State of Wisconsin
Department of Natural Resources

Lake Management Grant Application

Form 8700-283 (R 12/11)

Notice: Use of this form is required by the DNR for any application filed pursuant to ch. NR 190 or 191, Wis. Adm. Code. Personal information (PI data) collected on this form, including such data as your name, address, phone number, etc., will be used for management and enforcement of DNR programs, and is not intended to be used for any other purpose. Information will be made accessible to requesters under Wisconsin's Open Records laws (s. 19.32-19.39, Wis. Stats.) and requirements.

Section I: Application Type

☒ **Lake Management Planning Grant**

Check one:

☐ Large-scale planning grant

☒ Small-scale planning grant

Check one:

☐ Lake education

☐ Organizational development

☒ Other study or assessment, or multiple-purpose project

☐ **Lake Management Protection Grant**

Check one:

☐ Wetland restoration

☐ Ordinance development

☐ Lake improvement

☐ Lake classification

☐ Land or easement acquisition

Legislative District Numbers	
Senate	Assembly
1	1

To determine your legislative district, go to http://165.189.139.210/WAML//
Type in complete address, next screen shows information.

Section II: Applicant Information

Applicant: Door County Soil and Water Conservation Department

Lake Name: Dunes Lake (a.k.a. Mud Lake) | Size in Acres: 80.00

Project County/Township/Section/Range: Door County/T.28N. - R.27E Section 30,31

Type of Eligible Applicant: ☒ County ☐ Tribe ☐ Other Governmental Unit ☐ City ☐ Sanitary District ☐ Non Profit Conservation Organization ☐ Village ☐ Lake District ☐ Town ☐ Lake Association ☐ School Districts (Planning)

Authorized Representative Named by Resolution: William Schuster	Project Contact Name: Greg Coulthurst
Authorized Representative Title: County Conservationist	Project Contact Title: Conservationist
Address: 421 Nebraska Street	Address: 421 Nebraska Street
City: Sturgeon Bay; State: WI; ZIP Code: 54235	City: Sturgeon Bay; State: WI; ZIP Code: 54235
Daytime Phone (area code): (920) 746-2214; Evening Phone (area code): (920) 495-0718	Daytime Phone (area code): (920) 746-2214; Evening Phone (area code): (920) 495-3966
E-mail Address: bschuster@co.door.wi.us	E-Mail Address: gcoulthurst@co.door.wi.us

Mail Check to: (if different from applicant)

Name and Title	Address
Organization	City; State; ZIP Code

For DNR Use Only

Application Type: LPL-Small	Date Received: 2-1-2014	Date Reviewed (LC)	Lake Coordinator Approval / Date: Mary Gansberg
Waterbody ID#: 97300 + 97400	Adequate Public Access: ☐ Yes ☐ No	Environmental Grants Specialist Approval / Date	
Eligible Project: ☒ Yes ☐ No	Eligible Applicant: ☒ Yes ☐ No	Project Priority Rank	
Prior Grant Award(s): ☒ Yes ☐ No	Fiscal Year(s)	Amount Received To Date: $	Project Awarded: ☐ Yes ☐ No

Section III: Project Information

Project Title	Proposed Ending Date
Dunes Lake Protection and Feasibility Study	12/31/14

Other Management Units Around Lake	Letter of Support	Other Management Units Around Lake	Letter of Support
1. The Nature Conservancy	☒	4.	☐
2. Clark Lake Advancement Association	☒	5.	☐
3.	☐	6.	☐

Section IV: Lake Access

Number of Public Vehicle Trailer Parking Spaces Available at Public Access Sites: 12+ (Public Road & Adjacent Town Property)

Number of Public Access Sites on Lake Including Boat Launches and Walk-ins: 2

Section V: Cost Estimate and Grant Request

Section V must be completed or application will be returned. Details in support of Section V are welcome.	**Project Costs** Column 1 Cash Costs	Column 2 Donated Value	*DNR Use Only*
1. Salaries, wages and employee benefits			
2. Consulting services	10,000.00		
3. Purchased services--printing and mailing			
4. Other purchased services (specify):			
5. Plant material			
6. Supplies (specify)			
7. Depreciation on equipment			
8. Hourly equipment use charges			
9. State Lab of Hygiene (SLOH) Costs			
10. Non-SLOH Lab Costs			
11. Land or easement acquisition value			
12. Associated acquisition costs			
13. Other (specify)			
14. **Subtotals** (sum each column)	10,000.00		
15. **Total Project Cost Estimate** (sum of **column 1 plus** sum of **column 2**)	10,000.00		
16. **State Share Requested** (calculate based on State share listed below)	3,000.00		

Subject to the following maximum grant amounts:

- Large-scale lake planning projects--up to $25, 000 - 67% State share
- Small-scale lake planning projects--up to $3,000 - 67% State share
- Lake classification and regulation or ordinance development projects--up to $50,000 - 75% State share
- Lake protection projects (other than lake classification and regulation or ordinance development projects)--up to $200,000 - 75% State share

Use of Federal funding as match: (check box below if applicable)

☐ We are using or planning to apply for Federal funds to be used as match.

If known, indicate source of funding:

Section VI: Attachments (check all that are included)

A. For all applicants:

- [x] 1. *Authorizing resolution *(Resolution to be forwarded immediately following 2/11/14 LCC approval)
- [x] 2. Letters of support
- [x] 3. Map of project location and boundaries
- [x] 4. Lake map with public access sites identified (per Section IV of this application and page 33 of the guidelines)
- [x] 5. Itemized breakdown of expenses
- [ ] 6. For projects that entail sending samples to the State Laboratory of Hygiene (SLOH) only: a completed SLOH Projected Cost Form
- [x] 7. Project scope/description:
  - [x] a. Description of project area
  - [x] b. Description of problem to be addressed by project
  - [x] c. Discussion of project goals and objectives
  - [x] d. Description of methods and activities
  - [x] e. Description of project products or deliverables
  - [x] f. Description of data to be collected, if applicable
  - [x] g. Description of existing and proposed partnerships
  - [x] h. Discussion of role of project in planning and/or management of lake
  - [x] i. Timetable for implementation of key activities
  - [x] j. Plan for sharing project results
  - [x] k. Other information in support of project not described above

B. For applicants that are Lake Management Organizations (LMOs) or Non-profit Conservation Organizations (NCOs):

- [ ] 1. For first time applicant LMOs only: A completed Form 8700-226 (Lake Association Organizational Application)
- [ ] 2. For first time applicant NCOs only: Copy of IRS 501(c)(3) determination letter and copies of your Articles of Incorporation and Bylaws
- [ ] 3. List of national and/or statewide organizations with which you are affiliated
- [ ] 4. List of board members' names, including municipality and county of residence. Designate officers
- [ ] 5. Documentation of current financial status
- [ ] 6. For land or easement acquisition projects: Detailed description of your organization's land management experience
- [ ] 7. Brochures, newsletters, annual reports or other information about your organization

C. Wetland Restoration Projects:

- [ ] 1. Deed, easement, or land control agreement
- [ ] 2. Preliminary engineering plans
- [ ] 3. Water regulatory permits
- [ ] 4. Map of project location and boundaries

D. Ordinance Development Projects:

- [ ] 1. Inventory of applicable existing ordinances
- [ ] 2. Description of resources each jurisdiction allocates to enforcement
- [ ] 3. Preliminary surveys

E. Lake Improvement Projects:

- [ ] 1. Engineering and design plans
- [ ] 2. Water regulatory permits
- [ ] 3. Map of project location and boundaries

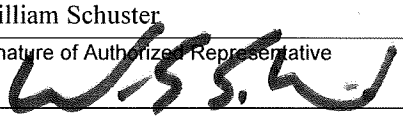
Section VI: Attachments, continued

F. Land or easement acquisition projects:

- ☐ 1. DNR Form 1800-1 (Environmental Hazards Assessment Form)
- ☐ 2. Legal description of the property
- ☐ 3. Project location boundary map
- ☐ 4. Property or easement appraisal (if not previously submitted to the Department)
- ☐ 5. If escrow closing, the title insurance commitment
- ☐ 6. Evidence of compliance with Uniform Relocation Act requirements, if applicable
- ☐ 7. Agricultural Impact Statement, if applicable
- ☐ 8. Status of acquisition negotiations, including expected time frame for closing
- ☐ 9. A land management plan
  - ☐ a. Full description of property and conditions
  - ☐ b. Description of current and proposed uses of property and adjoining properties
  - ☐ c. Management requirements for property
  - ☐ d. If roads, piers or grading are proposed, a topographic survey with feature locations, and design cross sections

Section VII: Certification

I certify that information in this application and all its attachments are true and correct and in conformity with applicable Wis. Statutes.

Print/Type Name of Authorized Representative	Title of Authorized Representative
William Schuster	County Conservationist
Signature of Authorized Representative	Date Signed
	11/30/17

~List of Attachments~

Attachment #1

- Authorizing Resolution – To be Signed and Submitted after the 2/11/14 Land Conservation Committee Meeting

Attachment #2

- Letter of Support for the Project from The Nature Conservancy
- Letter of Support from Paul Schumacher, Director of the Clark Lake Advancement Association

Attachment #3

- Dunes Lake Delivery System Location Map
- Project Location Map

Attachment #4

- Lake Map with Public Access Delineated

Attachment #5

- Breakdown of Expenses – Estimate from Endpoint Solutions
- Summary of Project Funding

Attachment #7

- Project Scope
- Photos

DOOR COUNTY

Resolution

DOOR COUNTY LAND CONSERVATION COMMITTEE

Lake Management Planning Grant Application for Dunes Lake

WHEREAS, Dunes Lake (a.k.a. Mud Lake) is an important resource used by the public for recreation and enjoyment of natural beauty; and

WHEREAS, the protection of critical watershed areas and reasonable lake use activities are paramount in the protection of ground and surface water quality resources and the natural ecosystem of the lake and the surrounding coastal wetland habitats; and

WHEREAS, we recognize the need for responsible and holistic long-range planning to better manage the lake, its watershed, and its use.

NOW, THEREFORE, BE IT RESOLVED, Door County Board of Supervisors Land Conservation Committee requests the funds and assistance available from the Wisconsin Department of Natural Resources under the Lake Management Planning Grant Program; and

HEREBY AUTHORIZES, Door County Soil & Water Conservation Department to: submit an application to the State of Wisconsin for financial aid in the amount of $3,000 for lake planning purposes; sign documents; and take necessary action to undertake, direct, and complete an approved feasibility project to further protect Dunes Lake.

BE IT FURTHER RESOLVED THAT, Door County Soil and Water Conservation Department will comply with state rules for the program and will meet the financial obligations under the grant.

Adopted this day _____ of __February__, 2014
By a vote of _____ in favor _____ against _____abstain

Land Conservation Committee

_____ Hugh Mulliken, Chairman

_____ Cletus Fontaine

_____ Mark Feuerstein

_____ John Neinas

_____

The Nature Conservancy
Protecting nature. Preserving life.™

The Nature Conservancy in Wisconsin
242 Michigan Street, Suite B103
Sturgeon Bay, WI 54235

tel 920-743-8695
fax 920-743-9068
nature.org/wisconsin

November 1, 2013

Michael Friis
Program Manager
Wisconsin Coastal Management Program
Post Office Box 8944
Madison, WI 53708-8944

Re: Support for Door County Soil and Water Conservation Department's proposal titled: "Dunes Lake Protection and Feasibility Study".

Dear Mr. Friis,

I am writing in support of Door County Soil and Water Conservation Department's proposal which seeks funding to develop plans for upgrading a small, rural, 35 year old waste water treatment system that currently discharges to Geisel Creek, the main surface water flow to an ecologically and recreationally significant coastal wetland of Lake Michigan in Door County.

The goals of the Door Peninsula and Green Bay Watershed Office of The Nature Conservancy include the protection of those most significant lands and waters of that region for native plants and animals, and the people who reside there. This project supports those goals. The waters of Geisel Creek, which receives discharge from the Town of Sevastopol Sanitary District No. 1 waste treatment facility, flow first into Dunes Lake, an 80 acre coastal embayment wetland which then drains to Lake Michigan via Shivering Sands Creek. Dunes Lake lies in a large, 3,000 acre unfragmented coastal wetland dominated landscape that has been of conservation interest for the Conservancy, the WDNR, U.S. Fish & Wildlife Service, Sevastopol Township, the Door County Land Trust, the Glidden Drive Association, and the County because of its national conservation significance and local water quality and recreational significance.

This proposal is part of a larger, comprehensive, collaborative effort to restore the ecological condition in Geisel Creek, Dunes Lake, and Shivering Sands Creek by improving water quality conditions in the surface point and non-point inputs, and ground water inputs to Dunes Lake and ultimately Lake Michigan. Other aspects of this larger project involve invasive species control and possibly restorative hydraulic dredging to remove accumulated sediment in the lake. Planning (and ultimately construction) for enhanced waste water treatment is a critical component to the success of this larger project.

Multiple government agencies, non-profit conservation organizations and local citizen groups are committed and engaged in a long term effort to return this site to a healthy Lake Michigan watershed; we urge the Wisconsin Coastal Management Program to join this effort and support this proposal.

I am the conservation ecologist for The Nature Conservancy working out of the Conservancy's Sturgeon Bay office and have been involved with this project throughout.

Sincerely,
Mike Grimm

Conservation Ecologist
The Nature Conservancy
Sturgeon Bay, Wisconsin

Dunes Lake Protection and Feasibility Project
Attachment 2

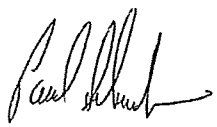
January 24, 2014

Mary Gansberg
Northeast Region Lake Coordinator
Department of Natural Resources
2984 Shawano Avenue.
Green Bay, WI 54313

RE: Letter of Support for Dunes Lake Protection and Feasibility Study.

As a citizen of Door County, a member of Wisconsin Lakes, and as the Director of the Clark Lake Advancement Association. I am writing this letter of support for DNR funding. This project will develop a feasibility plan that will ultimately layout the plans for a passive treatment system, which, when installed, will dramatically reduce the Phosphorus, Nitrogen, and other pollutant loading to Geisel Creek, Dunes Lake, Shivering Sands Creek and ultimately Lake Michigan. Dunes Lake is one of the last undeveloped lakes in Door County, and as such, does not have an Association of riparian landowners to act as an advocate for lake and watershed quality. However through several years of lake and watershed studies, the Dunes Lake Partnership, made up of The Nature Conservancy, Door County Soil & Water, and the DNR has developed a final report which indicates the necessary actions to protect Dunes Lake. One of the necessary action items for the Sevastopol Sanitary District to reduce nutrient loading is to: "Explore or study other potential systems tat would minimize leakage or provide maximum treatment prior to release into the environment."

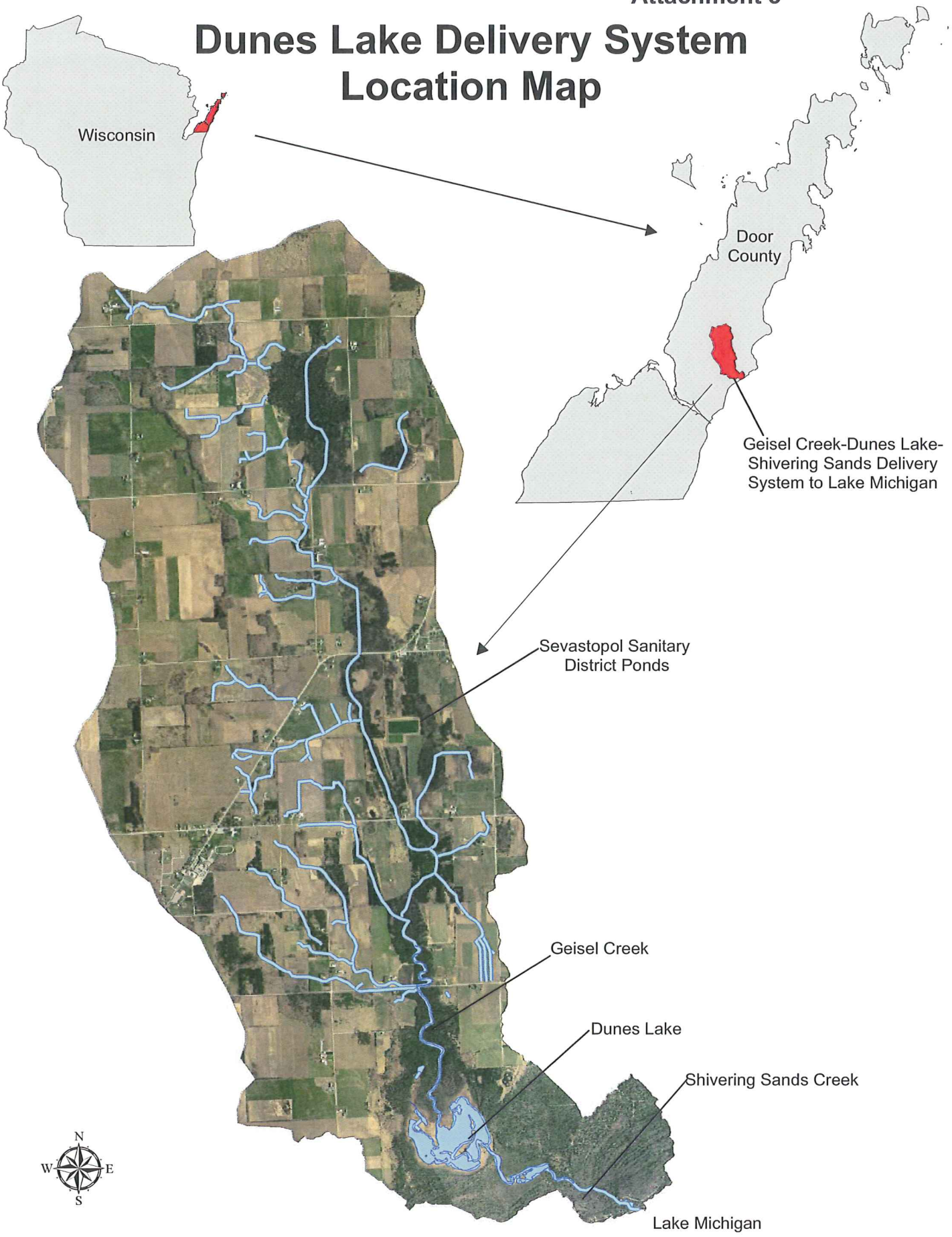
Thank You

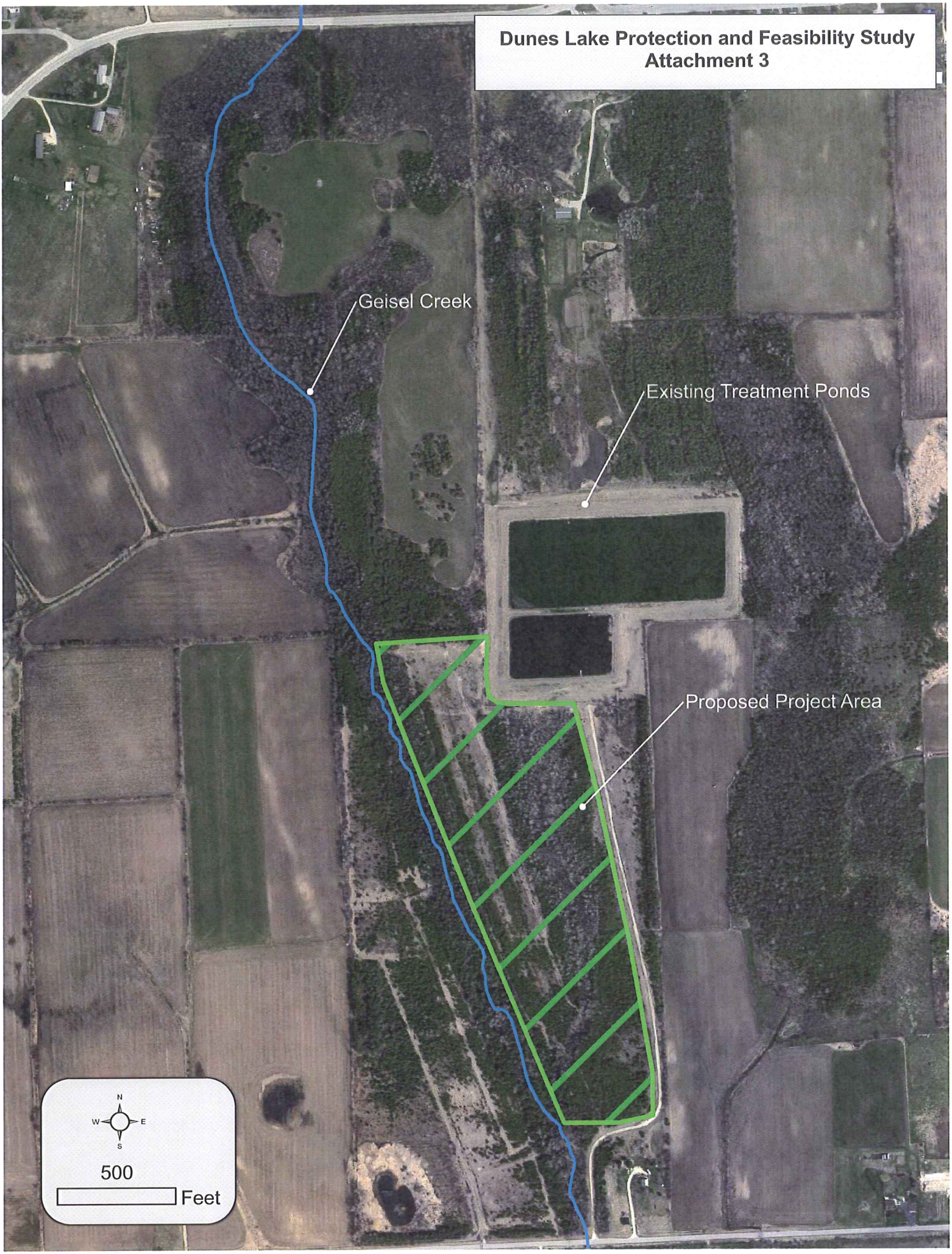


Paul Schumacher
5530 Butts Road
Sturgeon Bay, WI. 54235

Dunes Lake Protection and Feasibility Study
Attachment 3

Dunes Lake Delivery System Location Map




Dunes Lake Protection and Feasibility Study
Attachment 3
Geisel Creek
Existing Treatment Ponds
Proposed Project Area
N
W
E
S
500
Feet


Dunes Lake Protection and Feasibility Study
Attachment 4
Public Access
Town Property

Endpoint Solutions
12065 West Janesville Road, Suite 300
Hales Corners, WI 53130
Telephone: (414) 427-1200
Fax: (414) 427-1259
www.endpointcorporation.com

Mr. Greg Coulthurst
Door County Soil and Water Conservation Department
421 Nebraska Street
Sturgeon Bay, WI 54235

January 29, 2014

Subject: Revised Proposal Concept Plan Development
Sevastopol Sanitary District Third Nutrient Polishing Cell
Pond Road, Sevastopol, Wisconsin

Dear Mr. Coulthurst:

Per our conversation today I have revised the scope and estimated cost for the evaluation of the third cell to include the potential for it to achieve higher phosphorus discharge limits that are being considered by the Wisconsin DNR. The objective of the plan is to identify passive technologies that can be implemented to reduce the nutrient loads that the lagoon is annually discharging to Geisel Creek and Dunes Lake. The concept plan will provide the Sevastopol Sanitary District and Door County with technical documentation with which further grant funding may be secured. Our team will provide the services described below for a lump sum of $10,000. We have collaborated in the past on stormwater and waste water treatment projects, and we are comfortable serving as a team to meet your needs.

Features of the concept plan could potentially include:

1. Reduction in phosphorus and nitrogen loads to Geisel Creek and Dune Lake.
2. Higher quality discharge from the Sanitary District treatment facility, discharging over a longer period of time.
3. Extending the discharge from the lagoon system over a longer period of time may have the potential to reduce leakage from the lagoon and add to the treatment capacity of the total system.
4. The passive treatment system could be one cell with a single technology or a series of cells with different technologies.
5. Provide educational opportunities to local school classes on the watershed protection, water budgets, nutrient cycles and the role of vegetation on treating wastewater.

SCOPE OF SERVICE

1. DATA REVIEW OF WASTEWATER SYSTEM

David Flowers will review the water quality and flow data reported to WDNR by the Sevastopol Sanitary District to determine nutrient loads and processes required to achieve the desired

reductions. The analysis will establish design criteria for the passive polishing cell. Wastewater dosing methods will be outlined that do not require electrical power.

2. Plant Selection

Ginny Plumeau will compile a list of native plants that could be used in the passive treatment cell. Plants will be identified that could optimize the uptake of nutrients based on the hydrologic depths and flows and concentration of pollutants, and will be selected to minimize long-term operating and maintenance needs.

3. Concept Plan and Layout

John Ferris will prepare a narrative summarizing the operation and maintenance of the passive polishing cell. The concept plan may consider the use of solar or wind to meet any energy needed for pumps, valves, system monitoring and communication. A figure will be drafted illustrating the plan view of the concept facilities. The concept plan and illustration will be formatted for use in future prospective grant applications.

4. Potential for Achieving Proposed Higher Phosphorus Limit

David Flowers and Mr. Ferris will evaluate alternative layouts and technologies that could be considered to achieve lower discharge limits for phosphorus, that are being considered to be added to the Sevastopol Sanitary District WPDES discharge permit at sometime in the future by the Wisconsin DNR.

5. Cost Estimates

Planning level cost estimates will be developed for the concept plan. Estimates will help establish the level of local and outside funding that will be need to implement the concept plan.

6. Funding Options

A summarized list of selected, potential grant programs will be prepared for consideration of funding opportunities to finance the design and construction of the passive polishing cell.

Our collaboration team of Endpoint Solution, David Flowers, PE of Natural Water Solutions and Ginny Plumeau, REM of TRC, are excited about working together again on your very interesting and unique project. If you have any questions please do not hesitate to contact me at (414) 758-4379 or john@endpointcorporation.com.

Sincerely,

Endpoint Solutions

John Ferris, PE
Sr. Water Resource Engineer

cc: David Flowers, PE Natural Water Solutions
Ginny Plumeau - TRC

Project Funding	
Total Project Cost	$10,000
State Share Requested	$3,000
WCMP Grant Award	$5,000
Committed Funding from The Nature Conservancy	$1,000
Solicited Donations	$1,000

Description of Project Area:

Dunes Lake is an undeveloped, 80- acre shallow lake and wetland complex located approximately 0.85 miles inland of Lake Michigan. Surface water enters this complex primarily through Geisel Creek, an approximately five mile long stream that flows through a landscape that is comprised of agriculture and wetlands. Shivering Sands Creek drains Dunes Lake and discharges to Lake Michigan.

The Sevastopol Sanitary District has operated a two-cell stabilization lagoon facility, approximately two miles north of Dunes Lake, since 1975. These ponds provide a passive treatment system that, as permitted by the Wisconsin Pollution Discharge Elimination System, discharges effluent to Geisel Creek.

Description of Problem to be Addressed by Project:

In recent years, concern has been growing regarding significant ecological changes within Geisel Creek and Dunes Lake. Empirical evidence suggests that the lower reaches of Geisel Creek and Dunes Lake are experiencing accelerated eutrophication through addition of excess phosphorus and nitrogen nutrients. These nutrients are being discharged to Lake Michigan at levels that exceed established trophic standards.

The Dunes Lake complex has been the focus of several years of research designed to assess the water quality, determine the ground and surface water parameters and determine the potential nutrient sources within the ground and surface water contribution areas.

During the spring, summer and fall months of 2008 and 2009, water samples were collected with water quality and chemical analysis being the primary focus. Sampling locations consisted of Geisel Creek, several groundwater springs, Dunes Lake, and the outflow at Shivering Sands Creek. Samples were collected by the Dunes Lake Partnership and analyzed by the Wisconsin State Lab of Hygiene for dissolved reactive Phosphorous, total Phosphorous, total Kjeldahl Nitrogen, Nitrate + Nitrite-N, Ammonia-N, and total suspended solids. In-field analysis, using a hydro lab data sonde included pH, temperature, dissolved oxygen, and specific conductance. Additionally, a continuous recording data sonde was deployed in Geisel Creek to monitor dissolved oxygen, pH, temperature, specific conductivity and chlorophyll.

In 2009 and 2010, studies focused on water quality and chemical analysis as well as a delineation of groundwater contribution and identification of potential sources of nutrients. Three piezometers (constructed from 2" diameter PVC pipe) and nine minipiezometers (constructed from ½" flexible tubing) were manually installed around Dunes Lake to provide water level observations and sampling points. In addition, three 6 inch diameter, 100 ft deep bedrock wells were installed.

Analyses of seventeen water samples, from the lake outlet, show that the average total phosphorus concentration of water leaving Dunes Lake and entering Lake Michigan exceeds the trophic standard. The trophic standard is exceeded even considering that there is an estimated 40% reduction in phosphorus by retention within the lake sediments. The detriment illustrated by this is two-fold: even though Dunes Lake is absorbing excessive nutrients and is suffering, the discharge to Lake Michigan is still at an unacceptable level.

Observations of accelerated eutrophication of Dunes Lake and Geisel Creek have included increased abundance and coverage of attached algae on bottom cobble and a similar increase in large rooted plants in the lake. There also appeared to be an accelerated deposition of organic sediments at the inlet of Dunes Lake, a decrease in native clam numbers particularly near the outlet of Dunes Lake and in Shivering Sands Creek, and a large increase in coverage of duck weed on Geisel Creek.

Blooms of cladophora are a growing nuisance in Lake Michigan and the coast of Door County has experienced increasing accumulations of rotting cladophora.

Despite significant assimilation of phosphorous and nitrogen within Dunes Lake, it has higher phosphorous discharges to Lake Michigan as compared with Clark and Kangaroo Lakes, two similar drainage lakes in northern Door County that outlet to Lake Michigan. Phosphorus management in the Dunes Lake watershed is essential to addressing excessive loading of this nutrient to Lake Michigan.

Discussion of Project Goals and Objectives:

The purpose of this project is to complete a feasibility study on land adjacent to the Sevastopol Sanitary District pond, owned by the Sevastopol School District, for a future innovative and passive treatment system. The proposed system will illustrate effective and efficient methods to reduce the excessive nutrient delivery that is currently occurring. The study will also estimate future installation costs so that grant funding can be sought. Once installed, habitat improvement projects can begin on Dunes Lake to obtain the eventual goal of restoring the lake to its historic habitat.

Other goals include lower nutrient discharge levels to Geisel Creek, Shivering Sands Creek and Lake Michigan as well as additional pollutant absorption for protection of groundwater resources.

Description of Methods and Activities:

Preliminary consultation with engineering firms has revealed the following technologies are possible for this system:

- Phytoremediation (planting and harvesting of trees)
- Native Prairie/wetland filter beds
- Phosphorous absorption bed with or without plants

The items that will be considered in the study funded by this project will include:

- Reduction in phosphorus and nitrogen loads to Geisel Creek, Dune Lake and Lake Michigan.
- Higher quality discharge from the Sanitary District treatment facility, discharging over a longer period of time.
- Extending the discharge from the existing lagoon system over a longer period of time may have the potential to reduce leakage from the lagoon and add to the treatment capacity of the total system.
- The passive treatment system could be one cell with a single technology or a series of cells with different technologies.

A complied list will include native plants that could be used in the passive treatment cell. Plants will be identified that could optimize the uptake of nutrients based on the hydrologic depths and flows and concentration of pollutants, and will be selected to minimize long-term operating and maintenance needs.

Description of Project Products or Deliverables:

The result of this project will be a concept plan that weighs the feasibility of potential shovel-ready options to address the delivery of nutrients to the Geisel Creek/Dunes Lake system. The concept plan will provide planning level cost estimates and technical documentation with which future grant funding may be secured.

The developed concept plan will include a summary of the operation and maintenance of the passive polishing cell. The concept plan may consider the use of solar or wind to meet any energy needed for pumps, valves, system monitoring and communication. Figures will be drafted illustrating the plan view of the concept facilities. The concept plan and illustration will be formatted for use in future prospective grant applications.

In addition to the above items, a summarized list of selected, potential grant programs will be prepared for consideration of funding opportunities to finance the design and construction of the passive polishing cell.

Description of Data to be Collected, if Applicable:

A qualified engineering/consulting firm will perform a data review of the existing wastewater system. This review will include field work and research of the existing conditions of the system, the site and the watershed as a whole. The team will review the water quality and flow data reported to WDNR by the Sevastopol Sanitary District to determine nutrient loads and processes required to achieve the desired reductions. The analysis will establish design criteria for a passive polishing cell. Wastewater dosing methods will be outlined that do not require electrical power.

Description of Existing and Proposed Partnerships:

Partnerships have already begun and will continue through all phases of the upcoming projects. From the proposed concept plan that this project addresses to the implementation through construction of the necessary practices, this project will employ partnerships with the following entities:

- Sevastopol Sanitary District
- Sevastopol School District
- Town of Sevastopol
- The Nature Conservancy
- Dunes Lake Partnership
- Glidden Drive Association
- Door Property Owners Association
- Doorland Preserve, LLC

Discussion of Role of Project in Planning and/or Management of Lake:

This project will aid the protection of the Shivering Sands State Natural Area, a 4,000-acre wetland complex that is a botanically-rich coastal wetland that's core is comprised of a large, central white cedar swamp that surrounds three undeveloped lakes. The largest of the lakes, Dunes, is 80 acres in size. Schwartz Lake (28 acres) and Arbter Lake (16 acres) are shallow embayment lakes to the north of Dunes Lake. The plant diversity in this area includes many lilies, orchids and sedges flower amidst the mosses and downed trees. Orchids such as Showy Lady-Slippers (Cypripedium reginae) and the rare Adder's Mouth (Malaxis monophylla var. brachyopoda), flower amidst the mosses and downed trees. The fen-like communities found on the lake edges harbor such very rare species as Scirpus caespitosus and Carex exilis. Dwarf Lake Iris (Iris lacustris), a federally-threatened listed plant, is found in the dolomite-based upland conifer forests of these areas. The open fen communities found on the lake edges harbor such rare species as tussock bulrush and coast sedge. The site supports an impressive diversity of mammals including fisher, otter, black bear, snowshoe hare, porcupine, and mink. Breeding bird surveys have recorded 110 species of resident birds throughout this complex. The federally endangered Hine's emerald dragonfly (Somatochlora hinaea) has been observed at Arbter Lake.

Implementation of the system developed by this project will reduce the input of nutrients that have been documented as having a negative impact on coastal wetland communities throughout Lake Michigan. Development of this concept plan will provide the necessary tool for habitat protection. Monitoring that has already been employed throughout the area will be able to corroborate the success once the system promoted in the developed concept plan in installed. The final component of the needed protection in this system will ensure that protective actions will reduce threats and aid in the recovery of species that are currently threatened or endangered.

The project proposed for this grant application will provide the necessary information for a long-term solution to the discharge of nutrients to this system. Coupled with other grant programs for agricultural practices employed throughout the watershed, the implementation of the developed plan will result in all significant sources of nutrients being addressed.

This project will be the catalyst for the implementation of essential practices to reduce nutrients from the sanitary lagoons before entering the Geisel Creek/Dunes Lake system that outlets to Lake Michigan. Results from the proposed concept plan will be used to illustrate the feasibility of the construction phase. The developed plan will provide the details necessary to establish the justification, methods, budget and timeline for future funding sources and in-kind support from local entities.

The detail provided by this project will be necessary for the leverage of future grants, solicitations for donations and in-kind assistance and the planning for potential firms to perform the work.

Timetable for Implementation of Key Activities:

Milestones for this project are straightforward:

- Develop and advertise a Request for Proposal – Due June 1, 2014
- Hire consultant/engineering firm upon grant approval – Approximately July 1, 2014
- Production and delivery of a plan – Prior to December 1, 2014

Plan for sharing project results:

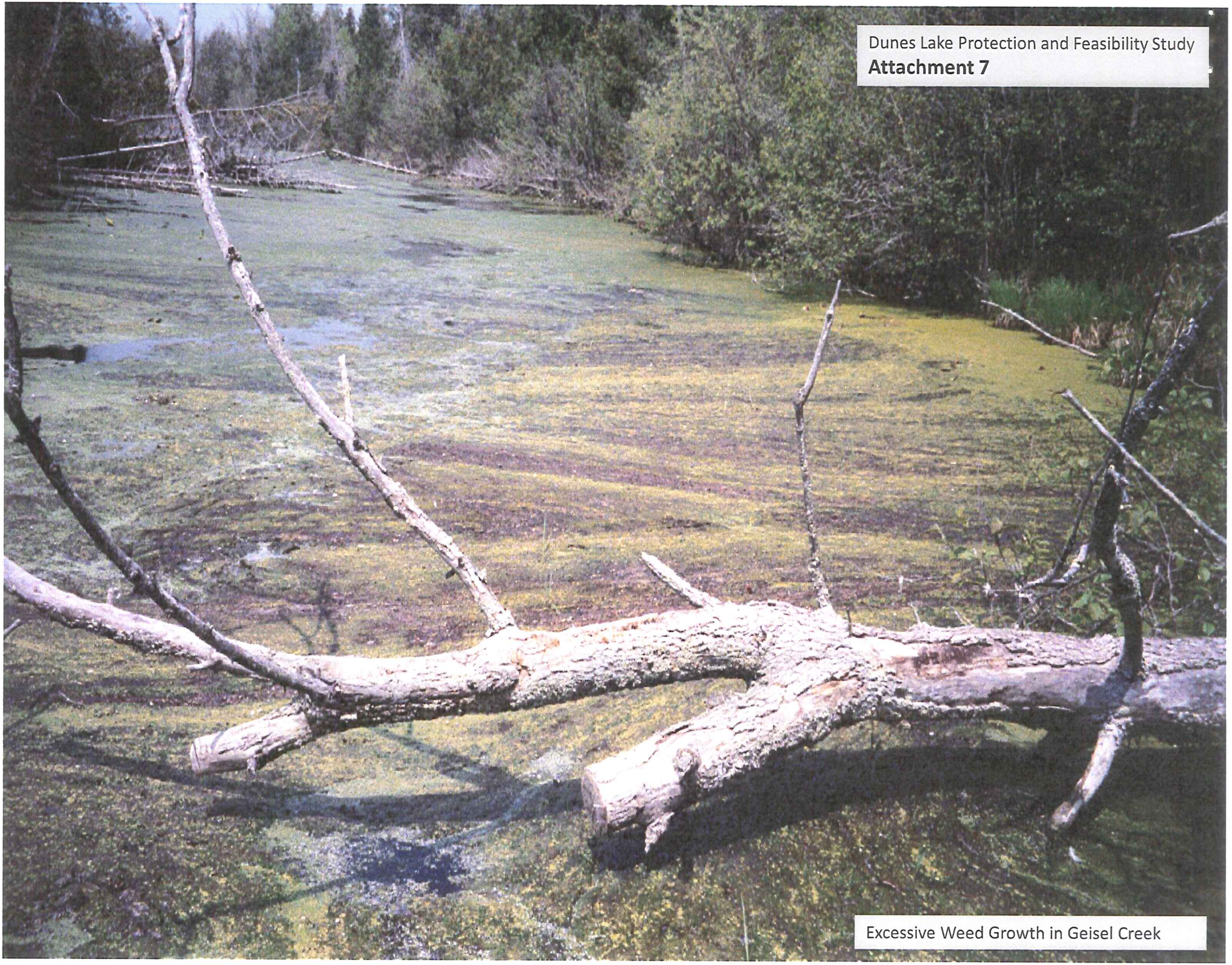
The final project that will be installed, based on this project, will be an exceptional opportunity for outreach and education activities, available for public access for educational and recreational purposes. The Sevastopol School District owns the adjacent property and has shown interest in the idea of having this system available as a teaching tool or outdoor classroom setting. The technology will be an excellent hands-on system that will provide ample opportunity for the study of wetland ecosystems, hydrology and treatment of wastewater.

The concepts developed in this plan will utilize proven technology and will be applicable to communities that are seeking passive systems to address nutrient reductions in storm and/or wastewater. The resulting technologies identified in the concept plan will be a transferrable demonstration of those methods necessary for resource protection.

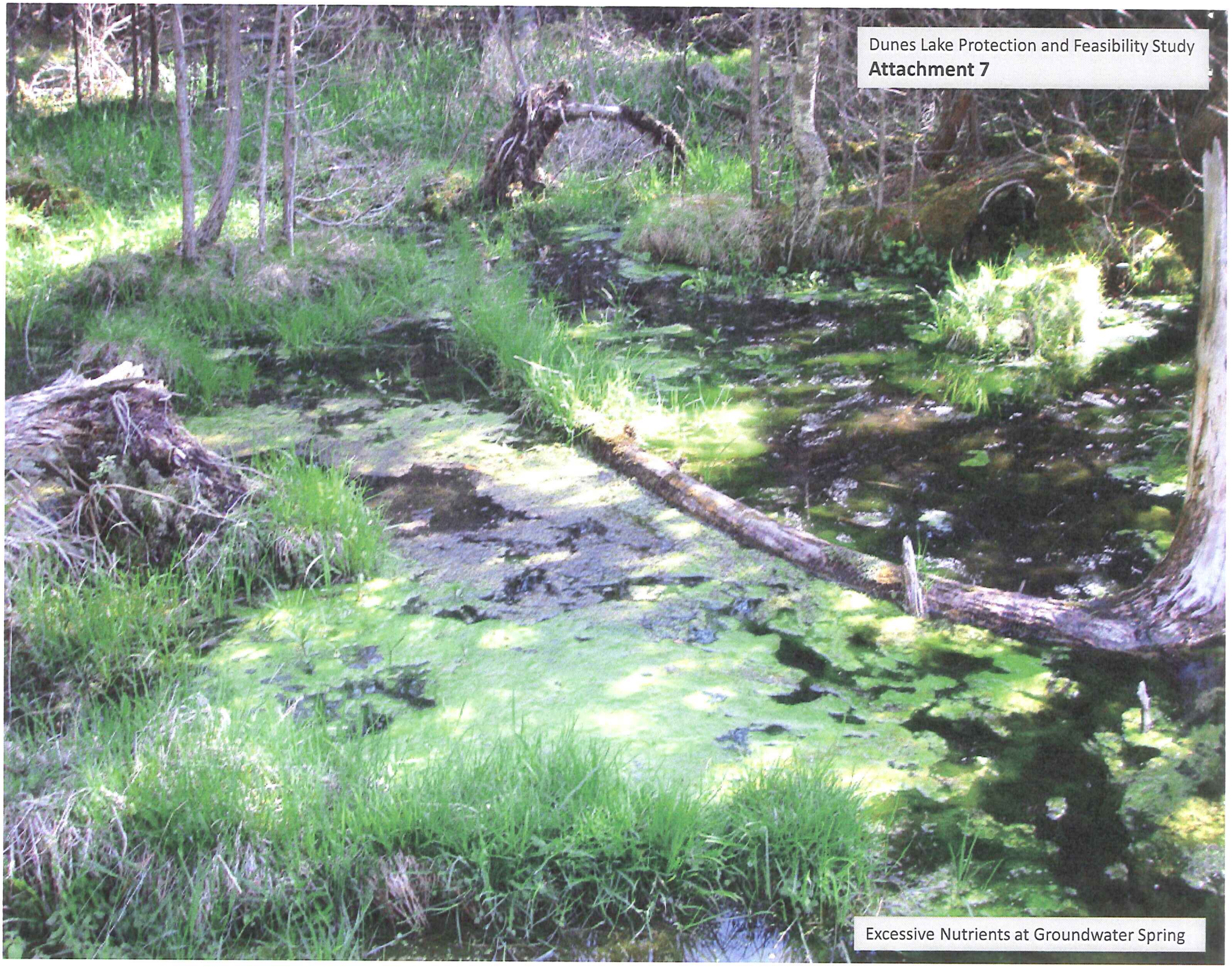
Dunes Lake Protection and Feasibility Study
Attachment 7

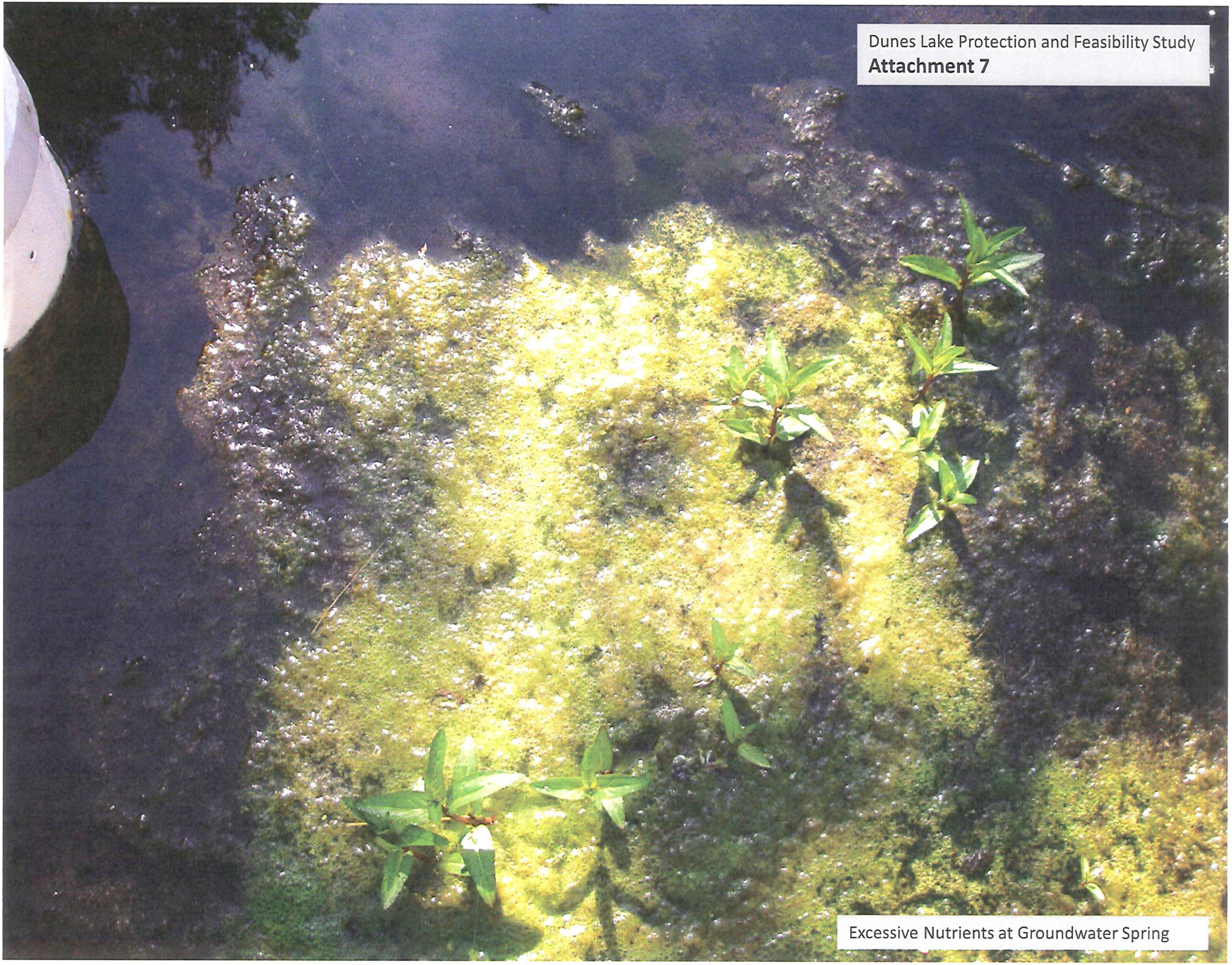
Dunes Lake

Dunes Lake Protection and Feasibility Study
Attachment 7



Excessive Weed Growth in Geisel Creek


Dunes Lake Protection and Feasibility Study
Attachment 7
Excessive Nutrients at Groundwater Spring



Dunes Lake Protection and Feasibility Study
Attachment 7

Excessive Nutrients at Groundwater Spring

Dunes Lake Protection and Feasibility Study
Attachment 7

Turbidity in Geisel Creek

Dunes Lake Protection and Feasibility Study
Attachment 7

Weed Growth in Geisel Creek

Dunes Lake Protection and Feasibility Study

Attachment 7