

# South Dakota Quality Assurance Project Plan for Monitoring for Harmful Algal Blooms



Department of Agriculture and Natural Resources

Watershed Protection Program

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### A3: Distribution List

The current version of the Quality Assurance Project Plan (QAPP) will be posted on the DANR website and on the South Dakota Harmful Algal Blooms (HABs) webpage. It will also be saved under the file pathway; N:/WATRSLED/QAQC – SOP/QAPP.

**Table 1: Distribution List**

<b>Name</b>	<b>Title</b>
<b>Bill Smith</b>	Division Director
<b>Barry McLaury</b>	Administrator Watershed Protection Program, Manager II
<b>Paul Lorenzen</b>	Team Leader/Environmental Scientist Manager I Assessment Team
<b>Kris Dozark</b>	Team Leader/Environmental Scientist Manager I Implementation Team

All personnel involved with assessment and implementation sampling activities for the South Dakota Department of Agriculture and Natural Resources, Watershed Protection Program (SD DANR WPP) shall receive a copy of this plan and therefore should be thoroughly familiar with WPP sampling policies, management structure, and procedures. Compliance with QAPP elements results in data collection and management that is valid and suitable for use in implementation, water quality and (TMDL) Total Maximum Daily Load assessments projects, other programs, and projects.

### A4: Project Organization

The following individuals are responsible for the design and implementation of this project:

#### Roles and Responsibility:

The HABs Program Manager will be responsible for coordinating with states and tribes to identify waterbodies that will be routinely sampled and/or are experiencing a harmful algal bloom event. Joshua Strobel will serve as the primary contact for recreational HABs issues. Josh will coordinate with the Region 8 Lab, Assessment Partners and DANR to facilitate collection of samples. All samples will be taken by DANR staff or by project sampling partners that are trained by DANR staff. The HABs manager will coordinate with state, DOH, and partners regarding sample results and any recommended follow-up actions that may need to be taken.

#### Management Responsibilities:

No Extramural funding is associated with this project.

**Quality Assurance (QA) Responsibilities:**

The DANR QA Office, Tyler Frideres, will be responsible for interpreting the validity of the data. R8 laboratory analysts and Mid-West Laboratory analysts will be responsible for conducting the laboratory analyses according to their approved Standard Operating Procedures (SOPs) and ensuring that all field documentation submitted with samples has been satisfactorily completed. Joshua Strobel will coordinate with external partners to ensure that all samples are collected according to the laboratory guidance from EPA Region 8 Lab and Mid-West Labs.

**Field Responsibilities:**

All samples will be collected by state staff or project partners and will follow all QAPP guidance and SOP methods.

**Laboratory Responsibilities:**

The EPA Region 8 Lab (Lakewood, Colorado) and Mid-West Labs (Omaha, Nebraska) will be responsible for all sample analysis. The EPA Region 8 Lab will be analyzing our composite toxin samples and all our response samples. Mid-West Labs will analyze all our shoreline samples.

**Laboratory and Field Audit Responsibilities:**

Laboratory audits will occur as specified in the Mid-West Lab QAPP/SOP and in the EPA Region 8 QAPP/SOP. All field sampling will be conducted by DANR staff and project partners. No field audits will be conducted as part of this project.

Joshua Strobel, DANR HABs Coordinator, will make sure that the QAPP is followed as approved; and that all DANR staff and project partners working with HABs have access to the most current version of the QAPP and all necessary documents in order to sample for HABs. Personnel will be informed of all requirements for the project prior to any sampling.

## A5: Problem Definition/Background

The lakes of South Dakota provide a basic natural resource, recreational in nature, of utmost importance to the economy of the state and quality of life for its residents. Approximately 800 lakes, ranging in size from prairie potholes to the Missouri River mainstem reservoirs, are readily available for public use. 573 state lakes have been recognized as significant waterbodies, specifically categorized by the South Dakota Department of Agriculture and Natural Resources (SDDANR) as to their assigned beneficial uses.

As we know, much of the state of South Dakota is dominated by agricultural practices and continue to intensify as years go on. Agricultural land is a major contributor to cultural eutrophication via nutrient loss and sedimentation. As nutrients runoff into our lakes, an abundance of nitrogen and phosphorus can cause toxin producing algae to grow excessively, which results in a Harmful Algal Bloom (HAB). These events are typically produced by blue-green algae, a primitive photosynthetic algae also known as cyanobacteria. The toxins that blue-green algae produce can be harmful to people and fatal to pets and livestock. In South Dakota, harmful algal blooms typically occur during the warm summer months. It is important for the state to educate the public on harmful algal blooms and to inform when it may not be safe to recreate in the waters of South Dakota.

The EPA has come up with Recreational Ambient Water Quality Criteria for cyanotoxins. The established criteria are listed below in table 2.

**Table 2: Recreational Ambient Water Quality Criteria**

	Recreational Ambient Water Quality Criteria
<b>Cyanotoxin</b>	
Cylindrospermopsin	8.0 µg/L
Microcystins	15.0 µg/L

**Goals and Objectives:**

The goal of this project is to increase public awareness about HABs and quantify toxin concentration by conducting routine toxin monitoring on lakes in South Dakota where algal blooms can occur. Information from routine sampling efforts will provide the state with information regarding the presence/absence of potentially toxic blooms and the concentrations of toxins within the samples. Goals/objectives addressed by routine sampling include:

- Identify if cyanotoxins are present and if they are, quantify the concentration of toxins.
- Develop a long-term dataset that shows comparisons between chlorophyll-a, cyanotoxin, nutrient concentrations, and the dominant algae community.

Additionally, the project will also do response sampling on HAB events to determine if an advisory should be posted for the effected body of water. DANR will not post advisories for bodies of water, but will inform Game, Fish and Parks (GF&P) and Department of Health (DOH) of the situation at hand. Since GF&P manages the beaches and waters in state parks, we will let them be the entity to decide if an advisory should be posted or not. Objectives for this component include:

- Identify if cyanotoxins are present and if they are, quantify the concentration of toxins.
- Develop a long-term dataset that shows comparisons between chlorophyll-a, cyanotoxin, nutrient concentrations, and the dominant algae community.
- Use the above information in order to make informed decisions:
  - Recreational Waters:
    - Determine if an advisory should be posted based on comparing the toxin values to the EPA recreational ambient water quality criteria listed in table 2.
    - Determine if more sampling is needed in order to make an informed decision.
    - Conduct sampling post-advisory in order to determine if the bloom has subsided or if an advisory is still needed.
    - Use results of Water Quality sampling in order to make waterbody support determinations for recreational beneficial uses (beneficial use 7 and 8) for microcystin and cylindrospermopsin in our biennial Integrated Report.

**A6: Project Description and Schedule**

The DANR Harmful Algal Bloom Project is a partnership between EPA region 8, East Dakota Water Development District (EDWDD) and the State of South Dakota. DANR and its partners will do all of the sample collection, while EPA Region 8 will provide laboratory analytical assistance and will provide all

necessary materials and sampling kits. Sampling kits will include coolers, sample bottles, chain of custody/field condition forms, etc for sample collection.

This QAPP provides information regarding the collection and analysis of cyanotoxins in our routine and response sampling at lakes that can be susceptible to harmful algal blooms. A list of all sites for routine grab and composite samples is included in Appendix A.

Routine recreational sampling will occur during the months of July and August. DANR staff will collect routine grab samples from beaches or boat ramps and send samples to Mid-West Labs in Omaha, Nebraska for analysis. DANR staff will collect routine composite samples from multiple stations on a lake and send samples to EPA Region 8 Lab for analysis.

Response sampling will occur during the entire field season (May 1<sup>st</sup> – September 31<sup>st</sup>). When a call is received about a potential harmful algal bloom and possible exposure to toxins, a DANR staff member will respond to the call and go collect a sample. This sample will be collected, packaged and shipped based on the EPA Emergency Bloom SOP and will be shipped overnight to the EPA Region 8 Lab in Lakewood, Colorado.

**Table 3: Sample Types for DANR Staff**

Sample Type	Designated Use	Sampling Time Frame	Analytical Parameters	Shipment	Results
Routine (Composite)	Recreational	Monthly; July and August	Cyanotoxins	Ship immediately or freeze and ship monthly	End of sampling season
Routine (Grab)	Recreational	Monthly; July and August	Microcystins	Ship immediately or freeze and ship monthly	End of sampling season
Response	Recreational	Based on Bloom Events	Cyanotoxins	Ship immediately on ice or freeze and ship as soon as possible	Preliminary results shared within 48 hours

**Table 4: Sample Types for EDWDD Staff**

Sample Type	Designated Use	Sampling Time Frame	Analytical Parameters	Shipment	Results
Routine (Composite)	Recreational	Monthly; July and August	Cyanotoxins	Ship immediately or freeze and ship monthly	End of sampling season
Routine (Grab)	Recreational	Monthly; July, August and September	Microcystins	Ship immediately or freeze and ship monthly	End of sampling season
Response	Recreational	Based on Bloom Events	Cyanotoxins	Ship immediately on ice or freeze and ship as soon as possible	Preliminary results shared within 48 hours

Shipping by DANR and Partners will be overnight/expedited, with samples surrounded by double-bagged wet ice in a cooler, to:

Marcie Tidd

Us EPA Region 8 Laboratory

1 Denver Federal Center

Building 25, Door E-3

Lakewood, CO 80225

Phone: 303-462-9476

Shipping information, such as tracking, will be sent by email to the Region 8 Laboratory on-call analyst.



Changes to the sampling approach identified in this QAPP will be documented as necessary. The schedule for the 2021 HAB field season is shown below. Please note that this table is an estimated timeline of events for the year.

**Table 5: Estimated Time for 2021 Field Season HABs Sampling**

TASK	2020- 2021													
	Nov	Dec	Jan	Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec
QAPP development				X	X	X								
QAPP Approval						X								
Sampling (DANR)									X	X				
Sampling (EDWDD)									X	X	X			
Lab analysis (EPA)									X	X	X	X		
Lab reporting									X	X	X	X		
Project Data Analysis												X	X	X

## A7: Data Quality Objectives and Criteria

The primary data driven objective for the HABs program is to determine if cyanotoxins are present and if they are, to quantify the concentration within blooms. Results from the sampling will be used by the State of South Dakota to make decisions about public recreation and to inform the public about the possible impacts to human health. Further implications of the HABs program include developing strategies to respond to bloom events and also trying to protect our watersheds and lakes.

In addition to the SOP requirements from EPA Region 8, DANR will follow the criteria for deciding if data quality objectives have been met in terms of Completeness, Representativeness, Comparability, Precision, and Accuracy.

**Completeness** is a measure of the amount of valid data obtained from measurement systems compared to the amount that expected to be obtained under optimum conditions. For a set of data to be utilized with confidence to assess a parameter for a waterbody, the data must be complete, ie., there must be enough valid data from analysis to facilitate making the assessment. Since Harmful Algal Blooms are wind driven and can vary based on toxin production, the dataset will be considered complete as long as 90% of planned samples are collected and analyzed.

**Representativeness** expresses the degree to which data accurately and precisely represents the characteristics of that which is being measured. All samples will be collected in such a manner and at such sites to be representative of the medium from which they are taken. Multiple stations for HABs shoreline sampling will be sampled in order to get a representation of the lake and to account for wind. Multiple stations for HABs composite samples will be used to get a representation of the entire waterbody rather than one spot in the middle of the lake.

**Comparability** expresses the confidence with which one data set can be compared to another. Comparability can be measured and assessed through the use of standard, published sampling and analytical data. The comparability of data is achieved by the commitment of SD DANR staff, local coordinators, project partners and contracted laboratories to use standardized methods, where possible, including the SD DANR SOP volume 1 and 2, EPA-approved analytical methods, standard methods, or documented modifications thereof which provide equal or better results. All analytical results will be reported in appropriate concentration values and units to facilitate comparison.

**Precision** is a measure of the reproducibility of the measurement when an analysis is repeated. It is reported in Relative Percent Difference (RPD) or Relative Standard Deviation (RSD). Precision will be assessed through field duplicate and lab duplicate analyses. Collection of field blanks will also make sure there is no cross contamination.

**Accuracy** is a measure of how much of the constituent actually present is determined. It shows how close the sample value is to the “true” value. Accuracy will be assessed through the project by the collection of field blanks and duplicates. Also, following QA/QC practices will help ensure that accuracy is accounted for.

Please refer to Section 7.0 and 8.0 of the SD DANR WPP SOP Volume 1 for measurements of precision and accuracy and specific procedures for corrective actions.

## A8: Special Training and Certification

Any special training requirements needed for the completion of this project will be written in the Response Protocol and Assessment Strategy. Any associated costs with training will be documented in the budget table in the Response Protocol and Assessment Strategy. Josh Strobel, the project officer, will make sure that any necessary and needed training is documented and completed. All certifications will be discussed with the Quality Assurance Officer, Tyler Frideres.

## A9: Documents and Records

Documentation and record collection is an integral part of maintaining proper QA protocols. The project officer, Joshua Strobel, will make sure that before any sampling is done, that all partners have a copy of the most current version of the HABs QAPP. Prior to project sampling, Josh will also make sure that all sampling sites have been entered into the NR92/WISKI database with the correct results and latitude and longitude. All data will be stored indefinitely on a SQL server and backed up to the state IT system. Information about sample analysis and location will be shared with the public, but no personal information from reported blooms will be shared with the public. South Dakota DANR will make sure that all field notes documented will be sent to EPA Region 8 upon their request.

At the completion of the project, all project data, reports, documentation and records will be given to the project officer and stored. After multiple years of sampling for HABs, the goal is to have a long term dataset that can be used in order to make trends and see change overtime. All lab results from sampling will be sent from EPA Region 8 Lab and Mid-West Lab to the project officer. The project officer will make sure that all documentation is put into the associated folder and that the HABs map is updated with the toxin concentration from sample analysis.

## B1: Data Generation and Acquisition

### **Sampling Design (Experimental Design):**

South Dakota DANR staff and project partners will be collecting routine grab samples which will involve the analysis of microcystin. We will also collect routine composite samples which will involve the analysis of cyanotoxins. At each fixed location (shown in Appendix A), field staff will collect one grab sample at each site per standard protocol for toxin analysis, in addition to the field duplicate and field blank for each sampling event. The samples will be shipped overnight on wet ice to the EPA Region 8 Laboratory for analysis.

For recreational response samples, the specific location of where to take the sample will vary based on the geographical location of the bloom. Field staff will follow EPA HAB SOP protocol at all times while sampling bloom events. Field staff will collect at least one grab sample at each site per standard protocol for cyanotoxin analysis, as well as one field blank and duplicate for the project. For Response samples, EPA Region 8 Lab will be analyzing 1-5 samples plus one field duplicate and one field blank.

### **Sampling Schedule:**

For routine recreational samples, monthly sampling will occur. South Dakota DANR will sample for toxins in July and August of 2021. EDWDD will be sampling the months of July, August and September of 2021. This sampling period was selected in order to account for when blooms are generally at their peak toxin levels. For response samples, samples will only be collected during bloom events. South Dakota DANR will notify EPA ahead of time if sampling schedule needs to change.

### **Sample Identification:**

Sampling locations and descriptions have been assigned by the State of South Dakota and can be found in Appendix A. Sampling locations will also be identified on the chain of custody form when a sample is sent to the EPA Lab or Mid-West Lab for analysis.

### **Sample Bottles:**

Samples will be collected following the sampling procedure and checklist provided by the EPA Region 8 Lab with the sample kit (Appendix B). Cyanotoxin samples will be collected by filling a 30 mL or 60mL PETG sample bottle to 2/3 full, or to the indicated line for preserved samples. Sample handling, storage and shipping protocols are described in Appendix B. Bottles will be inspected up receipt by field personnel and any bottles that are damaged will not be used and will be sent back to the EPA Laboratory.

## **B2: Sampling Methods**

### **Sampling Methods:**

Samples are collected by DANR staff and project partners using the following EPA approved method:

1. Fill the cooler with ice and label bottles prior to sample collection. Create sample IDs that will be easy to associate with sample locations.
2. A new pair of gloves should be worn with each sample in order to avoid cross contamination.
3. Do not rinse the provided sample bottles.
4. Samples of open water are typically taken just below the surface of the water or at 0.5 meters depth. Samples may also be taken from surface sum, benthic blooms, or from other depths of interest to the state.
5. For unpreserved cyanotoxin PETG bottles: fill sample vessel approximately 2/3 full of sample water. If bottles are clear, wrap the sample vessel in foil to prevent light exposure.
6. For preserved cyanotoxin amber PETG bottles: Fill each bottle to the 30 mL graduation (indicated with a mark on bottle). Do not overfill pre-preserved bottles. Samplers may utilize a separate collection vial to fill the pre-preserved bottle with sample water to the 30 mL graduation to avoid overfilling.
7. For 125 mL TN and TP bottles: bottles contain acid preservatives, do not rinse or overfill. Fill the sample vessels approximately 2/3 full of sample water without losing preservatives (you may want to sample in a larger container and pour into 125 mL bottles). Avoid skin contact with acid preservative. Safety Data Sheets for HCl and H<sub>2</sub>SO<sub>4</sub> preservatives are included with bottles and caps are color coded (TN/HCl = Blue, TP/H<sub>2</sub>SO<sub>4</sub> = Green).
8. For chlorophyll-a 500 mL bottle: Fill sample vessel to the neck of the bottle.
9. Place samples on ice immediately after filling. Ship samples overnight or freeze until time of shipment (monthly).
10. Complete a Chain of Custody Form.

### **Site Disturbance:**

Ensure that the sample site is not disturbed prior to collecting a sample. Disturbing the sediment can resuspend toxins and result in uncharacteristically high turbidity and toxin concentrations that wouldn't have been there if the site wasn't disturbed.

- Avoid walking in the water near the edge of the waterbody.
- Don't enter the waterbody prior to sample collection.

**Field Duplicates:**

A field duplicate is collected in the same manner as a regular sample. The duplicates are given their own sample number and labeled as “duplicate” for the sample type. The field duplicate sample is factored into the total number of samples. A field duplicate will be collected for every 10 samples.

**Blank:**

A field blank is treated in the same manner as a regular sample. The blanks are given their own sample number and labeled as “blank.” The field blank sample is factored into the total number of samples (e.g., one sample plus one duplicate and one field blank for a total of three samples). Field blanks should be filled with deionized water. A blank will be collected for every 10 samples.

**Corrective Actions:**

Corrective actions for deficiencies will be addressed immediately in the field or after lab receipt (documentation errors). Corrective actions include but are not limited to; discarding improperly collected or handled samples, re-sampling, and correcting labels or COC’s. The State of South Dakota will work and communicate with the EPA in order to fix and issues or deficiencies with sample collection and documentation.

### B3: Sample Handling, Custody and Documentation

For recreational response samples, cyanotoxins samples will be stored on ice or refrigerated (4-8°C) in the dark. If samples are being shipped the day of sample collection, they will be kept in the dark on ice until shipment. If samples are being held overnight, samples will be placed in a freezer or on dry ice until ready for shipment. Samples will be shipped to the Region 8 Lab by overnight, express delivery. Samples must be received and frozen within 3 days of collection. The EPA Region 8 Lab only accepts samples Monday – Friday. Coordination of sampling schedule will be arranged prior to deployment by field staff. DANR staff and project partners will only sample Monday – Thursday so that no samples are received by EPA over the weekend.

EPA lab staff will check temperature of samples once received in order to verify that they are within the holding standards. If the temperature limit of 10°C is exceeded, samples will have to be discarded and if possible, a re-sample may need to occur.

An EPA Region 8 chain-of-custody form accompanies the samples, and includes the following for each sample:

- Waterbody/Location
- Site ID
- Site Description
- Date Sample Collected
- Time Sample Collected
- Identification of QC Sample Type: Field Sample, Field Duplicate, Field Blank
- Analysis Required (Total Microcystins, Anatoxin-A, Cylindrospermopsin)

The Chain of Custody Form will be signed and dated, relinquishing custody upon shipment to the EPA Region 8 Laboratory. Example of the chain of custody form is attached in Appendix B. The EPA Region 8

Laboratory will provide sampling equipment, containers, and ultra-pure water for the blank of not provided by the state.

## B4: Analytical Methods

The analysis of all response samples and routine composite samples will be analyzed at the EPA Region 8 Laboratory in Lakewood, CO. The analysis of all routine grab samples will be analyzed at Mid-West Laboratory in Omaha, NE. Cyanotoxins will be analyzed by ELISA for total microcystin, anatoxin-a, and cylindrospermopsin for all samples run at the EPA Region 8 Laboratory. LC/MS/MS will be ran on samples for microcystin congeners, anatoxin-a and cylindrospermopsin as identified in the EPA Region 8 HAB QAPP. Mid-West Labs will follow all EPA approved methods for the analysis of microcystin in their lab analyses. Only microcystin will be accounted for and analyzed within these samples. All DANR analytical methods for specific parameters can be found in the SD DANR WPP SOP Volume 1.

## B5: Quality Control

EPA Region 8 Laboratory and Mid-West Laboratories are responsible for complying with their internal data quality requirements. In the event that data quality requirements are not met, the specific laboratory will need to be in contact with project officer, Joshua Strobel, in order to take necessary corrective actions. Data must be comparable for all samples within each sample set. Both EPA Region 8 Lab and Mid-West Lab must follow in house QA/QC requirements. South Dakota DANR field staff and project partners will meet QA/QC guidelines and ensure that procedures including field duplicates, field blanks, field techniques, holding times, and forms are completed. On an annual basis, the project officer will evaluate blanks and duplicates of all samples and equipment to determine if acceptability requirements have been met. The South Dakota DANR field staff will follow their own QA/QC requirements of 20% (10% blanks and 10% replicates).

### **Field Duplicate:**

The field duplicate samples will provide an indication of variability withing the sampling. Selection of sites for duplication is determined by field staff.

### **Field Techniques:**

DANR field staff and project partners will ensure that all HAB samples are collected using proper techniques and following EPA approved methodology.

### **Field Blank:**

A field blank QA/QC sample is supplied to the EPA Region 8 Laboratory and to Mid-West Laboratory for analysis for each sampling event (one per 10 samples). A sterile bottle containing ultra-pure deionized water will be provided to South Dakota DANR field staff by the EPA Region 8 Laboratory. The blank sample should be treated like all other samples for the remainder of the field visit, during transportation and shipment.

**Holding Times:**

A maximum holding time of 180 days for cyanotoxins will be followed for the project as identified in the EPA HAB SOP and analytical methods.

**Chain of Custody Form:**

Chain-of-Custody forms are used to handle and track samples from field collection to delivery to the EPA Region 8 Laboratory and Mid-West Laboratory.

EPA Region 8 Laboratory and Mid-West Laboratory will each provide South Dakota DANR with their own chain of custody form. Multiple chain-of-custody forms will be required if more than one shipping container is sent. Copies of all chain-of-custody forms are saved in hard copy and digital copy by the State of South Dakota, EPA Region 8 Laboratory, and Mid-West Laboratory.

## B6: Instrument/Equipment Testing, Inspection, and Maintenance

No testing, inspection, or maintenance of instruments or equipment will be necessary for this project. Therefore, this section is not applicable to the HABs QAPP.

## B7: Instrument/Equipment Calibration and Frequency

No calibration of instruments or equipment will be necessary for this project. Therefore, this section is not applicable to the HABs QAPP.

## B8: Inspection/Acceptance of Supplies and Consumables

The EPA will provide the State of South Dakota with Ultra Pure Deionized water for the QA/QC blank samples that will be collected during the field season. This is to minimize the contamination of blanks through regular deionized water that could potentially not be fully deionized.

## B9: Non-direct Measurements

2020 toxin values from previous HABs sampling will be used to compare to this year (2021) to look for any possible trends and to help build a long term dataset of toxin values for the lakes in South Dakota. Previous data from 2020 was analyzed by EPA Region 8 and then results were sent to South Dakota in order to publish on our online HABs map.

## B10: Data Management

Information management occurs on several levels. First, sample collection must be completed in a manner to ensure the quality, compatibility, and timeliness of the data collected. Once collected and organized, it must be available for review, analysis, and interpretation. Ultimately, the data may be used in several aspects: to assess water quality of the waterbody based on beneficial use and provide general information to other interested organizations and the general public.

Field notes for each site will be recorded on a field datasheet, and include the following:

- Sampler(s) name(s)
- State location ID

- Date sample collected
- Time sample collected
- Additional observations

Hard copies of field datasheets, chain-of-custody forms and laboratory results are scanned and saved in electronic format under the file pathway: N/WATRSHED/HABs Response/HABs Reports.

## C1: Assessment and Response Actions

The State of South Dakota is responsible for field sample collection and QA/QC procedures. Corrective actions for deficiencies will be addressed immediately in the field or will be resolved through collaboration of study partners.

The State of South Dakota will use the following assessments for HABs:

### **Surveillance:**

The project officer will keep in constant contact with both EPA Region 8 Laboratory and Mid-West Laboratory to ensure that all QA/QC components are being followed.

### **Peer Review:**

Peer review may be performed before a project starts and after a project is completed. Staff members will review HAB project for completeness, accuracy, and proper documentation.

### **Systems Audit:**

A full scale systematic, qualitative review of equipment, personnel, training, procedures, record keeping, data validation, data management and reporting aspects of the SD DANR WPP program will be completed by the SD DANR QAO, Tyler Frideres, every 5 years to evaluate SD DANR WPP QA/QC Procedures.

The EPA project manager or a representative of the Regional Quality Assurance Officer may, at any time, conduct an announced or unannounced audit or review of any data collection and analysis activities with assessment and implementation projects. This includes any contracts or subcontracts thereof used in the data collection and analysis effort.

## C2: Reports to Management

On an annual basis the SD DANR WPP QAO, Tyler Frideres, will submit a quality assurance report to the SD DANR QAO, Shannon Minerich, who in turn reports the information to EPA and the Program Administrator in an annual report covering the SD HABs Program. All reports will also be sent to the Team Leader and Administrative Leader. The report should include the following:

- Assessment results of measurement data, accuracy, precision, and completeness
- Results of performance and system audits
- Quality assurance issues
- Corrective actions and results; and
- Revisions to Standard Operating Procedures and Quality Assurance Project Plans.



## D1: Data Review, Verification and Validation

The objective of data review is to assess whether or not the data collected achieved the quality objectives of the project. All analytical data generated for the Watershed Protection Program by a laboratory undergoes reduction and report preparation by the respective laboratory. Laboratory reports are reviewed by the project officer and the SD DANR WPP QAO for reasonableness. The field data recorded in the laboratory (date, time collected, depth, site number, etc.) are also checked against field reports for accuracy.

## D2: Verification and Validation Methods

Data verification will include a review of the findings of all QA/QC assessment activities including:

- Appropriate sample collection and preparation of field transfer blank sample: assessed during sample collection by responsible field personnel.
- Chain-of-custody procedures: assessed by the responsible field personnel and laboratory sample custodians for EPA Region 8 Laboratory and Mid-West Laboratory.
- Analytical data collection, recording, and reporting including laboratory QA/QC procedures: assessed by EPA Region 8 Laboratory Staff and Mid-West Laboratory Staff.

Data review, verification and validation are key steps in the transition from the data collection to data review and acceptance. Data review, verification and validation are the responsibility of the project officer and are accomplished by following the quality assurance guidelines and criteria addressed in the SD DANR WPP-SOP, Volume 1.

## D3: Reconciliation with User Requirements

All data and related information obtained during the course of this project will be included in the final report from EPA Region 8 Laboratory and Mid-West laboratory. It will be the State of South Dakota's job to assess and interpret the data, but EPA assistance by the project manager is available upon request.

## Signature Page

X

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Hunter Roberts  
Secretary of the State

X

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Bill Smith  
Division Director

X

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Barry McLaury  
Administrator, Manager II

X

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Paul Lorenzen  
Team Leader, Manager I

X

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Kriz Dozark  
Team Leader, Manager I

X

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Shannon Minerich  
State QA/QC Officer

X

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Tyler Frideres  
Program QA/QC Officer

X

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Josh Strobel  
HABs Coordinator, Scientist III

## Appendix A

## South Dakota DANDR Sample Site List

AU_ID	# shoreline station	# of shoreline samples	composite samples	Shoreline 1	Shoreline 2 Station	Shoreline 2 lat	Shoreline 2 long	Shoreline 3 Station	Shoreline 3 lat	Shoreline 3 long	Shoreline 4 Station	Shoreline 4 lat	Shoreline 4 long	
1	AU_ID													
2	SD-CH-L-DEERFIELD_01	1	2	0	SWLABAC9207									
3	SD-CH-L-SHERIDAN_01	1	4	2	SWLABAC9233									
4	SD-CH-L-SYLVAN_01	2	4	2	SWLABAC2111	HAB2111A	43.844058	-103.56249						
5	SD-CH-L-CANYON_01	0	0	0	SWLABAC9204									
6	SD-BF-L-NEWELL_CITY_01	0	0	0	SWLABAC1502									
7	SD-CH-L-CURLEW_01	0	0	0	SWLABAC4904									
8	SD-CH-L-NEW_WALL_01	0	0	0	SWLABAC9243									
9	SD-GR-L-GARDNER_01	1	2	0	SWLABAC3502									
10	SD-CH-L-HORSETHIEF_01	0	0	0	SWLABAC9213									
11	SD-CH-L-STOCKADE_01	2	4	2	SWLABAC2110	HAB2110A	43.769736	-103.518697						
12	SD-BF-L-COX_01	0	0	0	SWLABAC9902									
13	SD-CH-L-DURKEE_01	1	2	0	SWLABAC4905									
14	SD-CH-L-ROUBAUX_01	1	0	0	SWLABAC9906									
15	SD-JA-L-LEM_01	2	4	2	SWLABAC9301	HAB9301A	45.910571	-98.686608						
16	SD-JA-L-MINA_01	2	4	2	SWLABAC2606	HAB2606A	45.449039	-98.73189						
17	SD-JA-L-RICHMOND_01	4	8	2	SWLABAC9309	HAB9309A	45.531889	-98.592501	HAB9309B	45.546968	-98.619356	HAB9309C	45.53393	-98.624019
18	SD-JA-L-FAULKTON_01	1	2	2	SWLABAC2802									
19	SD-JA-L-WYJIE_01	1	2	2	SWLABAC9313									
20	SD-JA-L-ROY_01	2	4	2	SWLABAC4835E	SWLABAC4835W								
21	SD-VM-L-COTTONWOOD_M_01	1	2	0	SWLABAC4808									
22	SD-JA-L-BUFFALO_01	1	2	2	SWLABAC4803									
23	SD-JA-L-BULLHEAD_02	1	2	0	SWLABAC4805									
24	SD-JA-L-FOUR_MILE_01	1	2	0	SWLABAC4814									
25	SD-JA-L-NINE_MILE_01	1	2	2	SWLABAC4830									
26	SD-MN-L-SUMMIT_01	0	0	0	SWLABAC2910									
27	SD-JA-L-MITCHELL_01	3	6	2	SWLABAC9801	HAB9801A	43.765032	-98.058343	HAB9801B	43.747746	-98.032947			
28	SD-VM-L-THOMPSON_01	2	4	2	SWLABAC4222	HAB4222A	44.264833	-97.491765						
29	SD-VM-L-WHITEWOOD_01	0	0	0	SWLABAC4223									
30	SD-VM-L-HENRY_01	1	2	2	SWLABAC4208									
31	SD-JA-L-CAVOUR_01	0	0	0	SWLABAC9404									
32	SD-MI-L-MCCOOK_01	1	2	0	SWLABAC6202									
33	SD-VM-L-SWAN_01	1	2	2	SWLABAC6103									
34	SD-JA-L-BEAVER_01	1	2	0	SWLABAC9701									
35	SD-VM-L-E-VERMILLION_01	2	4	2	SWLABAC4613	HAB4613A	43.590693	-97.170246						
36	SD-B5-L-ISLAND_N_01	0	0	0	SWLABAC4806									

## East Dakota Water Development District Sample Site List

Lake AU_ID	Station ID #1	Station #2 Description	Station ID #2	Station #2 Lat	Station #2 Long	Station #3 Description	Station ID #3	Station 3 Lat	Station 3 Long	Station #4	Station ID #4	Station 4 Lat	Station 4 Long
SD-B5-L-ALBERT_01	SWLABAC3201												
SD-B5-L-ALVIN_01	SWLABAC4401	Boat Ramp	HAB4401A	43.4426	-96.6186	Kayak Launch	HAB4401B	43.4355	-96.6295				
SD-B5-L-BITTER_01	SWLABAC2205												
SD-B5-L-BLUE_DOG_01	SWLABAC2207												
SD-B5-L-BRANT_01	SWLABAC4302	East boat ramp	HAB4302A	43.9156	-96.9307								
SD-B5-L-BULLHEAD_01	SWLABAC2303												
SD-B5-L-CAMPBELL_01	SWLABAC9606	North boat ramp	HAB9606A	44.2234	-96.8386								
SD-B5-L-CLEAR_D_01	SWLABAC3202												
SD-B5-L-E_OAKWOOD_01	SWLABAC9613												
SD-B5-L-ENEMY_SWIM_01	SWLABAC2209												
SD-B5-L-Goldsmith_01	SWLABAC9608												
SD-B5-L-HERMAN_01	SWLABAC4306	State Park Boat Ramp	HAB4306A	43.9921	-97.1622	Stoney Point Boat Ramp	HAB4306B	43.99045	-97.1852				
SD-B5-L-KAMPESKA_01	SWLABAC9508	Stokes-Thomas Lake City Park	HAB9508A	44.9338	-97.1707	Memorial Park Boat Ramp	HAB9508B	44.91759	-97.2435	Sailboat Landing		44.9492	-97.1882
SD-B5-L-MADISON_01	SWLABAC4309	Johnson Point		43.9736	-97.0354	Payne Access		43.97085	-97.0655				
SD-B5-L-NORDEN_01	SWLABAC3214												
SD-B5-L-PELICAN_01	SWLABAC9517	White's Point	HAB9517A	44.8647	-97.2114	Pelican Park	HAB9517B	44.88397	-97.138				
SD-B5-L-PICKEREL_01	SWLABAC2219	East State Park boat ramp	HAB2219A	45.4869	-97.2632	East Swimming Beach	HAB2219B	45.49244	-97.2652				
SD-B5-L-POINSETT_01	SWLABAC3215	Sorenson Boat Ramp	HAB3215A	44.5571	-97.1282	Sarranen PWA Boat Ramp	HAB3215B	44.59261	-97.0736	Prestrude	HAB3215C	44.57179	-97.0427
SD-B5-L-REID_01	SWLABAC1812												
SD-B5-L-SCHOOL_01	SWLABAC2319												
SD-B5-L-ST_JOHN_01	SWLABAC3211												
SD-B5-L-TWIN_01	SWLABAC4281												
SD-B5-L-W_OAKWOOD_01	SWLABAC9615	West Oakwood Boat Ramp	HAB9615A	44.4497	-96.9895								
SD-B5-L-WALL_01	SWLABAC9118	Boat Ramp Dock	HAB9118A	43.5309	-96.9618	Fishing Pier at Boat Ramp	HAB9118B	43.531	-96.9624				
SD-B5-L-WAUBAY_01	SWLABAC2226												
SD-MN-L-ALICE_01	SWLABAC3201												
SD-MN-L-BIG_STONE_01	SWLABAC5502	Douthitt Park	HAB5502A	45.3024	-96.4641	Hiawatha PWA boat ramp	HAB5502B	45.46718	-96.7431				
SD-MN-L-COCHRANE_01	SWLABAC2305	West shore boat ramp		44.7078	-96.4866								
SD-MN-L-FISH_01	SWLABAC2301												
SD-MN-L-HENDRICKS_01	SWLABAC9609	State Lakeside Use Area	HAB9609A	44.4804	-96.4767								
SD-MN-L-OAK_01	SWLABAC9612												
SD-MN-L-OLIVER_01	SWLABAC2315												
SD-MN-L-PUNISHED_WOMAN_01	SWLABAC9518												
SD-RD-L-TRAVERSE_01	SWLABAC5521	Jensen PWA	HAB5521A	45.6734	-96.8051								
SD-RD-L-WHITE_01	SWLABAC4843												

## Appendix B



**US EPA Region 8 Laboratory**  
 Denver Federal Center, Building 25, Entrance E-3  
 Lakewood, CO 80225

*Form No.: BIOLF-001 Rev. 1.0*

### **HAB Emergency Bloom Checklist for Algal Toxin Sample Collection** Algal Toxin Sample Collection and Shipment Quick Reference Guide

**Cooler Kit Contents:**

X	ITEMS
	Cooler
	5 prelabeled 30 or 60 mL PETG bottle sets
	5 squares of tinfoil (if clear bottles included)
	5 pair of large gloves
	1 gallon Ziploc bag
	1 Sample Submission form (BIOLF-002)
	1 Prefilled FedEx form and envelope
	1 Algal toxin quick reference guide (this form)

**Sample Site Selection:** Collect up to five samples. Sample locations can vary by waterbody, but typically the following sites should be considered.

X	LOCATION TYPES
	Index (deepest part or center of the lake)
	Public access areas (beaches, boat ramps, marinas, etc.)
	Leeward shores (downwind side of lake)
	Location of the most obvious bloom/area of concern
	Near drinking water intakes (if drinking water supply)
	Location of reported health concern

**Sample Collection:** Fill the cooler with ice and label bottles prior to sample collection. Create sample IDs that will be easy to associate with sample locations. Samples are typically taken just below the surface of the water or at 0.5 meters depth. Fill the sample vessel approximately 2/3 full of sample water. If bottles are clear, wrap the sample vessel in foil to prevent light exposure and place on ice.

**Chain of Custody Sample form:** Complete the HAB Sample Submission Form (BIOLF-002) by filling out the station ID, station description, time, and date. Sign and date the sampler block.

*Continued on back*

**Sample storage:**

Keep samples on ice or refrigerated in the dark. If samples are being shipped the day of sample collection, keep in the dark on ice until shipment. If samples are being held overnight, keep frozen by placing in a freezer or on dry ice until ready for shipment (Note: make sure adequate head-room is present prior to freeze).

**Sample Shipment Steps:**

X	Shipment Steps
	1. Place samples in cooler.
	2. Ice cooler (refresh ice if already on ice).
	3. Seal the Sample Submission form (BIOLF-002) in a ziploc bag and tape underneath the lid of the cooler.
	4. Tape cooler shut.
	5. Affix shipping label sleeve to the top of the cooler
	6. Schedule overnight express delivery of samples. At FedEx.com or by calling 1-800-463-3339 (1-800-GOFEDEX)
	7. Call and/or email the laboratory contact that shipped the cooler to let them know the coolers have shipped.
	<p><b>Lab contact information:</b>            Marcie Tidd: <a href="mailto:tidd.marcie@epa.gov">tidd.marcie@epa.gov</a>, Phone: 303-462-9476            Mark Murphy: <a href="mailto:murphy.mark@epa.gov">murphy.mark@epa.gov</a>, Phone: 303-462-9474</p> <p>EPA Region 8 Laboratory            1 Denver Federal Center            Building 25, Door E-3            Lakewood, CO 80225</p>

**Field conditions:** note overall waterbody (surface conditions, color, algal mats, odor, etc.) and weather (precipitation, air temp, cloud cover, wind speed/direction) conditions in the respective blocks. Insert any additional comments that may be relevant in the comments section. For the station specific conditions follow the same guidance as overall waterbody conditions but specific to the sampling site. If collected, enter max and secchi depth, pH, DO, SC, water temp in these sections.

<b>Weather Conditions:</b>	
<b>Overall Lake conditions:</b>	
<b>Station specific conditions (enter secchi/max depth, pH, temp, SC, DO if collected):</b>	
<b>ID:</b>	
<b>ID:</b>	
<b>ID:</b>	
<b>ID:</b>	
<b>ID:</b>	

<b>Additional comments:</b>



