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## **Lone Lake Algae Management Plan Request for Environmental Consulting Services**

### **Project Background**

Whidbey Island Conservation District (WICD) recently received a grant from the Washington Department of Ecology (ECY) to evaluate specific water quality issues that are associated with elevated nutrient levels and algal blooms in Lone Lake. Lone Lake is a roughly 100-acre shallow, monomictic lake located near the community of Langley on south Whidbey Island. The lake is a catchment for surface water runoff and groundwater from a 2,430-acre watershed, where land use is characterized by forest cover, low density residences on septic systems, and small areas of livestock grazing and hay pasture. The lake drains through a culvert and intermittent stream to Useless Bay.

Lone Lake has a long history of manipulation by various stakeholders, which has included stocking with trout, and herbicide and grass carp treatment to control aquatic weeds (e.g. *Egeria densa*). Predictably, removal of the aquatic plants, potentially compounded by the suspension of nutrient-rich sediment by the carp, created conditions that supported dense blooms of toxigenic algae. Periodic die-offs of the blooms have caused depletion of the lake's dissolved oxygen and fish kills.

WICD is working with several Lone Lake stakeholder groups including shoreline property owners, homeowner's associations, fishing clubs, boating clubs, and other users to develop a management plan to reduce the frequency and duration of toxigenic algae blooms and restore water quality to allow for historic uses such as swimming and trout fishing. The objectives of the plan are to reduce nutrient loading to Lone Lake, allow for restoration of native vegetation and fish habitat, and improve water quality to meet recreational use standards.

Additional project information can also be found on the WICD website at <http://www.whidbeycd.org/lone-lake-algae-management.html>.

### **Scope of Services**

WICD desires to contract for environmental consulting services to assist with the development of a lake management plan. The scope of services will include completion of the following tasks:

- Evaluate data gaps and develop a comprehensive environmental sampling program and Quality Assurance Project Plan that will provide sufficient data to develop a predictive model of lake response to specific actions for reducing nutrient loading;
- Carry out the sampling activities in accordance with the sampling plan and use the results to create a predictive model; and
- Use the predictive model to develop a detailed strategy for reducing nutrient loading and for managing the lake ecology to meet the overall project objectives.

Details on each of these tasks and deliverables are provided in Attachment 1 and the anticipated project timeline in Attachment 2.

### **Proposal Requirements**

WICD requests proposals from interested consulting firms to complete the tasks described in Attachment 1 within the timeline presented in Attachment 2. Proposals should include a brief technical discussion that outlines and justifies the consultant's proposed approach to completing the tasks, the proposed project team members, and examples of previous work where the consultant has used the proposed approach to address objectives similar to this project. These requirements are elaborated below. We request that proposals be brief, ideally not to exceed ten, double-sided pages. Additional materials such as cover letters and resumes of key staff may be appended as desired, and do not count against the page limit.

### **Approach and Methodology**

Please describe the consultant's proposed technical approach for completing the work tasks listed in Attachment 1.

### **Project Team**

Identify the team organization and key staff members proposed for working on this project. Include brief biographies describing the relevant experience of the identified team members. Consultants are welcome to team with subcontractors to bring additional expertise to their project team. If subcontractors are proposed please specify the name of the firm(s), their specific role in the project and their key staff who will assist with the project.

### **Experience and References**

Include a description of at least three projects where the consultant team has successfully used the proposed technical approach to meet similar project objectives as at Lone Lake. The examples may include work by the proposed subcontractor(s), whether or not that work was completed with the primary contractor. Please include the client or owner contact information for each example project so that WICD may contact them if desired.

### **Evaluation Criteria**

Proposals will be evaluated by a selection committee consisting of WICD staff and Lone Lake stakeholders. The committee will evaluate each proposal based on the consultant's technical approach, the qualifications of the project team, and the project team's previous project experience. The committee may interview the highest ranked consultants or select a consultant based solely on the proposals, at its discretion.

### **Project Budget**

WICD has budgeted approximately \$39,000 in grant funding for completing all of the consulting services described in Attachment 1. *ECY is requiring grant funds for this project to be distributed over two fiscal years, with 40% of the total available in FY 2019 (July 1, 2018 - June 30, 2019) and the remaining 60% available in FY 2020 (July 1, 2019 - June 30, 2020), thus project tasks must be distributed accordingly.*

WICD requests that respondents plan their project approach consistent with this budget. While cost is not a factor in evaluating proposals, WICD thinks it is helpful if respondents are aware of the project budget to plan a technical approach that can realistically be completed within budget constraints. The selected consultant(s) will be asked to prepare a detailed budget broken down by project task as part of the contract process.

### **Contract Award and Schedule**

Contract award(s) are anticipated in early September 2018.

Proposed project schedules should be consistent with the anticipated project timeline provided in Attachment 2 to ensure alignment with the project budget. WICD desires that all deliverables identified in Attachment 1 should be completed by April 30, 2020.

### **General and Technical Contacts**

For questions about the technical approach and objectives of the project, please contact Mr. Matt Zupich at tel. (360) 678-4708 or email [matt@whidbeycd.org](mailto:matt@whidbeycd.org).

### **Pre-proposal Site Meeting**

Interested consultants may arrange to visit the project site prior to the proposal deadline by contacting Matt Zupich at the contact address below. Depending on interest, WICD may schedule a single group meeting on a mutually-convenient date.

### **Submittal of Proposals**

Proposals must be received by 4:30 pm on August 31, 2018 to be considered. Please submit the proposals either by mail or email to:

Matt Zupich  
Whidbey Island Conservation District  
PO Box 490  
Coupeville, WA 98239-0490  
Tel. (360) 678-4708  
Email [matt@whidbeycd.org](mailto:matt@whidbeycd.org)

## Attachment 1: Scope of Work

Details on the requested consulting services and deliverables are provided below.

### Task 1: Project Administration

***This task is reserved for WICD as the project sponsor – see Task 6 for Project Kickoff Meeting and Stakeholder Meetings. Please do not include this task in your proposal.***

### Task 2: Literature Review and Database Development

***This task is listed for reference only and will be accomplished by WICD. Please do not include this task in your proposal.***

Over the past several years various studies have sampled the lake and surrounding watershed. The studies have used differing sampling methods and resulted in varying data quality. WICD will be responsible to create a database to compile, organize and annotate the data with regard to data quality and relevance to subsequent project tasks. The consultant will utilize this database as the basis for identifying data gaps and developing a sampling plan in Task 3.

### Task 3: Identify Data Gaps and Develop a Sampling Program

Identification of the relative importance of nutrient sources to the lake (e.g. watershed runoff, septic system seepage, suspension of lake sediment, etc.) is required for an effective management plan. Comprehensive, high-quality data on hydrology and nutrient concentrations are necessary for understanding nutrient loading to the lake and development of a model to predict the lake's response to reducing specific nutrient sources. Evaluation of the database assembled by WICD in Task 2 will permit identification of data gaps that will need to be addressed in order to develop a predictive model of the lake's response to nutrient loading reduction in Task 5.

The objective of Task 3 is to develop a detailed plan for an environmental sampling program to support the development of the management plan in Task 5. The plan will describe the type, location and frequency of environmental sampling activities as recommended by the consultant. It is anticipated that sampling activities will include, at a minimum, monitoring of flow quantities and relevant chemical properties of surface runoff and stream inputs, groundwater inputs, watershed soil properties, and existing lake sediment. The consultant may also propose monitoring of air inputs, lake outflows or other sources and sinks as appropriate.

The sampling plan must be designed to accommodate the practical constraints of using trained volunteers to perform sampling activities, if necessary, and a limited budget for laboratory testing. Staffing and budget resources will be clarified with the consultant during the Project Kickoff Meeting as described in Task 6. As part of the plan, the consultant will be expected to draft a Quality Assurance Project Plan (QAPP) per ECY's protocols to ensure that the sampling data is of adequate quality for project purposes and that all data can be properly reported on ECY's "Environmental Information Management" water quality monitoring database. The budget for this task is approximately \$4000.

#### Deliverables:

- Produce a detailed plan for an environmental sampling program, based on data gaps identified in Task 2, that will support development of a management plan in Task 5.
- Prepare a QAPP for the plan consistent with ECY's protocols.

#### **Task 4: Sampling**

Routine sampling to fill data gaps identified in the Sampling Plan (Task 3) will be conducted. WICD staff and other trained stakeholders may provide in-kind assistance to the consultant in carrying out specific sampling activities, as determined at the Project Kickoff Meeting, to help offset project costs.

Hydrologic, physical, and chemical data collection will result in data of sufficient quality to permit development of a water quality model for the lake. Anticipated sampling will include: discharge, dissolved oxygen, pH, conductivity, temperature, TN, TP, SRP, NO<sub>3</sub>+NO<sub>2</sub>, and NH<sub>4</sub> in major inflows and the outflow of the; lake profiles of temperature, dissolved oxygen, pH, conductivity, redox potential, and light; Secchi transparency; and depth integrated chlorophyll a, Si, TN, TP, SRP, NO<sub>3</sub>+NO<sub>2</sub>, NH<sub>4</sub>. In addition, temperature and dissolved oxygen will be monitored at 30-minute intervals using Minidot loggers at the surface and near the bottom of the lake. Air temperature, relative humidity, wind speed and direction, and solar radiation will be measured at an existing weather station located within 1000 feet of the lake. Core(s) will be collected from the deepest area of the lake using a gravity or piston corer. The core(s) will be sectioned and water and organic matter content will be measured. Cores will be dated using Pb210 or Cs137 to estimate sedimentation rate, and cyanobacteria pigments, cyanobacteria akinetes, and/or surface and bottom diatom assemblages will be examined to determine the likely historical trophic state of Lone Lake. At the present time, a grant budget of approximately \$18,000 is anticipated to cover one year of sampling and laboratory testing activities.

Deliverable: Collect complete, accurate, and precise data of known quality as described in the Sampling Plan (Task 3) to sufficiently develop a predictive model of the response of the lake's trophic status, cyanobacteria bloom frequency, and dissolved oxygen dynamics to nutrient loading reduction or other lake management techniques.

#### **Task 5: Develop an Algae Management Plan**

Task 5 will consist of developing a management plan for reducing the frequency and duration of toxigenic algae blooms in Lone Lake, based on evaluation of the data compiled in the previous tasks and in consultation with stakeholders. The relative importance of various nutrient sources and sinks in fueling algae blooms will be evaluated and a water quality model will be developed to predict the lake's response to nutrient reduction or other lake management techniques. The consultant may propose the use of existing nutrient reduction models such as the USDA Natural Resources Conservation Service's NSPECT model or develop a customized model for the specific project conditions.

As part of the plan development, the consultant will consult with stakeholders to develop practical endpoints for management actions. It is anticipated that the development of relevant endpoints will consider state water quality standards for aquatic habitat and recreational uses, the lake's historic trophic state, and ecological conditions associated with ensuring a healthy native plant community that provides habitat for fish and invertebrates. The estimated budget for this task is \$16,500.

Deliverables:

- Develop a new or adapt an existing model to predict the lake's response to specific nutrient reduction strategies or other lake management techniques
- Prepare a management plan detailing a well-conceived strategy for reducing the frequency and duration of toxic algae blooms. This plan shall include a proposal for reestablishing a resilient native plant community that provides ecological benefits and does not interfere with recreational use of the lake, a program for preventing reinvasion of invasive/nonnative/noxious weeds, a long-

term monitoring plan for tracking lake status and condition, and a description of costs and funding options for implementation.

### **Task 6: Project Kickoff Meeting and Stakeholder Meetings**

Project team members from WICD and stakeholder groups will meet with the consultant's project manager and key staff prior to commencement of work to explain the project approach and to acquaint the consultant with the available data sources and overall project staffing and budget resources. Based on the meeting, the consultant will be requested to prepare a detailed work plan for the project that all parties agree on.

The consultant will also consult with stakeholders on developing recommendations for specific nutrient reduction or other management strategies. The plan will include identification of future water quality and plant monitoring activities, cost estimates and options for funding ongoing management.

#### Deliverables:

- Attend a project kickoff meeting with project team
- Prepare a detailed work plan for the overall project approach.
- Attend up to two meetings with WICD and project stakeholders to consult on plan development and present the final plan

## Attachment 2: Anticipated Project Timeline

### Lone Lake Algae Management Project

Tasks	2018						2019						2020											
	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
	FY 2019 - 40% funded (\$15,600)												FY 2020 - 60% funded (\$23,400)											
<b>Task 1 - Project Admin/Management (WICD)</b>																								
1.1 - Progress Report/Payment Request																								
1.2 - Closeout Report																								
1.3 - Project Outcome Summary Report																								
<b>Task 2 - Lit. Review and Database Development (WICD)</b>																								
2.1 - Develop database																								
<b>Task 3 - Data Gaps &amp; Sampling Plan (Consultant)</b>																								
3.1 - Develop/Submit QAPP																								
3.2 - Develop/Submit Sampling Plan																								
<b>Task 4 - Sampling (Consultant/WICD)</b>																								
4.1 - Collect/Submit Data																								
<b>Task 5 - Algae Management Plan (Consultant)</b>																								
5.1 - Submit Draft Plan																								
5.2 - Submit Final Plan																								
<b>Task 6 - Stakeholder Involvement (WICD/Consultant)</b>																								
6.1 - Monthly project update emails (WICD)																								
6.2 - Kickoff Meeting & Periodic Stakeholder Meetings																								