WARNER LAGOON WATER QUALITY PLANNING REPORT

Prepared by:

City of Madison Engineering Division &

City of Madison Parks Division

DRAFT FINAL REPORT

January 12, 2021

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PURPOSE

This report serves as the final summary of the Warner Lagoon Water Quality Planning Process. It is the intent of this document to provide an overview of the planning process, summarize the Warner Lagoon Water Quality Analysis (Appendix A), and define a plan for implementing approved alternatives proposed the Water Quality Analysis. It is not the intent of this report to replicate or replace the Water Quality Analysis, also referred to as the Feasibility Study, but rather to be understood in conjunction with that study.

SUMMARY

The culmination of a multi-year, water quality planning process for Warner Lagoon is summarized in this report. In short, Warner Lagoon is a degraded and hypereutrophic waterbody, which will continue to deteriorate if not addressed. However, if appropriate measures are taken, water quality, water clarity, and pan fish habitat can be significantly improved.

The planning process identified 13 potential projects that will improve water quality, pan fish habitat, or recreational access. Eleven of those projects were approved through the public input process. One project, the fishing access pier, has already been constructed. This report will focus on the remaining 10 projects. Figure 1, the Water Improvement Alternatives Concept Diagram, which is excerpted from the Feasibility Study, depicts locations for the proposed projects.

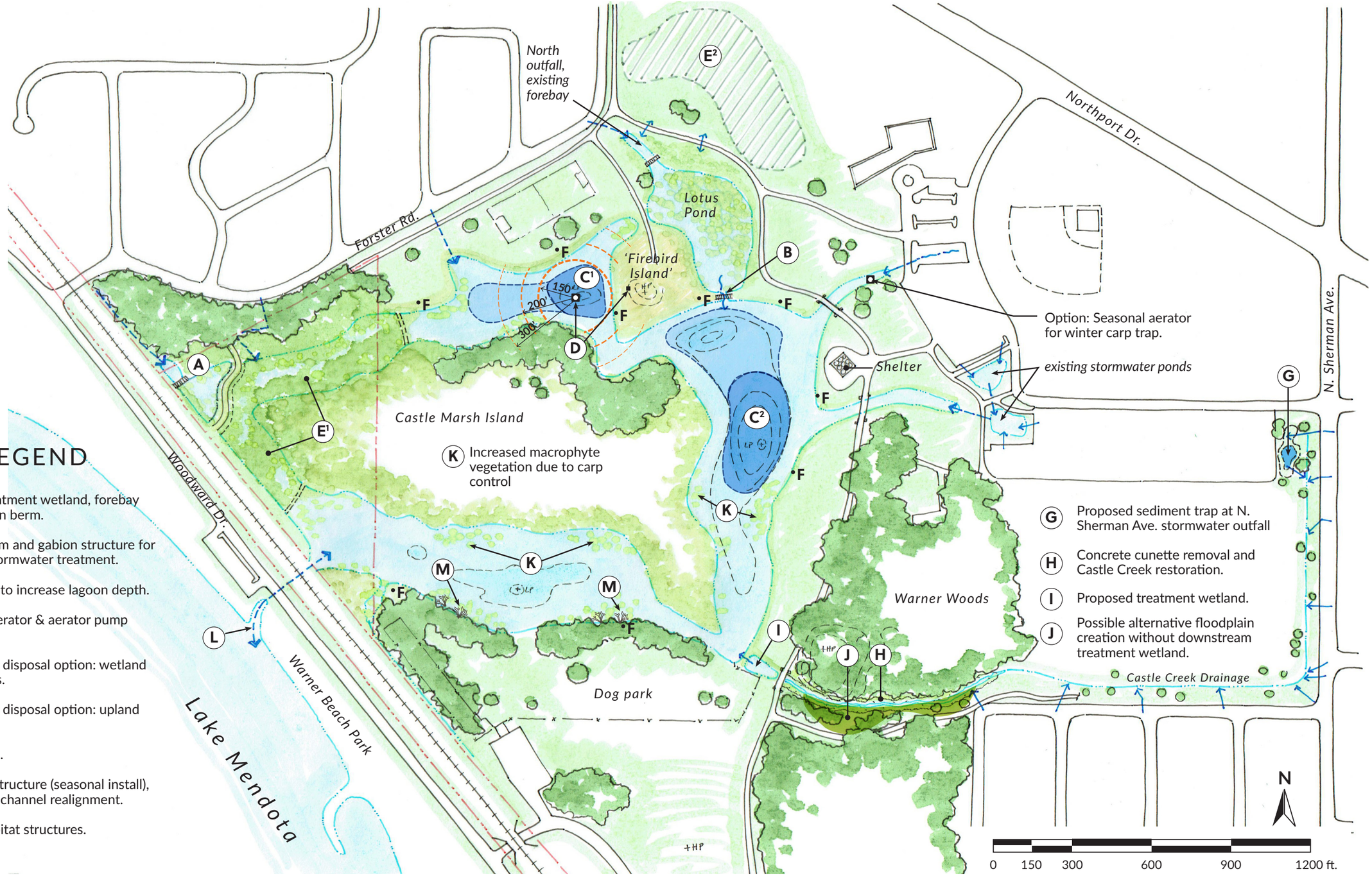
Table 1 lists the benefits, relative priority, and estimated budget for each publicly approved project. Detailed project information, including a summary of public comments and rough cost breakdowns, is included in the Public Involvement and Budget and Priority Sections, as well as in the Appendices.

Project Name	Water Improvement Alternatives Concept Figure Callout	Estimated Phosphorous Reduction (lbs)	Estimated Sediment Reduction (lbs)	Relative Priority	Estimated Project Cost
Northwest Watershed Forebay and Treatment Wetland	A	54.7	22,335	2	$ 102,464
North Watershed Lotus Pond Berm	B	49.6	20,814	2	$ 51,510
Lagoon Dredging - *Represents Max Dredging Possible, Could Be Scaled Back*	C & E	NA	NA	3	$ 4,011,700
In-Lagoon Aeration - *Eliminated During Public Involvement Process*	D	NA	NA	NA	$ -
Fishing Nodes	F	NA	NA	4	$ 25,050
East Watershed N. Sherman Ave. Sediment Trap	G	53.9	22,248	2	$ 54,869
East Watershed Castle Creek Cunette Removal and Channel Restoration	H & J			2	$ 270,106
East Watershed Castle Creek Treatment Wetland	I			2	$ 39,748
Increased Macrophyte Vegetation - *Volunteer Effort*	K	NA	NA	4	$ -
Tree Drop Structures	M	NA	NA	4	$ 6,250
Carp Barrier and Harvesting	L	NA	NA	1	$ 37,500
Alum Treatment - *Eliminated During Public Involvement Process*	NA	NA	NA	NA	$ -
TOTAL FOR ALL WARNER LAGOON PROJECTS					**$ 4,599,197**

TABLE 1: PROPOSED PROJECTS – PLANNING LEVEL COST ESTIMATES

NOTES LEGEND

- (A) Proposed treatment wetland, forebay and separation berm.
- (B) Proposed berm and gabion structure for lotus pond stormwater treatment.
- (C) Dredge areas to increase lagoon depth.
- (D) Submerged aerator & aerator pump house.
- (E¹) Dredge spoils disposal option: wetland creation areas.
- (E²) Dredge spoils disposal option: upland area.
- •F Fishing nodes.
- (L) Carp barrier structure (seasonal install), and potential channel realignment.
- (M) Tree drop habitat structures.



1 | **WARNER LAGOON** WATER QUALITY | Water Improvement Alternatives Concept Diagram

FINAL OVERVIEW PLAN June 19, 2019

Montgomery Associates Resource Solutions

Underwater Habitat Investigations, LLC

LVB LVBrown Studio LLC

INTRODUCTION

Warner Park, located on the north side of Madison, serves as a local and regional resource for the community. One of Warner Park's most unique assets is Warner Lagoon. The lagoon is a 28-acre, man-made waterbody that is hydraulically connected to Lake Mendota. The lagoon serves several functions for the community, including: wildlife habitat, pan fishery, paddle sport resource, passive recreation, and stormwater treatment.

Warner Lagoon was created in the 1950s and 1960s by dredging an area formerly known as Castle Marsh. The marsh, in turn, was created when the 1912 construction of Tenney Locks raised water levels in Lake Mendota by approximately 5 feet. Prior to 1912, it is assumed that the area was wetland, farmland, or both.

The watershed, or area which drains to the lagoon, is approximately 1,024 acres. The area predominantly consists of medium-density, residential development. The watershed also has areas of commercial development, parks, and other urban features (Figure 2).

Hydraulically, the lagoon functions as a large stormwater pond and anecdotal reports of deteriorating water quality have been raised throughout the life of the lagoon. High phosphorus concentrations, measured in recent years, have resulted in highly eutrophic or hypereutrophic conditions in the lagoon. Cyanobacteria blooms are common in hot summer months, resulting in impacts to lagoon enjoyment and use.

Low dissolved oxygen levels beneath winter ice cover routinely contribute to spring fish kills and overall poor fish habitat. As a result, the fishery in the lagoon is dominated by common carp *(Cyprinus carpio).* Carp prefer to feed by scavenging in benthic sediment, resulting in uprooted aquatic vegetation and turbid water. The loss of aquatic vegetation further impacts pan fisheries by reducing spawning habitat.

Historic records indicate little to no maintenance has occurred in the lagoon since construction.

Due to the poor and deteriorating conditions in the lagoon, residents and local groups have consistently urged City staff to improve lagoon conditions. However, since Warner Lagoon is not only a regional amenity, but also has multiple owners and multiple interested parties, it was decided the best approach would be to formalize a lagoon improvement plan. This would assure coherent and compatible projects that worked toward mutually agreed upon goals. This report details the public process followed to develop a coherent water quality plan, as well as the recommended solutions.

WARNER LAGOON WATER QUALITY RFP PROJECT NO. 10286	SHEET NO. 2
WARNER LAGOON WATERSHED	
FIGURE 2	CITY OF MADISON

WARNER LAGOON TOTAL
WATERSHED AREA: 1024 ACRES

152 ACRES

163 ACRES

12 ACRES

10 ACRES

22 ACRES

39 ACRES

114 ACRES

512 ACRES

0 900 1800

PLOT SCALE: ____

PLOT NAME: ____

REV. DATE: ____

ORIGINATOR: CITY OF MADISON, STREETS DIVISION

FILE NAME: M:\DESIGN\Projects\10286\Storm\Design\RFP Watersheds 2.dgn

DATE: 1/14/2021

PLOT SCALE: 899.9982 sf / In.

PUBLIC INVOLVEMENT – PHASE 1

As highlighted in previous paragraphs, Warner Lagoon has several groups who are concerned with the lagoon's long-term future. Warner Lagoon is also owned by two parties: the city of Madison, and the Wisconsin Department of Natural Resources. Because all parties with a vested interest in the lagoon have a vision for improvements, the master planning effort was born with the following objective:

> *"To produce a document that is agreed upon by the majority of the participants, and that defines realistic projects, which will work toward achieving the lagoon improvement objectives."*

Step one of the planning process was to identify a core stakeholder group. This consisted of:

- Wild Warner Park
- Yahara Fishing Club
- Dane County Conservation
- Clean Lakes Alliance
- Alders from Districts 12 and 18
- City of Madison: Park and Engineering Divisions
- Wisconsin Department of Natural Resources
- Individual Residents

The stakeholder group began meeting in 2016. The first task was to summarize each party's goals and determine if individual priorities were compatible. A summary of the stakeholders' objectives is listed in Table 2.

STAKEHOLDER	PRIORITY
City of Madison	Retain Recreation Amenities Retain Storm Water Treatment Capabilities Manage User Expectations Consensus Among Stakeholders and Public
Depart of Natural Resources	Maintain the Natural Resource Improve or Maintain an Accessible Shoreline Improve Fishing Habitat and Access Confined Stormwater Treatment
Alderpersons	Advocate for the Public Process Ensure Resident Voices are Heard
Wild Warner Park	Maintain the Natural Resource Limit Invasive Species
Yahara Fishing Club/Dane County Conservation League	Improve Fish Habitat, Including Spawning Habitat Improve Access to Fishing Opportunities Possibly Install ADA Accessible Dock
Clean Lakes Alliance	Accessible Park with Well-Planned Access Appropriate Grouping of Activities Realistic Alternative and Timelines Improved Education Component

TABLE 2: STAKEHOLDER OBJECTIVES FOR WARNER LAGOON

The stated objectives were then condensed and summarized into four primary goals.

1. Maintain or Improve Recreation Opportunities
2. Improve Water Quality
3. Habitat Maintenance and Improvement
4. Increase Educational Opportunities

Since the stated objectives were compatible, the next step was to gather public input. A public information meeting (PIM) was held in February 2016. The meeting was a charrette style forum, inviting open discussion about the future of the lagoon. After a general overview of the problems facing the lagoon, meeting participants were divided into small groups for discussion and idea gathering. The comments from the first PIM are summarized in Table 3, and included in Appendix B.

WATER QUALITY	HABITAT IMPROVEMENT	RECREATION	EDUCATION
increase depth	improved fish habitat	wild	respect for the natural cycle and timing of activates (nesting season, etc.)
increase hydraulic connectivity and boat access between the lagoon and lake	wild	varied opportunities to enjoy the lagoon	environmental education
dredge	control carp	paddling	fish/nutrition education (how much fish is safe to eat) fish language signs
filtering storm water before it reaches the lagoon	leave island alone and to nature	handicap accessible piers	improve park informational connectivity, to improve cross-communication throughout the park
sediment & toxicity management	maximize habitat riparian zone and balance it with park use	fishing pier	interface with neighborhoods
aeration	vary shoreline access with habitat	public boat launch (canoe/paddle access)	access to information and kiosks
systemic program for dredging (continuous maintenance)	natural areas	increase opportunity for outdoor activities for youth	signage
selective dredging/ state of art and best management practices	dredge for habitat	more benches	use library to educate
phase dredging with other initiatives	coordinate with the rest of the park	NO additional paddle access	"what's happening" feature
larger lagoon vs sediment ponds	limit pesticide use	balanced use (between passive, active, viewing, etc.)	utilize existing buildings
more dedicated storm water	inventory aquatic flora and fauna		creative funding
control carp	keep outlet clear in spring		
dog pier/entry			
targeted rain gardens on northside			

TABLE 3: PIM #1 COMMENT SUMMARY

Because the concerns expressed at the public meeting were consistent with the objectives expressed by the stakeholders, the City proceeded with a competitive proposal for developing possible solutions for the lagoon. The winning consultant was Montgomery Associates Resource Solutions – Emmons & Oliver Resources, Inc. (MARS-EOR). The Request for Proposals is attached as Appendix C.

FEASIBILITY REPORT

The MARS-EOR team consisted of water quality engineers, fisheries biologists, landscape architects, and others. They were tasked with developing creative and cost effective solutions that would improve water quality and aquatic habitat within the lagoon. The consultant team was not tasked with specifically improving recreation or educational opportunities, as these objectives are better handled by the Parks Division. However, proposed alternatives were not to reduce existing recreational opportunities. The alternatives had to be developed to a level that would assure feasibility and allow for rough cost estimates.

The consultant team was directed to focus on the three primary drainage areas to the lagoon, termed the North, Northwest, and East Watersheds. These three drainage areas comprise 827 acres, or 81 percent of the total 1,024 acre lagoon watershed (Figure 3). All three watersheds drain to single outfalls and have little to no upstream stormwater treatment.

The sections below briefly summarize the efforts, findings, and recommendations of the Feasibility Report. This is not intended to be an exhaustive review of the Feasibility Report, which is attached as Appendix A.

EXISTING DATA REVIEW

The information summarized in Table 4 was provided to MARS-EOR as background information for review. For future reference, this information is located in a file on the City of Madison network here:

M:\\DESIGN\Projects\10286\Background Information

DOCUMENT NAME	AUTHOR	DATE
Water Resource Assessment of Warner Park Lagoon with Management Alternatives	DW Marshall, Underwater Habitat Investigations LLC	2014
Warner Park: Fireworks Environmental Impact Baseline Study	City of Madison Engineering Division	2013
The Warner Lagoon from 1983 to 2012	Honors Aquatic Biology Madison Metropolitan School District	2012
Carp Barrier Plans	City of Madison Engineering Division	2012
Geese Management Report for Madison Parks Division	City of Madison Parks Division	2011
Aquatic Plant Management Plan: Jenni and Kyle Preserve Ponds, Tenney Park Lagoon, Vilas Park Lagoon, Warner Park Lagoon, and Verona Quarry	Dane County Land & Water Resources; Underwater Habitat Investigations LLC	2007
Northwest Watershed Outfall Sediment Trap (Forester Drive Outfall) Plans, Permit, and Summary	Various	2009 - 2005
Water Depth and Dissolved Oxygen Survey	Unknown	2005
Fish Survey	Brett Johnson, WI Department of Natural Resources	1989
Warner Lagoon Grading Plan	City of Madison Board of Park Commissioners	1970
Warner Park – Castle Creek Easement Map	City of Madison Engineering Department	1970

TABLE 4: EXISTING DATA FOR WARNER LAGOON

WARNER LAGOON WATER QUALITY RFP PROJECT NO. 10286	SHEET NO. 3
PRIORITY WATERSHEDS	
FIGURE 3	CITY OF MADISON

PLOT SCALE: ____

PLOT NAME: ____

REV. DATE: ____

ORIGINATOR: CITY OF MADISON, STREETS DIVISION

FILE NAME: M:\DESIGN\Projects\10286\Final Planning Report\Figure 2 Watersheds.dgn

DATE: 1/14/2021

PLOT SCALE: 899.9982 sf / In.

WATER QUALITY DATA COLLECTION

A site visit was completed in October 2017 with the purpose of assessing water quality in the lagoon. The 2017 water quality sampling effort collected data from four locations in Warner Lagoon, and repeated a water quality analysis completed in 2014 by D.W. Marshall. As the Feasibility Report states,

> *"the lagoon consistently displays highly eutrophic conditions. Total phosphorus measured at Sites 1 and 2 in 2014 and 2017 ranged from 181 ug/L to 398 ug/L. Secchi measurements and Trophic State Index (TSI) reflect hypereutrophic conditions as well. The slightly lower TSI for secchi may suggest influence of rooted aquatic plant growth in the lagoon that appeared to increase in 2017. The N:P ratios at Sites 1 and 2 were 5.4:1 and 6.2:1 respectively and indicate nitrogen limitation. Nitrogen limitation is characteristic of hypereutrophic conditions.*
>
> *The highest water clarity measurements occurred at site 4 that also appeared to coincide with greater rooted aquatic plant growth in 2017, particularly coontail (Ceratophyllum demersum). While secchi measurements were not significantly different between 2014 and 2017, turbidity measurements using the Hach Turbidimeter 2100 suggested clearer water at three of four sites in 2017. These data appeared to reflect an increase of rooted aquatic plants in 2017, primarily coontail. Site 1 consistently displayed to lowest water clarity in both secchi and turbidity measurements."*

FIGURE 4: 2014 AND 2017 SAMPLE LOCATIONS

All data and observations are detailed in Section 3.11 of the Feasibility Report.

In January 2018 a dissolved oxygen survey was completed and found near anoxic conditions on the north side of the lagoon, beneath a cover of thick snow. Alternatively, the survey found well-oxygenated water on the east side of the lagoon, where snow had been cleared for ice skating. As the Feasibility Study states,

> *"While it would be expected to observe higher dissolved oxygen under snow free ice, where sunlight penetration can support some plant respiration, the magnitude of the difference was surprising."*

This finding indicates that expanded snow removal during winter months could significantly improve over-wintering conditions for fish.

WATER QUALITY MODELING

Sediment and phosphorus loads for each watershed were simulated by MARS-EOR using WinSLAMM. The results of this effort are summarized in the table below. This data provided a starting point for determining phosphorous and total suspended solids reduction via potential solutions. The WinSLAMM models account for the existing gabion structure at the north outfall and the Castle Creek channel retrofit constructed in 2014. Estimated sediment removal efficiencies for these existing features were 28% for the north outfall gabion and 30% for the Castle Creek retrofit.

WATERSHED	ANNUAL SEDIMENT LOAD (lbs)	ANNUAL TOTAL PHOSPHOROUS LOAD (lbs)
Northwest	44,542	159
North	34,069	124
East	105,860	411

TABLE 5: EXISTING PHOSPHOROUS AND TOTAL SUSPENDED SOLIDS FOR PRIMARY WATERSHEDS

Additionally, Wisconsin Lake Modeling Suite (WiLMS) was used to estimate lagoon turnover and internal phosphorous loading. Per the Feasibility Report,

> *"modeling indicates that the volume of runoff flowing into the lagoon annually is much larger than the storage volume of the lagoon, and water in the lagoon flushes into Lake Mendota approximately 4 - 5 times per year. The rate for any given year obviously depends on weather conditions and rainfall volume. Internal phosphorus loading from bottom sediments estimated by WiLMS is approximately 4% of the total load, due to the large stormwater inflows from the watershed compared to the lagoon volume. However, carp activity could lead to higher internal loading due to sediment resuspension."*

After collecting new data and reviewing existing data, MARS-EOR concluded that the lagoon is a highly or hypereutrophic waterbody that will continue to deteriorate if not addressed.

PROPOSED ALTERNATIVES

Using the data described in the previous sections, the MARS-EOR team developed alternatives that would work as an integrated strategy to improve water quality and fish habitat. Improved recreational opportunities, such as shoreline access, were included where applicable. The table below lists all concepts that were explored by the consultant, as well as the general benefits and impacts associated with each.

ALTERNATIVE	BENEFITS	IMPACTS
Construct stormwater treatment at 3 major storm sewer outfalls.	Could reduce sediment and phosphorus loads by 29 and 23%. Diversify wetland habitat. Remove concrete cunette and naturalize Castle Cr.	Construction would disrupt lagoon use and require equipment traffic in park. Would impact habitat and paddling at outfalls. No stakeholder consensus for Castle Creek outfall.
Remove carp by baited net trapping	Reduce carp biomass to improve water clarity, establish macrophytes and improve panfish population.	Highly visible netting operation would temporarily disrupt aquatic recreation and wildlife.
Install carp barrier grate	Reduce adult carp migration into lagoon.	Visible structure would affect aesthetics. Adult gamefish could also be blocked.
Install aeration system in one or more locations	Maintain DO levels for winter fish survival. Reduce anoxia & internal P release in summer.	Thin ice safety hazard requires fencing. Addition of mechanical equipment to lagoon. No stakeholder consensus.
In-lagoon chemical treatment	Could help clarify water to establish macrophytes, if carp control and stormwater treatment are insufficient.	Application requires boat application throughout lagoon. Chemical addition can cause public concern. Discussed with stakeholders as a back-up alternative.
Dredge deeper fish habitat	Improve diversity of fish habitat & population. Improve fishing, especially if more macrophytes establish. Potentially restore marsh in northwest corner of lagoon.	Upland spoils disposal would negate use of some fields for a season. In-water spoils placement for marsh restoration would impact paddling and change existing habitat. No stakeholder consensus.
In-lagoon diversion of runoff away from habitat areas	Reduce sediment and nutrient loads to parts of lagoon.	Would require segmenting lagoon with berms, with impacts to recreation & wildlife.
Tree-drop / other fish structures	Enhance fish and turtle habitat.	Potential for tangling carp trap nets.

TABLE 6: CONCEPTUAL IMPROVEMENTS

Two general alternatives were eliminated during the development phase: In-Lagoon Direction of Runoff and In-Lagoon Chemical Treatment. In-Lagoon Direction of Runoff was eliminated because it would require the construction of berms and diversions within the lagoon, which would negatively impact fish habitat and recreational access, specifically paddling. In-Lagoon Chemical Treatment was eliminated only from this phase of planning. It was determined that, due to the high flow-through rate of the lagoon, large quantities of flocculent would be needed to adequately treat the lagoon. This was determined to be a generally unpopular alternative. If the other proposed alternatives do not adequately solve the water quality issue, chemical treatment can be reconsidered at a later date.

The consultant refined the remaining objectives into feasible alternatives by developing 30 percent plans for each proposed project. These alternatives and their locations are shown in the Water Improvement Alternatives Concept Diagram, included as Figure 1. The 30 percent plans are included as Appendix D.

PUBLIC INVOLVEMENT – PHASE 2

The stakeholder group was involved throughout the development of alternatives. Stakeholders were routinely apprised of potential solutions and were given the opportunity to offer feedback. Not all alternatives were

favored by the stakeholder group; however, no alternatives were eliminated based on stakeholder comments alone.

All feasible alternatives were brought to a vote at a public information meeting in October 2019. At this meeting, potential projects were described in detail, discussed at length, and voted upon by those who attended. Ballots were made available to those who could not attend. The summary of votes is included in Table 7, which is in the format of the ballot used at the PIM. Individual ballots and a summary of comments has been included as Appendix E.

Two projects were eliminated based on public comment: installation of an aeration pump and the walkable connection between the shoreline and Firebird Island. Aeration was unfavorable due to concerns about aesthetics and the possibility of weakened ice during the skating season. Although the treatment wetlands associated berm were a favored alternative, an enhanced walkway and fishing platform were unpopular. The general consensus was that sufficient connection between the shoreline and Firebird Island already existed. Additional connections could potentially impact restoration efforts on the island.

PROJECT NAME AND CONCEPTUAL PLAN CALLOUT		**YES -** *Include in Master Plan*	**NO -** *Do Not Include in Master Plan*
A	Northwest Outfall Treatment Wetland	NA	NA
	Forebay Only	6	
	Forebay and Treatment Wetland	14	2
B	Lotus Pond Berm – Treatment Wetland	NA	NA
	Berm Only	11	1
	Berm and Lagoon Access	5	7
C	Dredge Areas	NA	NA
	C1: Dredge Near Firebird Island	12	
	C2: Dredge Near Rainbow Shelter	12	2
D	Submerged Aerator and Aerator Pump	3	8
E	Dredge Spoils Locations	NA	NA
	E1: Shallow Marsh Creation	11	1
	E2: Upland Burial	12	4
F	Fishing Nodes/Pier Location	NA	NA
	Rainbow Shelter Accessible Pier	12	2
	Small Fishing/Shoreline Access	10	2
G	N. Sherman Ave. Sediment Trap – Detention Basin	12	2
H	Concrete Cunette Removal	10	2
I	East Outfall Treatment Wetland	10	3
J	Floodplain Restoration	10	2
K	Macrophyte Vegetation Improvement	10	3
L	Carp Barrier Structure and Carp Removal	14	
M	Tree Drop Structures	7	3

TABLE 7: BALLOT TALLY FROM PIM #2

BUDGET AND PRIORITY OF RECOMMENDATIONS

PRIORITIZATION

Participants were asked to comment on preferred priority of installations. Very little data was collected on the ballots, and the data that was collected was not consistent. However, during discussions at both the stakeholder meetings and the public information meeting, general consensus on an implementation plan was reached. This is reflected in priority listings in Table 1, which is repeated in this section.

The first priority will be to control carp. A carp barrier should be installed first, followed by a carp removal program. This is a relatively easy and low-cost installation, and should make a significant impact in water clarity and aquatic vegetation.

After carp have been controlled, the second priority should be sediment and phosphorous management. The outfall treatment projects at the North, Northwest, and East outfalls should be constructed together. The treatment wetland berms reuse concrete generated in the cunette removal and excess cut from the East Watershed. The Castle Creek floodplain restoration and the N. Sherman Avenue outfall sediment trap should also be constructed as priority two.

Once sediment into the lagoon is controlled to the extent practicable, dredging can take place. Dredged depths in locations C1 and C2, shown on Figure 1, should be approximately 15 feet deep. The quantity of 63,000 cubic yards listed in the dredging estimate is based on available area for dredge material disposal. This includes the upland disposal location in the north greenspace, and the reconstruction of a shallow marsh near the northwest outfall (Location E1 and E2, Figure 1). It may not be necessary to dredge the full 63,000 cubic yards to accomplish the habitat improvement.

At the public meeting, and in follow-up communications, it was requested that additional dredging be included in the plan. Residents and stakeholders expressed interest in removing accumulated sediment in the smaller channels leading to the lagoon, and near the outfall. The request was detailed in a communication from the Yahara Fishing Club and Wild Warner, dated March 20, 2020. This additional dredging was not included in the Feasibility Study, but can be accommodated at the same time as originally proposed habitat dredging.

Finally, items listed in fourth priority are relatively small projects that can be completed at any time: shoreline access nodes, tree fall habitat, and improvement of macrophyte vegetation.

BUDGET

In the Feasibility Report, MARS-EOR created estimates for each project. City Engineering has revised those estimates based off City of Madison Public Works Contract pricing. Therefore, the estimates in the Feasibility Report and this document differ. The estimates in this document should be used for planning purposes, and may be revised throughout the implementation process. Project estimates are included in the subsequent sections and Appendix F.

Project Name	Water Improvement Alternatives Concept Figure Callout	Estimated Phosphorous Reduction (lbs)	Estimated Sediment Reduction (lbs)	Relative Priority	Estimated Project Cost
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Carp Barrier and Harvesting	L	NA	NA	1	$ 37,500
Alum Treatment - *Eliminated During Public Involvement Process*	NA	NA	NA	NA	$ -
TOTAL FOR ALL WARNER LAGOON PROJECTS					**$ 4,599,197**

PUBLIC COMMENTS – ONGOING

The Warner Lagoon Water Quality Planning effort was intended to create an array of feasible projects, which could be implemented when funding became available. A robust public input process was held to assure City agencies that general consensus has been reached on ways to improve the health of Warner Lagoon.

However, this does not mean that the conversation is over. This Public Comments section is intended to continue to record input. This section will serve as a record for discussions that occur after the planning process, to determine if sentiments have changed toward specific projects, or the process at large.

Formal comments will be continuously added to Appendix G.