the flowage during their annual migrations. However, in general, the flowage is only fair waterfowl habitat because of the small amount of associated wetlands and narrow littoral zone as well as the riverine habitat.

Birds of prey also either reside on or visit the project area. Great horned owl (*Bubo virginianus*), barred owl (*Strix nebulosa*), red-tailed hawk (*Buteo jamaicensis*), and American kestrel (*Falco columbarius*) are probable residents of the area. Several other species of owls and hawks probably visit the site for hunting and reside there in limited numbers. Some of these species probably nest on-site since the habitat is suitable for such. Bald eagle and osprey (*Pandion haliaetus*) are also seen in the project area. The bald eagle, in particular, is known to fish on the flowage and in the tailwater area of the Big Falls Dam and the FHS. Bald eagle nest sites have also been reported for the flowage and the Flambeau River. The ospreys that have been seen are probable transients passing through the area as osprey range widely in foraging. Birds utilizing the reservoir are likely from 4 known sites NW of Bruce as there are no known nest sites nearby. Broad-winged hawks (*Buteo platypterus*), Cooper's hawks (*Accipiter cooperii*), & merlins (*Falco columbarius*) nest in the immediate vicinity (periphery) of the reservoir.

Garter snakes (*Thamnophis sp.*), and water snakes (*Natrix sipedon*), are probably the most common snake species found on-site among the 13 species that have geographical ranges that overlap Rusk County. Painted (*Chrysemys picta*), snapping (*Chelydridae serpentina*), and softshell turtles (*Apalone spinifera*) are the prominent turtles found on site. Among the amphibians, several species of frogs, American toad (*Bufo americanus*), and salamanders including (site-common mudpuppy (*Necturus maculosus*) are known inhabitants of the general area and are assumed to reside on adjacent lands.

c. Threatened and Endangered Species

The US Fish and Wildlife Service (USFWS) has records for bald eagle (*Haliaeetus leucocephalus*), which is classified as threatened, and Sheepsnose Mussel (*Plethobasus cyphus*), classified as a candidate species, occurring in Rusk County. The USFWS also has records for gray wolf (*Canis lupus*) occurring in the project area. The gray wolf was recently delisted by the USFWS. The State threatened, wood turtle (*Clemmys insculpta*) and State threatened Blanding's turtle (*Emydoidea blandingii*) both occur in the immediate area, and probably nest on and immediately adjacent to the reservoir.

Freshwater mussel surveys have been conducted in the Flambeau River downstream from the project site and in the Dairyland Reservoir tailwater area. The purple wartyback (*Cyclonaias tuberculata*) and the round pigtoe mussel (*Pleurobema sintoxia*), are both reported in the immediate vicinity of the reservoir. The purple wartyback is listed as endangered while the round pigtoe is listed as special concern species in Wisconsin.

Lake sturgeon (*Acipenser fulvescens*), a species of concern at both the state and federal level, is found upstream, downstream, and in the Dairyland Reservoir. No state or federally listed threatened or endangered species of fish have been reported found near the reservoir, although the gilt darter (*Percina evides*) has been reported for the Thornapple tailwaters. The greater redhorse (*Moxostoma valenciennesi*), State threatened, has been reported for the Chippewa River in Eau Claire County; and the river redhorse (*Moxostoma carinatum*), State threatened, was reported in a survey of the Thornapple Project about 10 miles downstream.

d. Wetlands

There are three primary (greater than 5 acres) palustrine wetlands next to the reservoir. The largest, 61.5 acres, is located in the upper reaches of the reservoir. This particular wetland is primarily composed of deciduous shrubs and trees. Soil type is classified as wet. Approximately one acre of this wetland is located within DPC's property boundary.

Another significant wetland is located near the southern tip of the lower reservoir. This wetland, which is about 27.6 acres, is made up primarily of deciduous trees and shrubs, although it does contain a small area, which is characterized as an emergent or wet meadow. Soil type is again wet. This wetland is located outside of DPC's property boundary.

The third wetland, over five acres, is located along the edges Bunyan's Hat Island in the lower reservoir. This area can be described as an emergent or wet meadow, with standing water.

Numerous smaller wetlands (less than five acres in size) are located in the lower half of the reservoir, primarily bordering Groothousen Bay (all located within DPC's property boundary). Combined acreage of these wetlands is approximately 18.5 acres.

13. Cultural Environment

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

The surrounding landscape consists of mainly woodlands and agricultural lands. Approximately one-third of the shoreline is residential development. The majority of the shoreline is privately owned. DPC owns approximately 1083 acres around the reservoir including the dam. Most of the shoreline of the Dairyland Reservoir is wooded providing the boater or angler with a feeling of a primitive, wilderness setting. DPC, by policy, has maintained the wooded shoreline and has no plan to sell, develop, or clear the land at this time.

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

The population of Rusk County was 15,589 in 1980, 15,079 in 1990, and 15,347 in 2000, while the population of Ladysmith was 3,826 in 1980, 3,938 in 1990, and 3,932 in 2000. In 1992, there were 3,759 people employed in 350 establishments with a payroll of \$62,438,000. Most of these jobs were in manufacturing -- 1,649 jobs in 38 establishments; in lumber and wood products -- 841 jobs in 15 establishments; and in retail businesses -- 663 jobs in 104 establishments.

Recreational use of Dairyland Reservoir and adjacent properties consists primarily of fishing, although other activities such as camping, hiking, picnicking, jet and water skiing, swimming, boating, and snowmobiling are also popular.

DPC, in cooperation with Rusk County, the Town of Dewey, and the Rusk County Wildlife Restoration Association provide five recreation areas. The Community Park is located on the south end of the dam dike in the SW1/4 of Section 30. This land is leased by the county, which provides picnic tables, grills and privies, and an improved boat launch with parking for about 20 vehicles. Picnic Point is a primitive area leased by Dewey Township on the southeast side of the lake in the E1/2 of Section 20 and is accessible from Tony, Wisconsin. Josie Creek Park and Campground, located northeast of Tony in the NE1/4 of Section 15 on County Highway "X" off US Highway 8 and leased by the county, is the only overnight facility on the reservoir. The facility includes camping, picnicking, an archery range, a pistol and rifle range, a sportsman's clubhouse, and a public boat launching ramp, which provides access to the reservoir. This park receives, by far, the most use of any of the sites on the reservoir. Recent improvements to the site include new toilets, underground electric and water to 12 new RV sites, shelterhouse, entrance signs, trout habitat structures in Josie Creek, picnic tables, road and parking lot for the rifle range, and a new boat ramp and boat dock. The Quarry Road landing is an unimproved landing just downstream from the Big Falls Hydroelectric Station. It is accessible from County Highway "X". The North Dike Landing is located on the north end of the dam dike in the SW1/4 of Section 19 and provides a boat launch with parking for about 10 vehicles. The canoe portage is also located here. The landing is leased by the County and is accessible from County Highway "J" north of Ladysmith. DPC has also assisted in providing handicapped accessible shore-fishing in a cooperative effort with the county and the State of Wisconsin at a site on the north end of the County Highway "I" bridge. Construction was completed in December 1998.

The Rusk County Outdoor Recreation Plan outlines various improvements to all the recreational areas in Rusk County to include those on the Dairyland Reservoir. However, there is no mention of any overcrowding or congestion at any of the areas.

Results of a 1995 angler survey of the reservoir found that out of 626 anglers surveyed, 93.1 percent were Wisconsin residents, 84.5 percent fished from a boat, and 99.0 percent of people had used a vehicle to access the reservoir. Winter survey results showed that of 46 ice fishing anglers polled, all were Wisconsin residents and all had used a vehicle to access the reservoir. All anglers surveyed during both the summer and winter surveys were fishing on their own, without the assistance of a guide.

c. Archaeological/Historical

The Mississippi Valley Archaeology Center (MVAC) at the University of Wisconsin - La Crosse (UWL) was contracted to provide a literature and records review as well as a Phase I Archaeological Survey to identify archaeological and historic resources on project lands. The literature review summarizes the history of the project and the lower Flambeau River area, the environment of the project area, the prehistoric cultural history of the region, previous archaeological investigations in the project area, identifies previously reported historic and prehistoric sites within the project, and identifies research problems that would be relevant to future cultural resource evaluations. The site survey focused on areas that are subject to reservoir related impacts, particularly shoreline erosion and recreational development. The fieldwork was carried out in October 1995 and the results of the survey, literature, and records review are available as a separate report.

The review of literature revealed two prehistoric and 29 potential historic sites within or near the reservoir. Most of the potential historic sites were twentieth century farmsteads.

The field survey relocated one of the previously recorded prehistoric sites, "4 historic farmsteads, 7 prehistoric lithic scatters, and 2 sites that included both prehistoric artifacts and historic remains associated with the nineteenth century logging industry."

The report concluded: "Project-related impacts were observed at 12 of the fourteen sites.... Eight sites are partially or entirely inundated when the lake is at its normal operating level. Shoreline erosion was noted at five sites. Two of the historic sites are near a minimally developed recreational facility and, in the future may be affected by recreational development. Two other historic sites were found on an undeveloped island, Bunyan's Hat..., but they do not seem to be affected by current project operations.

It was recommended that test excavations be conducted "...to evaluate 3 prehistoric and logging sites that are affected by shoreline erosion for National Register of Historic Places eligibility," and that "additional historic research is recommended to evaluate the two historic farmsteads that are affected by the project." These surveys were conducted during the 1998 field season and the report was submitted to the Wisconsin State Historical Preservation Officer in December of 1998. A letter dated January 7, 1999, confirming the receipt and concurring with the results was received from the State Historical Society.

Per DPC's Programmatic Agreement (PA) among the FERC, the Advisory Council on Historic Preservation, the State of Wisconsin, State Historic Preservation Officer (SHPO), and the State of Michigan, State Historic Preservation Officer a Phase I archaeological survey of previously unsurveyed areas would take place during the drawdown prior to the habitat construction phase. If deemed necessary by the WI SHPO, Phase II archaeological surveys would be conducted prior to the construction of any of the underwater islands. Additionally, six sites, which are inundated during the reservoir's normal operating level, but have been previously identified as needing Phase II surveys, would be evaluated if time permits.

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

a. Prime Agricultural Lands

A 2002 survey of Rusk County found that there are approximately 715 farms located within the County. These farms have an average size of 242 acres making the total farmland in Rusk County near 173,030 acres. As of 2004, state owned lands for Rusk County totaled 18,475, acres and county owned parks and forests totaled 91,382 acres.

b. State Natural Areas

There are no known state natural areas or other special resources in the project area.

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

15. Physical (include visual if applicable)

The proposed project would permanently alter the lakebed of the Dairyland Reservoir by the removal of approximately 22,000 cubic yards of cobble size rock from a location upstream of the dam structure. This material plus additional field stone/quarry rock would be placed at 58 locations to construct rock humps and rock/brush humps. These structures would increase the reservoir's littoral and mid-depth habitat diversity and improve structural complexity and enhance angling opportunities.

Due to the levels of mercury associated with organic material in the sediments, the proposed dredging is limited to an existing rock pile site. Sampling data provided by DPC shows mercury concentrations associated with this location ranged from .014-.029 mg/kg and TOC concentrations ranged from 8130-10,900 mg/kg. These ranges indicate the coarse rock pile is not free of mercury or organic materials. It can be assumed that moving these materials would result in the disturbance and movement of mercury within the reservoir and to downstream receiving waters. The extent or degree of mercury movement is unknown.

Visual impacts would include the temporary placement of navigational hazard markers in the event of the reservoir level is dropped below 1183 feet Mean Sea Level (MSL).

The structural integrity of the proposed rock and rock/brush humps is unknown. The effects of wind, river currents and ice on the rock and rock/brush humps has not been investigated by the applicant or the department.

The current habitat structure sites are proposed up to the 5 foot depth contour. The structures may impact existing aquatic macrophyte beds or other quality habitat areas.

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

a. Vegetation

There would be minimal disturbance of upland vegetation except at the construction access points to the flowage. These proposed access points would be re-vegetated after project completion. Wild celery and other aquatic species would recover as they did following the thirty-foot drawdown in 1984.

Purple loosestrife (*Lythrum salicaria*), an invasive wetland plant, is present in a stand adjacent to the reservoir. Following proper procedures there should be no spread of this invasive species to areas disturbed by this project adjacent to the flowage, specifically the access points. Dredging and the placement of dredged material on the bed of the flowage would not result in the spread of purple loosestrife. The depth of the rock and rock/brush hump construction would preclude colonization of the sites by loosestrife.

b. Fish and Wildlife Resources

Assuming that there is a positive relationship between productivity and the amount of suitable physical habitat in aquatic ecosystems, and assuming further that physical habitat (and not some other factors, such as water quality or climate) is a limiting variable that controls productivity in Dairyland Flowage, then in theory adding physical habitat should increase biological productivity and in turn provide direct and indirect benefits for fish in the reservoir and in the Flambeau River downstream. It is impossible to predict the form in which these anticipated benefits would be manifested. In other words, we cannot forecast which species in the fish community would benefit, nor can we predict how recruitment, growth, and survival rates of individual fish populations would respond if the proposed project is implemented. Despite the generalized nature of the anticipated benefits, we do not expect the additional habitat in the proposed quantity and designs would result in species interactions that conflict with user-supported goals for the fishery.

Construction or placement of structures could inadvertently concentrate fish and increase their vulnerability to angler harvest, thereby increasing fishing mortality under existing regulation. The large number of structures and their broad distribution across the lakebed on the lower portion of the flowage should however, serve to minimize this risk.

The proposed dredging and repositioning of lakebed materials would disturb contaminants in sediments and flooded soils, potentially increasing bioaccumulation of mercury and other metals by various organisms in the food chain. Most focus group participants who helped to develop goals and objectives for the fishery in Dairyland Flowage expressed their preference for balance between “catch and release” and “maximum sustained harvest” of walleye, black crappie, and bluegill and indicated their desire to keep and eat these species. Remobilization of contaminants may result in WDNR issuing even more restrictive health advice for people to further limit consumption of walleyes from Dairyland Flowage.

c. Threatened and Endangered Species

There is no known federal or state threatened or endangered species located within the flowage at the sites of the proposed dredge and rock/brush hump construction.

d. Wetlands

Some of the wetlands within the proposed project area would be negatively impacted by the drawdown. These negative impacts are expected to be short-term and cease once the reservoir’s water level is returned to its normal elevation.

e. Flood Plains

No impacts to the local flood plain are anticipated as a result of the proposed project. The reservoir is managed at a normal pool of 1183.48 MSL and only permitted to fluctuate +/- six inches as a permit of the FERC license agreement.

f. Water Quality

The proposed project may increase reservoir and downstream turbidity levels (temporarily) during the refill, after completion of the habitat project. The proposed project is expected to be completed during the draw down, therefore the potential for turbidity increase associated with the dredging is limited, especially when compared to a dredging project with a water filled reservoir. Based on the recent data provided by DPC from the proposed dredge site, mercury may become available to the aquatic environment both from the dredge location site and at the habitat structure sites once inundated. In its current state this mercury is at depth and unavailable to the aquatic environment. The rate or degree of movement of mercury from the sediments to the aquatic biota is unknown and may depend on a number of biological, chemical, and synergistic variables. We assume the movement of mercury, once disturbed, would likely increase mercury availability within the reservoir and receiving waters. To what degree is unknown.

17. Cultural

a. Land Use (including indirect and secondary impacts)

Local land use impacts are not anticipated by the proposed project.

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

Navigation Safety:

All habitat structures are proposed to have a structure top height no higher than 1178 feet MSL. The Dairyland Reservoir pond elevation is maintained as a highly stable pool. Daily fluctuations are limited by the FERC, not to exceed +/- 0.5 feet per day. DPC typically maintains the pond within +/- 0.3 feet per day. Seasonal drawdowns of up to 3 feet are allowed from February 1 to May 1. The license also allows for a 5-foot drawdown under a system wide power emergency; however, this has never been required during the 55-year history of the project. A review of the DPC hydro operations log was conducted to determine the actual frequency of potential navigational hazard risk.

Review of surface elevation data for the past 15-years by DPC shows that the occurrence of days when the pond is below 1183 feet MSL after ice out has been 13 days. With respect to seasonal drawdowns, the advent of real time precipitation data, streamflow data, and predictive watershed flooding models, has basically eliminated the need for advanced seasonal drawdowns. Station headwater elevation alarms are now remotely monitored 24 hours per day by the DPC Systems Operation Center and locally by plant operations staff. Station turbine flow can now be remotely as well as manually controlled.

In the event of a system wide emergency, the FHS Project would be used to energize the Jump River REC substation at Ladysmith. This would require approximately 2.5 mW of generation from the project. At this rate, .02 feet per hour drawdown rate would be required assuming the Big Falls project was at zero discharge.

The effects of the structures on ice formation or thickness during the winter months is unknown.

c. Archaeological/Historical

Per DPC's Programmatic Agreement (PA) among the Federal Energy Regulatory Commission, the Advisory Council on Historic Preservation, the State of Wisconsin, State Historic Preservation Officer (SHPO), and the State of Michigan, State Historic Preservation Officer a Phase I archaeological survey of previously unsurveyed areas would take place during the drawdown. If deemed necessary by the WI SHPO, Phase II archaeological surveys would be conducted prior to the construction of any of the proposed structures.

d. Fish Consumption by anglers:

It is unknown whether fish harvest and consumption on the reservoir would increase or decrease due to this project. The Dairyland flowage has a specific fish consumption advisory for Walleye pike because of elevated mercury levels found in fish tissue samples. Sediment sample results indicate mercury is associated with the reservoir sediments. Disturbance of reservoir sediments may increase the availability of mercury to the fish community. It is unknown if or to what extent this project would increase fish tissue concentration of mercury.

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

a. State Natural Areas

No State natural areas would be impacted by the proposed project.

b. Prime Agricultural Land

No farmland, prime forestland, or prime rangeland would be affected by the proposed project.

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

- Increase in turbidity
- Movement of mercury
- Increased navigational hazards
- Bioaccumulation of mercury within the aquatic community
- Movement of other metals in the sediments

DNR EVALUATION OF PROJECT SIGNIFICANCE (complete each item)

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.

Dredging 22,000 cubic yards of rock/gravel from the location upstream of the dam structure, placing this material, field stone and brush/trees on the flowage lake bottom will have a long term effect. This activity will change the structural complexity of the lake bottom at the locations where the structures are places.

The potential release of mercury (disturbance making it more available) may occur from the location of the proposed dredging and through the placement of this dredge material into rock humps and rock/brush humps. This will be both a short term and a long term effect. The short term effects will be immediately after the reservoir is re-filled and water covers the dredge location and the built structures by releasing available mercury from the sediments. The potential long term effects will be through the ongoing “bleed” of mercury from the dredge location as the sides of the dredge hole slump and from the erosion and wear of the rock and rock/brush humps where this dredged material was placed. This potential release of mercury would affect both flowage and downstream environments. If the mercury is in the methylated form or is released to a location or environment where it can be methylated, it has the potential to move into the aquatic food chain and ultimately to fish and humans.

It is expected that there will be a short term increase in turbidity during and after the refilling of the reservoir. This should be a short term event.

The proposed rock and rock/hump structures are proposed to have a structural height 5 feet below the lakes surface at normal pool (1183 MSL). DPC proposes to buoy the habitat structure locations when the normal pool level drops below 1183 MSL. These structures will be a long term navigational safety issue. The placement of the buoys will affect the natural scenic beauty of the waterway, at least temporarily when the reservoir pool elevation is below 1183 MSL.

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).

Impacts to ecologically scarce resources are not anticipated to occur with this project with the exception of potential increased mercury and metal uptake by aquatic organisms, or those that feed extensively of aquatic life. Threatened and endangered resources occur within the project area however the proposed project sites are not in areas known to be inhabited by those species with the exception of the lake sturgeon. The project is proposed to be completed during reservoir draw down, therefore lake sturgeon will not be present during construction. The project was proposed to avoid all known historic and cultural resources.

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

The removal and reclamation of the material used to create the rock humps and rock/brush humps and the dredge location may be possible but would be very difficult to accomplish. Environmental consequences from these activities would not be realized until after the reservoir is refilled and the next possible drawdown is not expected for another 20-30 years. If corrective actions are required to remediate environmental affects resulting form this project (prior to the next draw down), the reservoir would need to be drawn down and the structures removed. Removal of the structures could be done while the flowage is filled but would not be advisable do to the potential release of mercury and turbidity.

The release or remobilization of mercury and metals from dredging and the creation of the habitat structures will not be reversible.

The release of turbidity during and after the refill would not be reversible.

The navigational safety issue related to the height of the underwater structures may be reversible. Depending on the material used to construct the particular structure (clean rock vs. dredged material) there may be an issue with the release of mercury (see above). These structures could be lowered in height at any time using a boat/barge with the proper equipment to “knock” down the structures tops. If the structures are only comprised of rock and wood this could more easily be accomplished.

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.

Depending on the material used to create these underwater fish habitat structures there could be a significant cumulative effect. At present, the Department has been working with the applicant to reduce these risks by minimizing the extent of dredging by creating these structures using clean rock or other materials. Disturbing or exposing sediments containing mercury or other metals will likely increase availability of those substances to the aquatic environment. Given the right conditions, which may include; mercury or metal concentration, organic carbon, sulfate, anoxic conditions in the water column or sediments, and sulfate bacteria, each structure and dredge would cumulatively increase the available mercury or metal availability. If the department were to permit this type of project (dredging and piling sediments to create fish habitat) in the other flowages on the Flambeau River upstream of Dairyland it could have a significant cumulative effect on the quality of the environment through a similar anticipated release of mercury and metals. A number of the upstream flowages have higher sediment mercury concentrations than the Dairyland reservoir and similar activities have the potential to release more mercury and metals to the environment. The department expects that fish tissue mercury concentrations would increase throughout the Flambeau River System.

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?

The potential release of mercury from the sediments resulting from the proposed dredging activity is a significant unknown. It is not mercury concentration alone, but sulfate, sulfate bacteria, organic carbon and conditions that contain no oxygen (in the water column or in the sediments) that make mercury available to the aquatic environment to be bioaccumulated. The act of dredging sediment that contains detectable levels of mercury that is currently at depth and not available to the aquatic

system and piling it into the form of rock or rock/brush humps makes this mercury potentially available. The maintenance drawdown will expose and oxidize the sediments and oxidize sulfur into sulfate. Sulfate is the food source for sulfur bacteria, which are responsible for converting inorganic mercury to methyl mercury under the right no oxygen conditions. This process is interrelated to the concentrations of dissolved organic carbon (DOC), mercury, sulfate and the microbial community. The concentrations of DOC, sulfate and the composition of the microbial communities are unknown. It is believed these factors govern methyl mercury production synergistically. Each has an effect but together they have a larger effect than individually. This is a significant unknown. To better understand this unknown and the significance of the proposed action a number of studies would have to be conducted. These could include; bioaccumulation studies, ecological and human health risk assessments, etc.

- 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

There is the potential for equipment malfunction including fuel spills, or fuel or hydraulic leaks etc. that are associated with any construction project. DPC has provided a spill containment and fueling plan with their permit application to address these concerns. There is the potential for the project site to flood. Flooding cannot be predicted or controlled. Any permit authorized by the Department could be conditioned to minimize risk associated with site flooding such as storage of fuel or equipment off of the reservoir bed etc.

- c. 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.

There is the potential for construction equipment to malfunction, fuel leaks and spills etc, which are associated with any construction project. DPC has provided a spills response and equipment fueling proposal that minimizes these risks. There is potential for the site to flood during a storm event. A permit could be conditioned to limit equipment access and storage on the reservoir bed which would alleviate some risk of equipment flooding.

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.

Approval of this dredging project may set a precedent in the management of sediments with detectable levels of mercury. This project is a unique; due to the multiple sources of mercury (air deposition and past historical industrial discharge); project proposal is a fish habitat improvement project and not a remediation dredging proposal; and ultimate disposal of the dredge spoils will remain in a navigable waterway. It should be emphasized the proposed project is to construct fish habitat structures to diversify the flowage bottom which can be accomplished by bringing in clean materials and not dredging.

This proposal could influence how the Department:

- Reviews future projects of this type (sediment issues vs. fish habitat)
- Reviews proposals that include moving sediments with elevated concentration of metals and mercury without conducting any bioaccumulation studies, risk assessments, etc.
- Manages other sediment projects and/or remediation projects where mercury is a contaminant of concern (again related to no bioaccumulation studies, allowing the dredge material to remain in the water as a disposal site, etc.)

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.

Mercury, sediment and other potential chemical transport to downstream locations resulting from dredging are likely to be controversial subjects. The potential for mercury bioaccumulation by fish may be controversial. The success of a fishery habitat project without a dredging component may be controversial. There may be controversy regarding the need to dredge versus a habitat improvement project which involves the placement of inert materials on the reservoir bed.

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)

No Action: This alternative would eliminate the mercury/sediment issue, the navigational concerns, and any increase in flowage or downstream turbidity related to dredging or structure development. Fish and aquatic habitat in the flowage would remain as it is now.

Create Fish Habitat Structures using clean rock and wood from outside sources: This would increase the habitat structure and diversity of the reservoir and would limit the disturbance of flowage sediments and mercury. There would still potentially be some sediment disturbance from construction of the rock and rock/brush humps due to reservoir bed disturbance by construction equipment. This alternative would decrease the potential for mercury movement and availability in the aquatic environment.

Create Fish Habitat Structures by placing rock on the ice: This would increase habitat structure and diversity of the reservoir bottom and would eliminate the disturbance of sediments and mercury. This alternative would be less precise in placement and development of the rock structures than during the drawdown in a dry condition but would create fish habitat. Winter ice and weather conditions would limit how much structure or material could be placed on the ice and would not easily allow for the incorporation of woody materials with the rock. There may be safety concerns regarding vehicle and equipment traversing the ice.

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).

<u>Date</u>	<u>Contact</u>	<u>Comment Summary</u>
<u>3-7-07</u> <u>to</u> <u>present</u>	Jim Killian and Steve Galarneau	On going discussion on mercury, NR 347 and Departments Consensus Based Sediment Quality Guidelines.
3-21-07	Bob Grefe – Solid Waste	Discussed with Bob the applicability of Solid Waste rules on the proposed dredging project. Since the project was not removing the material from the lake bed and disposing them at a off site location, NR 500 did not come into play. He stated that this project was more like a dam removal project and that it needed to satisfy the WQ folks in assuring that it would protect surface waters and biota (resuspension/redistribution and possible bioaccumulation).
3-14-07	Internal Meeting between WRZ, FH and Basin Leader	Discussed the proposed dredging project on Dairyland Flowage. Discussion focused on responding to their proposal to place 100s of structures on the bed of the flowage. Letter to Dairyland dated 3-29-07 was a partial outcome of this meeting.
4-25-07	Conference call with Jim Killian, Steve Galarneau, Dave Webb, Jeff Scheirer, Carl Watras and Tom Aartila	Conference call focused on Hg movement in the aquatic environment and how the proposed project including dredging and side casting bed material to form underwater production islands and above water islands will impact the movement and availability of Hg. Dr. Watras described his research on the NHAL lakes, how and what is required to methylate Hg, and what may be the end result in terms of Hg if this project is done as proposed.
4-26-07	Meeting in Ladysmith with Paula Carow, Gerry Carow, John Theil, Mike Zimmer, Art Kuntzman, Jon Kleist, Dave Neuswanger, and	Discussed the proposed project and some of the data that would be in the draft EA (Fish tissue data, sediment data, water chemistry data), permits required for the project, timelines and contact names. Gerry provided a gallery of old photographs showing the flowage pre-dam and during the 1984 drawdown.

Tom Aartila

5-17-07	Internal meeting between WRZ, WQ, FH, EA, Basin Leader and Regional Water Leader	This meeting discussed the current proposal (Revision dated 4-27-07) and what we (the Department) thought we might be able to permit in terms of locations of structures, number of structures, mercury levels, etc. We also discussed what was needed to satisfy the Environmental Assessment (EA) component of the project.
6-14-07	Dairyland Habitat Project public informational hearing in Ladysmith	Conducted public informational hearing on this project in Ladysmith from 6:00 – 9:00 pm. Approximately 18 people were at the informational meeting.
6-29-07	Meeting between John Theil, Brian Rude, Gerry Carow, Jeff Scheirer, Jon Kleist, Tom Aartila and Tom Jerow	Met at the Ladysmith DNR Service Center to discuss the Dairyland Habitat project. DNR provided John Theil and Gerry Carow with a summary of the issues we were dealing with in this project and the outcome of our internal discussion. Based on these discussions and the fact that Department could not see how to eliminate the potential release of Hg from dredging sediments in the flowage, the Department told the representatives of Dairyland and the WRA that we would not permit dredging but would permit the placement of hard clean material (rock and wood) to construct fish habitat.
5-17-07	Email reply from Dr. Watras on additional Hg questions posed by Steve Galarneau	Steve Galarneau's questions focused on the availability of Hg from dredging and piling it to create islands and concentrations from other lake sediments and soil. Dr. Watras's assessment was that by piling dredge material that contains Hg, that it could potentially move into the water column and by piling the sediments containing Hg, could lead to a prolonged "bleed" of Hg into the lake system.,
7-13-07	Conference call with John Theil, Dr. Carlton, Jon Kleist, Jim Killian, Dave Neuswanger, Elizebeth Harrahay, and Tom Aartila	Conference call focused on a list of question regarding Hg that the Department put together. The questions focused on the process of methylation of Hg, mobilation of Hg during dredging and construction aspects of this project, concentrations that would increase bioaccumulation, etc. A brief summary of the call: Hg is bound to particulate organic matter, so anything to reduce disturbance will reduce mobilization of Hg; Methyl mercury is not driven by total Hg concentration; bioaccumulation is related to methyl Hg in the water column; Physical disturbance/exposing particulate matter to the water column may cause metals and Hg to desorb to the water column because of concentration gradient; Best way to manage Hg in sediments is to minimize disturbance of any organic sediments-pore water, organic matter; We are data poor in this project and it is difficult to make definitive statements or conclusion.
7-17-07	Sent a list of follow-up questions to Dr. Watras and Dr. Carlton regarding Hg	The four questions were: Based on the available sediment information, do you think dredging and piling the bed sediments will release mercury to the environment?; What Hg concentration or mass of Hg would be acceptable to disturb or release in the process of doing this habitat project?; Do you think we have enough data to make such a determination with any degree of certainty?; How would you avoid the release of mercury from this dredging project to the Dairyland Flowage and areas downstream?
7-19-07	Reponse Email from Dr. Watras on summary of 7-13-07 conference call	Dr. Watras's stated that Hg loading is important, along with the loading of sulfate, organic carbon and the composition of the microbial communities. Hg (II), sulfate, and DOC appear to govern meHg production synergistically. That is, each one has an effect, but together they have a larger effect than signally.
7-25-07	John Thiel passed on Dr. Carlton's reply to the Departments follow-up questions dated 7-17-07	Summary of his comments: Question 1 – Any disturbance that restructures soil or sediments can potentially result in release of mercury especially if there is water flowing through the disturbed material. Only a small fraction of the total Hg is immediately available to move with any drainage from exposed sediments. Likely fate of Hg is that it would become associated with other particulate material or dissolved organic matter at a later time. Another possibility is that exposed Hg will be photo reduced to elemental Hg (0)(based on our conf. call of 7-13-07, this would only happen in the top centimeter or so) which would likely volatilize to the atmosphere. As to mass of Hg that is acceptable, it would depend on where Hg moves to. Dilution and short retention time would result in a

minimal overall increase in concentration of Hg in water and would probably move Hg down stream. Third question regarding enough data is that there is not sufficient data to predict the fate of Hg and again reference to the short retention time indicates a good possibility of dilution and downstream movement. The last question asked how to minimize release of Hg and Dr. Carlton's response was to ensure that sediment resuspension in the reservoir water be avoided. Avoid areas of sediment accumulation and use parent material for construction of islands. Field stone used for base construction of the islands should provide essentially no mercury to the system (this is not how the island construction has been proposed).

3-29-07	Letter from Jon Kleist to John Theil regarding permit application to dredge and place habitat structures on bed of Dairyland flowage.	Letter responding to their time line on expedited permit and discussion of the Ea process. The letter also contained an attachment that discussed project timelines, general comments related to the proposed project including navigational issues, protection of existing fish habitat and minimization of impact from the shoreline to the 10-foot contour, sediment characterization and analysis needs, access points, environmental analysis information needs, and details needed on the project work plan and proposal.
6-27-07	Phone conversation with Dr. Watras and Jon Kleist on Hg issues	Ongoing discussion with Dr. Watras on Hg issues. Dr. Watras conducted a scaling exercise comparing the potential release of Hg from dredging 400,000 cubic yards of and placing it on the bed of the flowage to that of the annual air deposition of Hg. This exercise did not take into account all source of Hg (upstream or overland) but was just meant to compare it to a relatively consistent and know source. We made a conservative assumption that all of the Hg would become available (in reality only a portion of it would) and did the same with the air deposition mass (in reality only a portion of this is becomes bioavailable). We used 0.5 mg/kg Hg as our concentration (conservative and protective number) and found that the potential mass of remobilized Hg from the proposed 400,000 cubic yards of dredging would be 240,000 grams. When compared to the annual deposition of Hg from the air (77 grams on Dairyland flowage) this potential remobilization of Hg would be 3000 times higher than the annual air deposition of Hg.
8-2-07	Site visit conducted on the flowage by John Theil, Gerry Carow, Jon Kleist, Tom Jerow and Tom Aartila	DNR staff looked at the proposed sites on the flowage during its drawn down condition. Much of the flowage bed is sandy/silt with areas of tree stumps, undulating surface, rock and numerous fish cribs and tire cribs. There were areas of fine deposition overlaying the sandy/silt and one area that contained coarse gravel/rock from a crushing operation that was operating during the dam construction phase. DNR again discussed the issues of Hg with Dairyland and the WRA and told them we were still not going to permit dredging of the bed of the flowage to construct production islands do to the Hg in the substrates. We discussed using clean rock and wood to build fish habitat structures and diversify bottom substrates. Dairyland was interested in moving forward in that direction and the WRA was not interested unless it included the dredging component.
7-3-07	Stormwater Permit	Joe Graham WDNR Stormwater Specialist conveyed stormwater permit coverage to the project
3-2-07	Permit application	Permit application received at Ladysmith DNR Service center. Project proposal did not include project plans but had a project description including 75,000 cubic yards of dredging to construct habitat structures
3-15-07	Email form John Thiel DPC	Email describing project in more detail confirming project includes a proposal to dredge 75,000 cubic yards of lakebed, and describing a refill re-suspension model of fish habitat structure.
3-16-07	Permit amendment, request to expedite review	Plans and draft EA received by Department with request to expedite permit decision, Project plans included dredging 75,000 cu.yds. to construct 32 fish production islands, 250 or more bush humps, 100 or more crib fills and 100's of tree drops.
4-26-07	Permit amendment	Additional information submitted another draft EA and permit plans amended to include 400,000 cubic yards of lakebed to be dredged and used to construct habitat structures. Structures now include 32 fish production islands, 250 or more brush humps, 100 or more crib fills, 100's of tree drops, 5 emergent islands, 1 perch spawning reef, and 3 wetlands to be excavated from an existing island. Project plan narrative descriptions were in

		conflict with plan drawings.
5-29-07	Public notice issued by department and faxed to Rusk County LWCD	Public notice for project setting public informational hearing for June 14, 2007. discussion with Paula Carow, Rusk County LWCD to have notice published immediately to stay on expedited schedule, notice was published on May 31, 2007
6-8-07	Public notice for project issues by USACOE	The public notice for an individual permit for the project under Section 404 of the Clean Water Act was issued with project plans attached. Project narrative from the Federal notice was different than the project proposal currently under department review dredge volume was noticed at 288,583 cu.yds.
3-9-07	Letter from Regional Director sent to GLIFWC	Letter form John Gozdziwski to James Zorn, executive director of GLIFWC, with an offer to consult on a project involving wild rice.
7-2-07	Amended permit plans received by department via email form Mike Zimmer Rusk Co LWCD	Permit plans modified to include 133,584 cubic yards of dredging, structures now include 22 fish production islands, 100-200 Brush Humps, 5 emergent islands, 1 perch spawning reef . 100's of tree drops, Unknown # of crib fills. Wetlands removed, Project narrative in conflict with project plans.
7-9-07	Amended permit plans received by department via email form Mike Zimmer Rusk Co LWCD	Permit plan amended to 20 fish production islands, 100 brush humps, no crib fills, 5 emergent islands, 1 spawning reef, 100's of tree drops
8-6-07	Amended permit plans received by department via email form Mike Zimmer Rusk Co LWCD	Permit plans amended to the scope of the project as outlined in this EA
8-17-07	Amended permit plans received by department via email from Mike Zimmer Rusk Co LWCD	Permit plans amended to include 80,000 cu. yds. of dredging. (all old structues except tree drops have been replaced with all new structures and new names, 5 wild celery humps, 3 ground humps, 11 rock humps, and approximately 80 tree drops
8-23-07	Amended permit plans received by department via email form Mike Zimmer Rusk Co LWCD	Permit plans amended to include unspecified dredge volume likely remaining at 80,000 cu.yds., 6 wild celery humps, 4 ground humps, 11 rock humps, approx 80 tree drops. (this is interpretation as map key does not match previous descriptions). Site locations have been changed.
8-22-07	Additional Hg sample results received by department via email from Mike Zimmer Rusk Co LWCD	Sediment results from 8-16-07 sampling from DPC staff including Hg and TOC.

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 you have a right to challenge this decision made by the Department, you should know that Wisconsin statutes, administrative codes and case law establish time periods and requirements for reviewing Department decisions.

To seek judicial review of the Department’s decision, ss. 227.52 and 227.53, Stats., establish criteria for filing a petition for judicial review. Such a petition shall be filed with the appropriate circuit court and shall be served on the Department. The petition shall name the Department of Natural Resources as the respondent.

