

**SECTION 206 PROGRAM
PRELIMINARY RESTORATION PLAN
LAKE BELLE VIEW AQUATIC ECOSYSTEM RESTORATION**

1. Project

Lake Belle View Aquatic Ecosystem Restoration PWI no. ____
Congressional District: Wisconsin 02

2. Location

2.1 Lake Belle View is a shallow millpond located on the Sugar River in the Village of Belleville, Dane County, Wisconsin, and approximately 20 miles southwest of Madison. (Figure 1) . The Sugar River watershed above Lake Belle View is approximately 172 square miles. Two river channels (Sugar River and West Branch Sugar River) converge several miles upstream of Lake Belle View. The Sugar River watershed is highly agricultural and experiencing rapid urban growth. The 92 acre project area includes a lake, floodplain forest and various wetland communities. Surrounding the lake are a park, residences, roads and farmland.

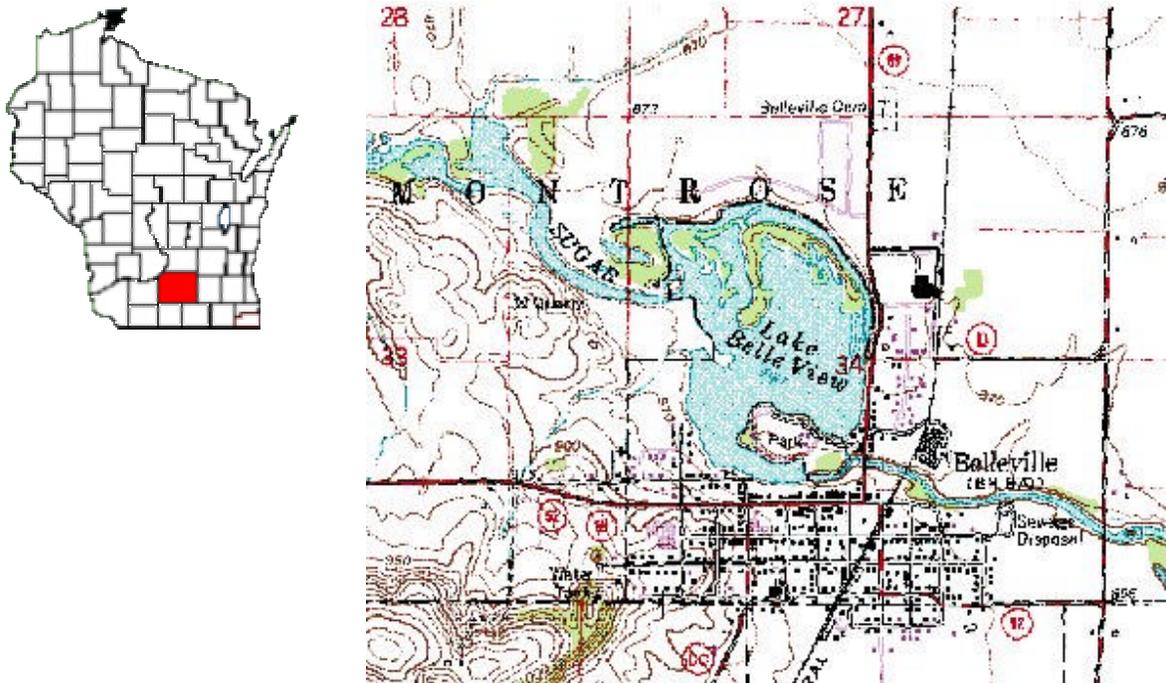


Figure 1. Portion of USGS map depicting Lake Belle View, Belleville, and the location of Dane County within the state.

3. Project Description

3.1 Project Proposal. The goals proposed for this project follow:

- Improve water quality in both Lake Belle View and the Sugar River. Restore a sustainable warm water fishery to the lake, and improve the fishery within the Sugar River. This includes the reduction of rough fish populations and increase in suitability for sportfish.
- Enhance the adjacent wetlands to take advantage of their natural filtering abilities and improve their value as wildlife habitat.

3.2 Project Features. To accomplish these goals the following restoration features are proposed;

- **Dredge sediment from the lake.** Selective hydraulic dredging of the lake and river channel to remove sediments and increase the water depth. Dredging would increase the depth up to the depth of the hard bottom. MSA (1997) estimated that 450,000 cubic yards of sediment could be excavated from the lake. MSA is a consulting firm performing studies for the Village of Belleville. Potential dredged material placement locations have been considered. An agricultural field downstream of the lake to the southeast of Belleville is the preferred site at this time.
- **Separate the lake and river channel.** Construction of diversion dikes would direct the flow of the Sugar River around Lake Belle View, bypassing the dam. This redirection would place the majority of flow in a channel along the north and east shoreline of the lake and exit at the outlet structure. The diversion would include construction of a diversion dike, pool and riffle structures, modification of the canal gate (former mill race), and shoreline protection. A gated inlet structure would be constructed to allow water into the lake. Modification of the canal gate and installation of pool and riffle structures would improve fish passage.
- **Enhance wetlands.** Several options of wetland enhancement are available within the project area. Each of them has the ability to improve fish and wildlife habitat and improve water quality. The restoration of submergent and emergent vegetation would enhance and add diversity to the existing floodplain forest and wet prairie/sedge meadow. Potential placement of dredged material on a 10:1 slope in the west bay would allow transition from deep water to shallow marsh and emergent wetlands.

3.3 Project Purpose. John Frederick, the Village founder, constructed a dam in the Sugar River for powering a sawmill in 1845. Not far from that location, another dam was constructed in 1920 forming the present Lake Belle View. In 1926, the Village developed a 12-acre park on a peninsula extending toward the center of the lake. Since

that time the Village has grown around the lake, as have the communities of Montrose to the north and Exeter to the south.

Currently the 92-acre lake has a mean depth of 2 feet and maximum depth of less than 10 feet with sediment depths of approximately 4 feet. The lake has the typical water quality and fishery problems associated with aging artificial impoundments including sedimentation, turbidity, lack of aquatic plant diversity, excessive nutrients, algal blooms, and rough fish (UW). The Sugar River supports both cold and warm water fisheries, with several miles of cold water fisheries upstream of Lake Belle View. Marshall and Stewart, 1993 sampled the upstream fishery and found 28 species. Common carp populations in the lake are high and have increased upstream into the Sugar River. Carp populations are not only a result of, but contribute to the water quality problems in the lake through, re-suspension of bottom sediments when scavenging. The river was once known for its smallmouth bass population, which seems to have been diminished. The Wisconsin DNR states that the Belleville dam impedes fish passage (WI DNR, 1994). Therefore the dam is potentially an impediment to maintaining the fishery downstream and contributing to reduced populations of smallmouth bass and other species upstream.

To understand the factors affecting the lake, one must understand the watershed. The southwest portion of Dane County is a driftless area, untouched by glaciation. The soil in this area is characterized as loess, which is easily eroded, forming deep cut valleys and narrow river channels (UW Rept). When the Midwest was settled in the 1800's, land was cleared for agriculture and homes. Since then, the area has been heavily farmed and increasing population growth has caused urbanization. Both of these factors have contributed to increased erosion and nutrient runoff within the watershed. Although farming practices have changed and communities have implemented measures to reduce erosion and runoff the effects will continue to be seen for some time.

The Water Resource Management Workshop at the University of Wisconsin-Madison is an academic program in which graduate students study a particular water resource problem or issue in depth and write a report on their study. In 1995, the WRM Workshop conducted several surveys of the lake including vegetation and invertebrates. The results of those surveys show that there is not great species diversity in the lake itself but downstream of the dam there is a more diverse macroinvertebrate population, as would be expected with hard substrate and flowing water. Five species of aquatic macrophytes were found in the lake including, in decreasing order of frequency, Curly-leaved pondweed, Sago pondweed, coontail, leafy pondweed and *Elodea*.

3.4 Project Outputs. Over 40 acres of warm water fishery would be restored to the lake, existing wetland enhanced and approximately 15 acres created. At least 10 miles of the Sugar River would be improved and fish passage unimpeded within this section of the Sugar River.

Selective dredging of the lake would have several benefits. Removal of nutrient rich sediment is a part of improving water quality. Phosphorus levels in the lake in 1995 were seven times higher than levels at which excessive algal growth can be expected (UW, 1995). Removal of that sediment from the lake would reduce the potential for internal loading of phosphorus in the lake and lower the risk of eutrophication. To realize maximum benefits though, the nutrient levels in the upstream watershed need to be reduced. Reduction in nutrients will reduce the potential for excessive algal growth and improve conditions for other macrophytes to grow. Additional means of reducing the

common carp population within the lake may be necessary to reduce sediment resuspension and improve the likelihood of plant growth.

Restoration of water depth in the lake would benefit the fishery in several ways. It would increase the amount of habitat suitable for game fish, reduce the habitat available for carp spawning, and provide overwintering habitat for game fish. A diversity of water depths would also increase the habitat diversity and quality for fish, shorebirds, migratory waterfowl and wildlife. Gamefish species occurring within the area include smallmouth and largemouth bass, bluegill, crappie, and walleye.

Separation of the lake and river channel would have several benefits for the lake and river. Directing the river into a channel would allow it to maintain its velocity and not drop sediments and nutrients into the lake. It would also reduce the warming effect that the lake has on the river and potentially extend the cool water fishery downstream. The reduction of sediment and nutrients entering the lake would have water quality benefits and benefit the warm water fishery as well. By modifying the canal gate and installing pool and riffle structures in the river channel, fish passage would be provided.

Wetland enhancement and restoration would provide multiple benefits to water quality and to fish and wildlife. The existing forested wetland and wet prairie/sedge meadow could be enhanced by the creation of additional wetlands throughout the lake. A diversity of habitat types would be beneficial to the fishery and to the wildlife utilizing the area. Wetlands also have the ability to remove nutrients from the water and thus improve water quality. Urban runoff enters the lake from the west and creation of wetlands would provide a "filter" for that runoff prior to its entering the lake and river.

3.5 Benefit Importance. Implementation of the proposed project would improve water quality, increase habitat value for fish and wildlife, and enhance the aesthetic values of the area. It would also contribute to the initiative to improve the condition of the Sugar River watershed. Lake Belle View is of high importance to the local community. Restoring the water quality and improving the habitat for fish and wildlife will improve its aesthetic value for the community and future generations to enjoy.

3.6 LERRDs. The Lake Belle View Aquatic Ecosystem Restoration Project would impact privately owned residential shoreline lots (shoreline protection), which would require a .18 ha (.45 acre) channel improvement easement. Dredging the Lake would require a .18 ha (.45 acre) pipeline easement, and would require that a channel improvement easement of approximately 16 ha (40 acres) be acquired by the sponsor for a dredge material placement site. The Village of Belleville, Dane County Wisconsin is the sponsor for this project.

No navigational servitude lands are involved. The cost estimate for LERRDs including land acquisition costs is \$200,000.

The model Project Cooperation Agreement (PCA) will be executed upon project approval. A gross appraisal will be prepared during the ERR phase.

Based on review to date, there are no sources of Hazardous, Toxic, and Radioactive Waste (HTRW) within the project area. Sediment testing was conducted in 1985 and results are available in (MSA 1997).

3.7 Relationship to Other Projects. Efforts within the watershed include streambank fencing and protection projects on Badger Mill Creek and the Upper Sugar River Initiative that includes various stakeholders cooperating to address watershed issues. In addition, Dane County Regional Planning Commission has developed a Water Quality Plan to address many of the problems effecting the counties water resources. The cities of Madison and Verona, WI are both conducting stormwater planning and management programs. The northern portion of the watershed was part of a U.S. Soil Conservation Service P.L. 566 watershed plan, which began in 1981. The goals of the plan were to provide watershed protection, improve water quality, and enhance fish and wildlife habitat. Efforts to ensure continued erosion and nutrient reduction within watershed will further the benefits within Lake Belle View and the entire watershed.

3.8 Alternatives. Alternatives to the proposed restoration measures would be investigated. Those alternatives include different combinations and dimensions of the proposed measures.

Dredge sediment from the lake

- spatial area
- depth
- hydraulic dredging
- mechanical dredging
- alternative placement sites

Separate the lake and river channel

- routing main channel through existing dam
- routing main channel through mill race

Enhance wetlands

- spatial area
- configuration

3.9 Methodologies. Habitat Evaluation Procedures (HEP) or Wildlife Habitat Appraisal Guide (WHAG) will be used in determining fish and wildlife habitat benefits within the project. Models will be used to analyze project outputs, and IW Plan software would be used as the incremental analysis tool in the feasibility phase to be included as part of the environmental assessment. Potential target species for the assessment will be bluegill, smallmouth bass, carp, and species of shorebird, waterfowl, or amphibians.

Outputs will include changes to the habitat for fish species with intended increases in suitability for species such as large and smallmouth bass and decreased suitability for carp. Wetland enhancement will be best measured with the use of avian or amphibian habitat suitability models.

Studies are currently underway to evaluate water quality, local hydrogeologic conditions, lake basemapping, and a floodplain study. Results of these studies will be utilized in planning and

design of the project. Additional hydraulic study may be required to better understand the changes to river flow and future lake conditions, including flood heights. There is also extensive water quality monitoring in the upstream Sugar River watershed which may be useful in future work.

An archeological and structural reconnaissance would need to be completed to assess the historical significance of existing surface, subsurface, and superstructure properties. This reconnaissance will be coordinated with the appropriate interested parties, Native American Tribes, and the Historic Preservation Division of the State Historical Society of Wisconsin in compliance with the National Historic Properties Act of 1966, as amended in 1999.

4. Views of Sponsors : A letter from the Village of Belleville is attached. The views of the sponsor can be seen in their commitment to find a solution to the problems that have been identified within Lake Belle View. In the early 1980's the Village of Belleville recognized the need to find solutions to problems in Lake Belle View. The Village formed a Lake Restoration Committee, which completed structural restoration efforts including dam repair and riprap placement. They also authorized the University of Wisconsin Water Resources Management Workshop that completed a comprehensive report in 1995. In addition, the Village has passed a property tax exclusively for lake restoration and the nearby Towns of Montrose and Exeter have pledged funds to lake restoration efforts. The Village previously authorized and is funding several studies of the lake to assist in restoration efforts. Those studies are currently underway and results will be utilized to assist with project planning.

5. Views of Other Federal, State and Regional Agencies: The Village has been working with the Wisconsin Department of Natural Resources and Dane County Land Conservation office as well as the Upper Sugar River Initiative. All of these entities are in support of the efforts.

6. Environmental Compliance Requirements: National Environmental Policy Act (NEPA) compliance and documentation will be accomplished, pending approval of this project restoration plan. Federal, State and local permits, including water quality certification, would be completed in conjunction with NEPA documentation.

7. Costs and Benefits:

7.1 Costs:

Estimated Federal Cost	\$3,763,100
Non-Federal Contribution	<u>\$2,026,300</u>
Total Estimated Project Cost	\$5,789,400

7.2 Benefits: Implementation of these management measures will provide benefits locally at Lake Belle View and within the Sugar River. Cumulatively benefits

will be provided to the Sugar River watershed. These benefits will be in the form of lake, wetland, and stream habitat and associated water quality improvements.

Local benefits include the restoration of nearly 40 acres warm water fishery and restoration and enhancement of adjacent wetlands. Fish species to benefit within the lake include largemouth bass, catfish and bluegill as well as other fish species. Fish movement within this reach of the Sugar River will be unimpeded. The project will benefit migratory birds, as well as improve habitat for local animal populations.

Improving the quality of the lake will improve the habitat of the Sugar River and benefit the fishery as well. Benefits to the Sugar River will be measurable both up and downstream of the lake. Benefits to the Sugar River include: reduction of turbidity, restoration of the historic thermal regime, and restoration of fish passage.

Annual inspection, monitoring and maintenance will cost approximately \$6,400.00 each year. It will include embankment maintenance, mowing, and brush control and riprap, bedding replacement. This also assumes that no maintenance dredging will be required.

8. Schedule:

<u>Action:</u>	<u>Time Lapse</u>	<u>Date:</u>	<u>FY</u>
Letter of Intent received from Village of Belleville		July 99	99
Division Office approval of PRP/Receipt of Work Allowance	3 months	Oct 99	00
Ecosystem Restoration Report/Environmental Compliance	1 year	Oct 01	01
Completion of Plans and Specs	6 months	Apr 01	01
Div. Commander Signs PCA/Construction Work Allowance Request	3 months	July 01	01
Acquisition of LERRDs (right-of-way acquisition)	9 months	Apr 02	02
Contract Award	simultaneous with above	Apr 02	02
Construction Start	2 months	June 02	02
Complete Construction	1-2 years	Dec 03	04

9. Supplemental Information: Though the Sugar River has been effected by nutrient load and erosion caused by both agriculture and urbanization, steps are being taken throughout the watershed to improve land use practices and address the problem. Implementation of this project will further those efforts and benefit not only the immediate vicinity but the entire watershed. The Village of Belleville may decide to pursue work in kind as part of their cost share at a later date.

10. Financial Data:

a. Project Modification Costs: (Thousands)

	Totals	Belleville	Federal	FEDERAL FUNDING NEEDS				
				FY00	FY01	FY02	FY 03	FY 04
Report	\$412.1	\$0	\$412.1	\$412.1				
P & S	\$303.3	\$0	\$303.3		\$303.3			
Implementation	\$5,074.0	\$2,026.3	\$3,047.7			\$500.0	\$1,800.0	\$747.7
Total	\$5,789.4	\$2,026.3	\$3,763.1	\$412.1	\$303.3	\$500.0	\$1,800.0	\$747.7

Note: Report and Plans and Specifications are initially federally financed, and costs distributed as part of the non-Federal share of project costs during implementation.

b. Non-Federal Requirements:

LEERD	\$200,000
Cash	\$1,826,300
Work In Kind	\$ 0
Annual OMRRR	\$6,400

11. Financial Allocations to Date: This item will be completed on fact sheets accompanying funding requests.

Ecosystem Restoration Report: none
 Plans and Specifications: none
 Implementation (Construction) none