

SOUTHEASTERN WISCONSIN REGIONAL PLANNING COMMISSION

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Staff Memorandum

SCOPE OF WORK TO BE PERFORMED BY SEWRPC FOR PHASE ONE OF A COMPREHENSIVE LAKE MANAGEMENT PLAN FOR BIG CEDAR LAKE, WASHINGTON COUNTY, WISCONSIN

April 23, 2024

As initially requested during a February 20, 2023, meeting of the Big Cedar Lake Protection and Rehabilitation District ("BCLPRD"), the Southeastern Wisconsin Regional Planning Commission ("Commission") has prepared a scope of work examining a variety of management issues that the BCLPRD believes are important to the continued health and vitality of Big Cedar Lake ("Lake"). This scope of work provides most of the technical, schedule, and budget information regarding fieldwork and data collection efforts as the first phase of a two phase process in preparing a comprehensive lake management plan for the lakes. A subsequent phase and scope of work will cover data analysis, plan writing, and management plan activities; the BCLPRD may elect to apply for a grant through the Wisconsin Department of Natural Resources ("WDNR") Surface Water Grant program to help fund some of this subsequent phase.

BACKGROUND INFORMATION

Big Cedar Lake ("Lake") is a 937-acre spring lake located within the Towns of West Bend and Polk in Washington County. As a spring-fed lake, groundwater provides most of the water in the Lake although several small unnamed tributaries provide surface-water inflow, including from 44-acre Gilbert Lake to the northwest. The Lake forms the headwaters of Cedar Creek, which is the Lake's outlet. Water leaving Big Cedar flows downstream along Cedar Creek into Little Cedar Lake before flowing into the Milwaukee River near Cedarburg and ultimately discharging into Lake Michigan. The Lake is impounded by a weir along its southeastern shore. The Lake attains a maximum depth of 105 feet and a mean depth of 34 feet.¹ Four boat launches provide public access to the Lake: two launches along the western shore on Cedar Park Drive and Gonring Drive and two launches along the eastern shore on Wagner Lane and South Hacker Drive. According to the WDNR Presto-Lite model, the Lake receives runoff from 9.4 square mile watershed; nearly half of the watershed is in agricultural uses while most of the remainder is in forest, urban, and wetland uses.²

The Commission has previously produced plans and reports for Big Cedar Lake and the surrounding area. The most notable report for this effort is Memorandum Report No. 137, *A Water Quality Protection and Stormwater Management Plan for Big Cedar Lake, Washington County, Wisconsin*, which is effectively

¹ See <https://dnr.wi.gov/lakes/lakepages/LakeDetail.aspx?wbic=25300&page=facts>.

² For more information on the WDNR Presto-Lite model, see the following webpage: <https://dnr.wisconsin.gov/topic/SurfaceWater/PRESTO.html>.

Commission's first comprehensive lake management plan for the Lake. Other reports include Memorandum Report No. 131, *Environmental Analysis of the Lands at the Headwaters of Gilbert Lake and Big Cedar Lake, Washington County, Wisconsin* and at least two staff memoranda: *Big Cedar Lake Watershed Land Use and Pollutant Loading Update, 2020*, and *Groundwater Investigation for Gilbert Lake, Washington County, Wisconsin*, 2015.

Since the previous management plan was completed, the Lake watershed has become increasingly urbanized but there have also been considerable efforts to preserve natural lands as well as implement conservation practices on agricultural lands. Additionally, the lake ecology and human use have changed with a decline in the lake's two-story fishery, invasion by starry stonewort (*Nitellopsis obtusa*), and increasing recreational use pressures. Consequently, the BCLPRD would like to update the lake management plan to protect desirable ecological conditions and high-quality recreational opportunities on the Lake. Commission staff used prominent concerns expressed as part of several conversations, meetings, emails, and documents to design this draft scope of work to prepare a comprehensive lake management plan.

This scope of work is intended to cover summer 2024 fieldwork efforts; these efforts are expected to be entirely funded entirely by the BCLPRD. The Commission will also develop a subsequent scope of work tailored toward gathering additional information for the comprehensive plan, data analysis, and comprehensive plan development; elements from this subsequent scope of work could be included in a fall 2024 WDNr grant application. This memorandum serves as the foundation of a contractual working relationship between the BCLPRD and the Commission.

PROPOSED SCOPE OF WORK

The proposed study is designed to provide the BCLPRD with a comprehensive array of technical information that helps improve its understanding of factors that must be considered to make efficient and effective lake management decisions. In turn, the information will assist the BCLPRD and its partners promote actions that help achieve water quality, lake and stream health, recreational, and ecological resilience goals and desires. Some of these factors are universal to all lake studies while other factors are unique to issues associated with Big Cedar Lake. Commission staff will examine this information and will provide interpretations, context, suggestions, and concepts for management action. Furthermore, the Commission may include a few examples of where and how these management actions could be employed.

The major factors proposed to be examined as part of the study are listed below.

- Lake water quality
- Shoreline condition
- Recreational use

Some of these elements require active cooperation and participation by BCLPRD volunteers and may require contributions from Washington County and WDNr staff. Highlights of each element are summarized below.

Water Quality

Activity: Commission staff will assist the BCLPRD in developing a water quality monitoring strategy and the logistics of collecting appropriate water quality samples from the Lake. This effort could include determining whether boat-induced disturbances to the lake bottom sediment release detectable concentrations of arsenic or other heavy metals into the water column. A related effort would examine human impacts to water quality on the "sandbar" near the Cedar Community shoreline.

Method or Data Collected: Commission staff will assist the BCLPRD collect water quality samples from near the Lake bottom at up to six locations during periods without boat traffic and following heavy boating

traffic. As discussed with the BCLPRD, these six locations would be 1) north of Peninsula Drive, 2) south of Peninsula drive, 3) the “sunken island”, 4) the “sandbar” near the Cedar Community shoreline, 5) the northern WDNR-designated Sensitive Area, and 6) an area to be determined at time of sampling. Certified Wisconsin laboratories, such as the Wisconsin State Laboratory of Hygiene, can analyze these samples for detectable concentrations of arsenic or other heavy metals of interest by the BCLPRD.³

Commission staff will assist the BCLPRD in collecting water samples for analysis of ammonia, urea, or other nitrogen compounds in the “sandbar” near the Cedar Community shoreline. This sampling would occur on a quiet morning and then on a busy afternoon to examine whether there are detectable concentrations of nitrogen compounds in the lake and whether there is a significant change in the concentrations of these compounds between these two periods.

Deliverable: Commission staff will assist the BCLPRD with study design, logistics, and implementation to evaluate whether sediment disturbance by boating causes heavy metals concentrations in the water column to be elevated compared to quiet periods as well as other human impacts on water quality. The Commission could compare these resulting concentrations to determine whether release of these compounds into the water column could be affecting the aquatic plant community or other aquatic biota.

Shoreline Condition

Activity: Commission staff will complete an on-the-water shoreline condition inventory around the perimeter of the open-water portion of the Lake. The inventory will examine the type and quality of terrestrial and emergent vegetation present, the presence or absence of active erosion, the type and condition of artificial shoreline protection, the presence of buffer areas in the nearby uplands, and possibly other features such as springs, tributaries, and/or stormwater outfalls. Commission staff will also review historical aerial imagery to examine changes in shoreline development over time.

Method or Data Collected: With the assistance of a BCLPRD volunteer, Commission staff will take notes and photographs of the shoreline and record locations of erosion, shoreline protection, and other features. Commission staff will inventory shoreline condition utilizing developed protocols from WDNR and/or the Environmental Protection Agency. The survey will also distinguish the number of permanent and temporary docks and piers as an addition to the typical survey. Given the approximately 11 miles of Lake shoreline, the on-the-water portion of the inventory could be completed over several days.

In addition to the on-the-water survey in summer 2023, Commission staff will also review historical aerial imagery to tally the number of docks, boat houses, and other structures and, if feasible, approximate the area of the lake and riparian zone that is covered by structures and other impervious surfaces (e.g., driveway).

Deliverable: The Commission will inventory historical changes in shoreline development, map current shoreline conditions, as well as recommend how to enhance shoreline and near-shore habitat and protect against erosion. Commission staff will discuss opportunities to fund shoreline restoration and/or protection projects through the WDNR Surface Water Grant program, the WDNR Healthy Lakes & Rivers program, and potentially other programs.

Recreational Use

Activity: Quantitatively examine lake user concerns such as perceptions of excessive boat traffic, use conflict, general safety concerns, boat origin/AIS introduction, and occasionally lax boating ordinance compliance.

³ At the time of this writing, the Wisconsin State Laboratory of Hygiene offers testing for arsenic at \$32.00 per water sample. See the following link for more information: <https://www.slh.wisc.edu/environmental/water/public-environmental-and-water-testing-prices/>.

Methods and Data Collected: The overarching goal of this element is to inventory the total number of boats engaging in various pursuits during widely varying summer conditions and quantify use concerns and ordinance compliance as possible. Commission staff will help the BCLPRD organize field data collection efforts, but the BCLPRD is responsible for actual field-data collection, data compilation, and delivering summarized data sets to the Commission. The BCLPRD should collect boat traffic information during at least two warm-weather periods during 2024 and 2025.

The Commission advises the BCLPRD to employ unmanned aerial vehicle (drone) based video equipment to precisely count the number of boats on the lake and their operational characteristics during heavy boating pressure time periods. Nevertheless, the boat inventory should cover a range of boating intensity periods. For example, the inventory should examine extremely high boat traffic time periods (e.g., hot sunny holiday and weekend afternoons), moderate traffic conditions, as well as lower traffic periods (e.g., early morning, overcast). The watercraft inventory must endeavor to identify boat type, propulsion, speed, probable use, and visible occupant numbers and pursuits. Data must be collected throughout the Lake over set, equal length, time periods to illustrate changing conditions. As noted earlier, drone videography and analysis are especially important to evaluate the entire Lake during heavy boat use periods. The BCLPRD should attempt to collect such information during up to four particularly heavy open water boat use periods. Additionally, BCLPRD and project partner staff should count the number of boats moored or beached around the lake at private residences and marinas at least twice over the period of study as well as inventory the number and origin of trailered boats and vehicles at all accessible locations around the Lake. Furthermore, BCLPRD or partner organization staff should periodically visit boat launches to observe launch use intensity, vessel cleaning procedures, and note boat origin as possible.

Deliverables: This element is meant to quantify the number and type of boats using Big Cedar Lake, the types of recreational activities they support, and gage overall compliance with local ordinances (e.g., slow-no-wake speed). As feasible, use aerial drone video footage and/or satellite imagery analysis to evaluate whole-lake conditions during heavy boat traffic time periods. The Commission will help quantify in-operation boat density, Lake usable area, and the Lake's safe recreational carrying capacity as well as examine potential for use conflict, safety concerns, and environmental damage.

PROBABLE SCHEDULE

The Commission will initiate work on this project as soon as BCLPRD authorizes work to proceed.⁴ The fieldwork components would occur between May and September. Preliminary analysis of fieldwork results would be completed by late September to early October so these results could be discussed in a fall WDNR Surface Water Grant application. The results and findings will be shared with the BCLPRD and the WDNR.

PROPOSED PROJECT BUDGET

Category	Activity	Cash Outlays (Commission Services)	
		Labor (Hours)	Probable Cost (\$)
Water Quality	Assist BCLPRD in examining whether boating activity releases heavy metals in lake bottom sediment.	32	\$1,600
Shoreline Condition	Conduct a field inventory of the Lake's shorelines. Quantify the effect of riparian areas on Lake water quality and habitat value.	114	\$5,600

⁴A short letter agreement, with a copy of this scope of work attached, is what is used to retain the Commission's services for this type of project. The Commission issues this letter and the BCLPRD would also sign the letter to initiate work. The grantee must remember that Commission fee-based services cannot proceed before the date of official grant award to be reimbursed through the grant.

Recreational Use	Assist BCLPRD in surveying and characterizing recreational use of Lake. Examine lake use carrying capacity.	40	\$2,300
Communication	Discuss logistics regarding fieldwork efforts. Attend select meetings and provide updates on fieldwork progress.	8	\$500
Total		194	\$10,000

The Commission can supply additional budget details as may be required for the grant application and/or BCLPRD's interest.

As noted in the scope section of this document, this budget assumes that the BCLPRD will acquire and make available certain pieces of equipment (e.g., boats, incidental gear, water testing equipment), will provide volunteer labor, and will be responsible for contractor fees (e.g., analytical laboratories).

Following BCLPRD review and acceptance of this scope of work, an agreement would be executed between the BCLPRD and the Commission. Under that agreement, the BCLPRD would be responsible for the entire \$10,000 project cost.

#272817 - BIG CEDAR 2023 COMP PLAN SCOPE OF WORK
300-1000
JPP/nkk
04/16/2024

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May 17, 2024

Chris Genthe
Chair
Big Cedar Lake Protection and Rehabilitation District
4480 Gonring Drive
West Bend, WI 53095

SUBJECT: Proposed Scope of Services – Phase One of Comprehensive Lake Management Plan for Big Cedar Lake, Washington County, Wisconsin

Dear Mr. Genthe:

The Big Cedar Lake Protection and Rehabilitation District (“District”) expressed interest in working with the Southeastern Wisconsin Regional Planning Commission (“Commission”) to conduct several field inventories of Big Cedar Lake (“Lake”) in preparation for a forthcoming comprehensive lake management plan for the Lake. These field inventory efforts include surveying the Lake’s shorelines, examining potential impacts of recreational boating on Lake water quality, and surveying recreational use on the Lake. All fieldwork efforts are anticipated to be completed by early fall 2024. These fieldwork efforts will be referenced in a forthcoming Wisconsin Department of Natural Resources Surface Water Grant application to fund additional elements as part of a larger effort to prepare an updated comprehensive management plan for the Lake. The scope of work is enclosed with this letter.

To allow project work to commence, this letter, upon execution, constitutes an agreement between the Commission and the District, under which the Commission will complete the field inventories and share the resulting information with the District. The Commission will complete the tasks described for a cost of up to but not to exceed \$10,000. All project components will be collaboratively undertaken by Commission staff, the District, and other partners. The District may be asked to fulfill a few specific tasks (e.g., providing a volunteer boat and driver for the shoreline survey and water quality study).

We trust that this proposal provides an acceptable basis for executing the work associated with the proposed study for the District. Please appropriately execute two copies of this agreement, retaining one for your records and returning one copy to the Commission. Should you have any questions concerning this matter, please do not hesitate to contact us.

Mr. Chris Genthe
May 17, 2024
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Sincerely,



Thomas Slawski, PhD
Chief Biologist

JPP/TMS/nkk
BIG CEDAR LAKE 2024 COMP PLAN PHASE ONE LETTER AGREEMENT (272871).DOCX

Enclosure (#272817)

cc: Elizabeth Larsen

PROPOSAL ACCEPTANCE:



Mr. Chris Genthe, Chair
Big Cedar Lake Protection and Rehabilitation District

Date 5/17/2024