Nevada Cyanobacterial Harmful Algal Bloom Strategic Response Plan

May, 2024

NEVADA DIVISION OF ENVIRONMENTAL PROTECTION

NEVADA DEPARTMENT OF WILDLIFE

THE OFFICE OF STATE Epidemiology

NDA Nevada Department of Agriculture

NEVADA STATE PARKS

NEVADA DIVISION OF STATE PARKS

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1. Introduction

1.1 Background

Cyanobacterial toxins (also known as blue-green algal toxins) in fresh surface waters have been implicated in human and animal illness. During 2020, 227 cyanobacterial bloom events resulted in 95 cases of human illness and 1,170 cases of animal illness in the United States (CDC, 2022). In Nevada, cyanobacteria are naturally present in surface waters and play a functional role in aquatic food-webs and biochemical processes. When specific conditions that are favorable to cyanobacteria occur, such as high nutrients and warm temperatures, these organisms can reproduce rapidly. This dense growth of algae is called a bloom and can sometimes lead to a harmful algal bloom (HAB). These conditions tend to occur in the warmer months after spring rainfall and snowmelt runoff have accumulated high nutrient loads from animal waste, agricultural fertilizers, sewage effluent, and urban stormwater runoff into surface waters (EPA, 2019). HABs can also occur in winter months, although winter-dominant algal species have been found to be different from those of spring and summer.

Freshwater cyanobacteria can produce potent toxins (cyanotoxins) that may cause damage to the liver, skin, and nervous system. HABs vary in toxicity and may pose a direct threat to human and animal health. Exposure to cyanotoxins can result in adverse human health effects such as: hay fever-like symptoms, respiratory distress, skin rashes, vomiting, and diarrhea among other symptoms. These cyanotoxins have also been identified as the cause of many animal deaths in the United States. Exposure to cyanotoxins most commonly occurs when people or animals have direct contact with, ingest, or inhale contaminated water. There are no known antidotes to cyanotoxins, so preventing exposure is imperative. Details on common cyanotoxins and the symptoms they cause can be found in **Table 1**.

1.2 Purpose and Scope

The purpose of the Nevada Cyanobacterial Harmful Algal Bloom (HAB) Strategic Response Plan (Response Plan) is to provide a unified statewide approach to detect, monitor, and respond to HABs in a way that is consistent across partner agencies, and thereby protect the public from risks associated with exposure to cyanotoxins. Although the primary focus of the Response Plan is the protection of human health, it also provides information and recommendations regarding exposure and prevention of potential impacts to pets, livestock, and wildlife. The Response Plan is designed to identify:

- Entities responsible for response and actions;
- Recreational risk thresholds and appropriate responses to protect public health and safety;
- Acceptable parameters and methods for assessing risk;
- Appropriate monitoring and analysis protocols to identify cyanobacteria and determine concentrations of cyanobacteria and cyanotoxins; and
- Recreational Advisory Levels, recommended advisory language and other related communication mechanisms.

The scope of the Response Plan is for freshwater lakes, wetlands, ponds, reservoirs, rivers, and streams with potential public access and recreational use. These waterbodies may be owned or operated by

state, county, municipal, or federal agencies. As such, coordination of the investigation and response activities will vary depending on ownership.

2. Agency Responsibilities

This plan outlines the interaction, responsibilities, and activities of Nevada partner agencies and other stakeholders to ensure that HAB investigations are conducted in a rapid, consistent, and effective manner. The plan is founded on the principles outlined below.

- ❖ Response procedures described in this document should be limited to "Public Waters of the State";
- ❖ Response should be as rapid as practicable considering the resources available;
- ❖ Partner agencies, to the best of their ability, should initiate coordination on HAB response activities when potential HABs are observed;
- ❖ Any incidence of illness associated with a potential cyanobacteria bloom, either human or animal, should be reported as soon as practicable to the Nevada Division of Environmental Protection (NDEP) and the Nevada Department of Health and Human Services, Office of State Epidemiology (OSE);
- ❖ NDEP will be the primary agency responsible for monitoring, although other agencies may contribute to monitoring efforts if resources allow;
- ❖ OSE will be the primary agency responsible for issuing recreational advisories, although other agencies may issue notices, such as social media posts or via agency websites, as necessary;
- ❖ Monitoring may include: remote sensing, photo documentation, field testing, and/or cyanotoxin analysis. All available information will be used to issue public health advisories;
- ❖ When requested, NDEP will provide training for partner agencies to ensure the effective coordination and consistency of response;
- ❖ The Response Plan is a dynamic document that is reviewed on a regular basis and revised as needed by partner agencies.

2.1 Nevada Division of Environmental Protection (NDEP)

The Nevada Division of Environmental Protection responsibilities shall include:

- Coordinate Nevada HAB Task Force meetings. Meetings will be held bi-monthly during the HAB index period from May through September, in addition to pre- and post-index period meetings;
- Develop monitoring and analysis capacity for cyanobacteria/cyanotoxins;
- Maintain a HAB reporting platform for partner agencies and the public to report potential HAB occurrences. Collect and review reports following submissions,

and determine who should be contacted for follow-up.

- Validate incoming requests for the investigation of cyanobacteria blooms and initiate monitoring activities if deemed appropriate and resources allow;
- Coordinate a rapid response for collection and analysis of cyanotoxin samples if resources allow; as needed, promptly relay incoming reports of illness related to cyanobacteria from the public to OSE and other waterbody managers;
- Monitor and analyze potential HABs. Develop and update annually a HAB monitoring plan to guide monitoring resources to identify potential HABs;
- Develop and update as needed the HAB Monitoring standard operating procedures (SOP) and disseminate to partner agencies assisting with sample collection (Appendix A);
- If deemed appropriate by NDEP, analyze water samples to determine the concentration of cyanotoxins such as microcystin, cylindrospermopsin, and anatoxin-a, as needed. Samples may be analyzed by NDEP or sent to a certified analytical laboratory for analysis;
- Provide timely reports to OSE and waterbody managers with analytical results;
- Coordinate with the applicable agency representatives for the preparation and release of public notifications, as warranted.

2.2 Nevada Department of Health and Human Services, Office of State Epidemiology (OSE)

The Nevada Office of State Epidemiology responsibilities shall include:

- Attend Nevada HAB Task Force coordination meetings;
- Issue recreational advisories for waters where thresholds have been exceeded;
- Maintain the Nevada HAB Dashboard. The Nevada HAB Dashboard serves as an up-to-date resource for the public and stakeholders to view waterbody status;
- Provide technical advice on the public health aspects of HABs and coordinate the state's public health response;
- Coordinate with partner agencies on development of guidelines/thresholds for cyanotoxins for recreational risk and drinking source water risk;
- Coordinate with partner agencies on information dissemination and outreach to local health departments and the public regarding the effects of HABs;
- Coordinate with the applicable Public Information Officer(s) (PIO) for the preparation and release of public notifications, as warranted;
- Interview cases of human illnesses associated with reports of HABs;
- Collect information on reports of animal illnesses associated with reports of HABs
- Collect data and information (human, animal, environmental) from reported HABs and report to the Centers for Disease Control and Prevention (CDC) One Health Harmful Algal Bloom System (OHHABS).

2.3 Nevada Division of State Parks (NDSP)

The Nevada Division of State Parks responsibilities shall include:

- Attend Nevada HAB Task Force coordination meetings;
- Visually monitor State Park lakes for HAB development and initiate communication with partner agencies when potential HABs are observed;
- Assist in monitoring response activities, including visual monitoring, field tests, taking photographs, and water sample collection in accordance with the HAB Monitoring SOP (**Appendix A)**;
- When necessary, post notices to inform the public of potential or confirmed HABs, including posting of recreational advisories;
- Make decisions about implementing procedures for the protection of public health, including restricting access to State Park waterbodies where cyanobacteria blooms have been confirmed;
- Provide outreach and education to the public about HABs;
- Coordinate with the applicable agency representatives for the preparation and release of public notifications, as warranted.

2.4 Nevada Department of Wildlife (NDOW)

The Nevada Department of Wildlife responsibilities shall include:

- Attend Nevada HAB Task Force coordination meetings;
- Receive and review notifications of HAB occurrences that may affect wildlife;
- Visually monitor lakes and streams for HAB development during normal field operations and initiate communication with partner agencies when potential blooms are observed;
- Assist in monitoring activities, including visual monitoring, field tests, taking photographs, and water sample collection in accordance with the HAB Monitoring SOP (**Appendix A)**;
- When possible, post notices to inform the public of potential or confirmed HABs, including posting of recreational advisories;
- Provide outreach and education to the public about HABs;
- Coordinate with the applicable agency representatives for the preparation and release of public notifications, as warranted.

2.5 Nevada Department of Agriculture (NDA)

- Attend Nevada HAB Task Force coordination meetings;
- Receive and review notifications of HAB occurrences that may affect livestock;
- Notify NDEP of HAB reports received by NDA;
- Notify and issue notifications and information to livestock owners as appropriate to protect livestock health;
- After initial response and issuing of a notification, communicate status to livestock owners until the advisory is ultimately lifted.

2.6 Tribes

When HABs are suspected or confirmed on waterbodies that are:

- within tribal boundaries,

- are adjacent to shoreline that is tribally owned,
- are subject to tribal water rights,
- have any other legal tribal interests,

NDEP will initiate response coordination with tribal environmental/public health staff. Communications will be directed through the NDEP tribal liaison's office. When requested and if possible, monitoring assistance will be provided, and analysis data will be shared with tribal staff. Additionally, at the request of tribal staff, NDEP will assist with coordination of response activities, such as providing resources and materials for public notices, etc.

2.7 Other Entities

As necessary and appropriate, other entities may assist with monitoring and response activities. Such entities may include:

- Other state/federal agencies;
- Local governments;
- Non-profit organizations;
- Regional sub-conservancy groups;
- Citizen groups; and
- HOAs.

If requests for monitoring or response activities are received, NDEP will coordinate with the partner agencies to recommend an appropriate response. Partner agencies may provide technical assistance for such activities if appropriate.

3. Advisories

3.1 Human and Animal Health Impacts

The most common exposures to cyanotoxins occur during recreational activities by mouth, skin, eye contact, and inhalation routes (EPA, 2018). Oral exposure may occur from accidental or deliberate ingestion of contaminated water. Dermal exposure may occur during recreational activity in water containing cyanobacteria by direct contact of exposed parts of the body. In addition, contaminated aerosols may be inhaled while recreating. Adverse health effects from recreational exposure to cyanotoxins can range from a mild skin rash to serious illness in humans and animals, and potentially death for animals.

Many factors determine whether exposure to HABs will cause adverse health effects. These factors include, but are not limited to:

- Toxin type and concentration;
- Duration and route of exposure, and;
- Any comorbid conditions of the patient (more than one disease or condition is present in the same person at the same time).

Cyanotoxin	Acute Health Effects in Humans	Most common Cyanobacteria Producing the Toxin
Microcystin	Abdominal Pain, Headache, Sore Throat, Vomiting and Nausea, Dry Cough, Diarrhea, Blistering around the Mouth, Pneumonia, and Liver Toxicity.	*Microcystis*, *Anabaena*, *Nodularia*, *Planktothrix*, *Fischerella*, *Nostoc, Oscillatoria*, and *Gloeotrichia*
Cylindrospermopsin	Fever, Headache, Vomiting, Bloody Diarrhea, Liver Inflammation, and Kidney Damage	*Cylindrospermopsis raciborskii, Aphanizomenon flos-aquae, Aphanizomenon gracile, Aphanizomenon ovalisporum, Umezakia natans, Anabaena bergii, Anabaena lapponica, Anabaena planctonica, Lyngbya wollei, Rhaphidiopsis curvata,* and *Rhaphidiopsis mediterranea*
Anatoxin-a group	Tingling, Burning, Numbness, Drowsiness, Incoherent Speech, Salivation, Respiratory Paralysis Leading to Death	*Chrysosporum (Aphanizomenon) ovalisporum, Cuspidothrix, Cylindrospermopsis, Cylindrospermum, Dolichospermum, Microcystis, Oscillatoria, Planktothrix, Phormidium, Anabaena flos-aquae, A. lemmermannii Raphidiopsis mediterranea (*strain of *Cylindrospermopsis raciborskii), Tychonema* and *Woronichinia*

Table 1. Primary Cyanotoxins and their Associated Human Health Effects (EPA, 2018)

While determining the type of cyanotoxin that has caused illness can be difficult, some commonly reported symptoms following cyanotoxin exposure are listed in **Table 1**.

Animals can be exposed to cyanobacterial blooms in the same way that humans are exposed (CDC, 2022). These routes include ingestion, inhalation, skin contact, and eye contact. Exposure can occur while swimming, by licking cyanobacteria or cyanotoxins off their fur or hair, or by eating cyanobacterial mats found in or near the water. Domestic animals, especially dogs, may be early victims of HABs. Animals are often the first to be affected because they are more likely than humans to swim in or drink water contaminated by HABs, even if it looks or smells bad. Health effects seem to be more serious in animals than in humans. This might be the result of higher ingested doses or a difference in their reaction to cyanotoxins. Exposures to cyanotoxins have killed fish, dogs, cattle, birds, and other wildlife.

The Centers for Disease Control and Prevention (CDC) suggests that if a person or pet comes in contact with a HAB, they should wash themselves and/or their pets thoroughly with uncontaminated fresh water. If water is ingested from where a HAB is present, they should call a doctor, a Poison Control Center, or a veterinarian. Call a veterinarian if a pet displays any of the following symptoms of cyanobacteria exposure: loss of appetite, loss of energy, vomiting, stumbling and falling, foaming at the mouth, diarrhea, convulsions, excessive drooling, tremors and seizures, or any other unexplained sickness after being in contact with water.

3.3 Guidelines for Issuing Public Health Advisories

Advisories will be based on three levels of public health protection recommendations derived from the three levels of recreational risk. The document "RATIONALE: Nevada's Recreational Risk Thresholds for Cyanobacteria" describes the how the recreational risk thresholds were derived (**Appendix B)**. The three levels of public health advisories are "HAB Watch" for Low Risk; "HAB Warning" for Moderate Risk; and "HAB Danger" for High Risk. These advisory notification levels are determined by the concentration of harmful toxins and other indicators of potential hazards (**Table 2**).

> **HAB Watch** – *serves as an advisory to notify the public that hazardous conditions are possible or present. A HAB Watch may be issued based on visual confirmation of a bloom, cyanotoxin concentrations, and/or cyanobacteria cell concentrations. Visual confirmation is determined by qualified NDEP staff working with lake managers and/or managing agencies using jar tests, photographs, or site visits. A HAB Watch should be issued if it has been analytically determined that the concentration of microcystins >4 µg/L, or concentration of cylindrospermopsin >8 µg/L, or concentration of anatoxin-a >1 µg/L. A HAB Watch should also be issued if the cyanobacteria cell concentration is >20,000 cells/mL, based on satellite data or taxonomic enumeration. People and pets should use caution when in contact with lake water and avoid areas of algae accumulation.*
>
> **HAB Warning** -- *serves as an advisory to notify the public that conditions are expected to be unsafe for human exposure. A HAB Warning can be issued if it has been analytically determined that the concentration of microcystins is >8 µg/L, or concentration of cylindrospermopsin is >15 µg/L, or concentration of anatoxin-a is >20 µg/L. If there is verification of significant cyanobacterial surface scum present a HAB Warning may be issued. It is acceptable for action to be taken over and above those listed in the HAB Watch, such as restricting or prohibiting public exposure.*
>
> **HAB Danger** – *serves as an advisory to the public that extreme HAB conditions exist. At this level, it has been analytically determined that the microcystins concentration is >2,000 µg/L, or concentration of cylindrospermopsin is >17 µg/L, or concentration of anatoxin-a is >90 µg/L. It is acceptable for either a portion of the waterbody, or entire waterbody, to be closed and in some cases the adjacent public land (e.g., approximately 100 ft. from the shoreline) to be closed to the public. Actual setback distances will be determined on a site-specific basis, if necessary, by waterbody managers. When partial closures (i.e., beach or cove) are issued, HAB Watch status should be issued for the remaining lake or zone area at a minimum.*

Advisory Threshold Determination		
Advisory Thresholds	**Advisory Level**	**Recommended Actions**
Cyanotoxin Concentration of **Microcystin ≤4 µg/L** **OR** **Cylindrospermopsin ≤8 µg/L** **OR** **Anatoxin-a ≤1 µg/L**	None – Waterbody clear	None
Visual confirmation of bloom* **OR** **Cyanobacteria Cell Concentration of 20,000 cells/mL, Based on Satellite Data or Taxonomic Enumeration** **OR** **Cyanotoxin Concentration of** **Microcystin >4 µg/L to ≤8 µg/L** **OR** **Cylindrospermopsin >8 µg/L to ≤15 µg/L** **OR** **Anatoxin-a >1 µg/L to ≤20 µg/L**	**Waterbody will be placed on a HAB WATCH Advisory**	» Post signage » Post advisory on OSE Dashboard » Issue social media release
Presence of significant cyanobacterial surface scum* **OR** **Cyanotoxin Concentration of** **Microsystin >8 µg/L to ≤2,000 µg/L** **OR** **Cylindrospermopsin >15 µg/L to ≤17 µg/L** **OR** **Anatoxin-a >20 µg/L to ≤90 µg/L**	**Waterbody will be placed on a HAB WARNING Advisory**	» Post signage » Post advisory on OSE Dashboard » May restrict direct contact with water » Issue social media release » Issue press release
Cyanotoxin Concentration of **Microsystin >2,000 µg/L** **OR** **Cylindrospermopsin >17 µg/L** **OR** **Anatoxin-a >90 µg/L**	**Waterbody will be placed on a HAB DANGER Advisory**	» Close portions of the waterbody or the entire waterbody. If necessary – close adjacent land up to 100 ft from shoreline. » Post signage » Post advisory on OSE Dashboard » Issue press release

Table 2. Advisory Level Determination - *NDEP will recommend advisory levels when the supporting evidence consists of only non-numerical information, such as photographs and field observations. Non-numerical evidence should be submitted to NDEP for quality assurance, after which it will be forwarded to OSE along with recommendations on recreational advisory levels based on the Advisory Level Determination chart.

3.4 Downgrading or Removing Advisories

A recreational advisory will remain in effect until sufficient data have been collected to indicate cyanotoxins are no longer present in the waterbody*. The most recent toxin and cell count values will determine the HAB status of a waterbody, except if it is under HAB Warning or HAB Danger status due to cyanotoxin concentrations. In these cases, at least two consecutive sampling events, taken at least 24 hours apart, with cyanotoxin levels below the applicable threshold must occur before a HAB Warning or HAB Danger advisory can be removed (EPA, 2019).

When possible, resources should be allocated to regular follow-up monitoring after a waterbody has received a recreational advisory. Priority should be given to waterbodies with HAB Warning and HAB Danger advisories, and those with contact recreation and municipal/domestic supply beneficial uses, as those pose the greatest health risk, while also having the largest impact on recreational use. When resources allow, NDEP will conduct routine monitoring of waters with recreational advisories until the advisory is lifted. If monitoring is not possible, NDEP will provide technical support to partner agencies so ongoing monitoring may be conducted.

**Exceptions: A lake/reservoir mixing/turnover event or a waterbody freeze event may allow an advisory to be lifted from a waterbody.*

3.5 Advisory Response Actions

When possible, the following actions should be taken for each advisory level:

- A notification of the recreational advisory should be posted to OSE's HAB Dashboard. The notification should include information sufficient to warn the public of potential hazards.
- NDEP will post a notification on the NDEP HAB webpage (https://ndep.nv.gov/water/rivers-streams-lakes/water-quality-monitoring/harmful-algal-bloom-program) , and an alert will be distributed to partner agencies via a Nevada HAB Task Force Listserv.
- The appropriate HAB advisory signage (**Appendix C)** should be posted at the impacted waterbody. Signs should be placed at primary public access locations such as beaches, marinas, boat ramps, and other main points of entry to the waterbody. If the provided signage is not used, then sign information should include:
  - Cyanobacteria are/may be present, and the body of water may be unsafe for people and animals;
  - People should use caution when contacting lake water and wash with clean water afterward;
  - Discourage people from having contact with the water near visible blooms (e.g., no swimming, waterskiing);
  - Discourage allowing pets to drink or swim in the water. If pets do come in contact with the water, then they should be rinsed off with clean water immediately;
  - Contact information for the posting authority;
  - The date of the posting;
  - The symptoms of cyanobacterial exposure;
  - What to do in case of contact with the water; and

- Who to call in case of illness potentially associated with exposure.
- Indicate that if fish are caught, the fish should be properly cleaned and rinsed with clean potable water, and all internal organs removed, with only the fillets retained for human consumption. (This only applies to waterbodies without existing fish consumption advisories.)

- Waterbody managers may choose to restrict access to an entire waterbody, or a portion thereof based on advisory level, magnitude of threshold exceedance, location of bloom, or potential for recreational or incidental contact with cyanobacteria bloom. Managers may request technical guidance from NDEP, however, public safety decisions must be made by the managers and their agency.
- Partner agency PIOs may issue notifications on applicable online platforms, such as social media, using the provided templates (**Appendix D)**.
- If appropriate, media outlets may be contacted to inform a broader audience of potentially hazardous conditions, particularly regarding waterbodies with higher levels of advisories. Agency PIOs will coordinate this response.

4. Monitoring Procedures

Partner agency staff should consider adopting a risk-based monitoring plan for recreational waters that are potentially vulnerable to HABs in order to prioritize their monitoring resources by considering both the potential for HABs and potential frequency of recreational contact. The prioritization of monitoring locations and sampling frequency should include an evaluation of the recreational waters including geographic location, and an assessment of site-specific information and the potential risk that a HAB at the site would present to human health and the health of animals, including pets, wildlife, and livestock. This step-by-step process may be informed by how the waterbody is used by people, whether pets or livestock may access it, and other relevant factors. This process will also allow reduction of efforts in locations where HABs are not likely to occur, potential exposure risk is considered to be low, or where resources to sample is high. For example, agency staff might choose waterbodies to closely monitor throughout the swim season based on the designated uses, the proximity to populated areas, the average number of recreational users, and whether HABs have occurred in the past.

4.1 Routine Monitoring for Blooms

The Nevada HAB Satellite Remote Sensing Tool will be used by NDEP to regularly monitor the larger recreational waters of the state. The data produced by the satellite tool will provide insight into the extent and magnitude of potential blooms, which will allow NDEP to provide guidance on monitoring resource allocation. The satellite tool will provide automated notifications as concentrations of cyanobacteria cells exceed user defined thresholds. With the often changing and transitory nature of HABs, this service will be invaluable for locating potentially hazardous blooms while freeing resources from constant on-the-ground monitoring.

On site, there are multiple indicators that partner agencies can use to determine the potential presence of HABs including visible discoloration of a waterbody due to suspended cell filaments or scums (e.g., a red, green, or brown tint); thick, mat-like accumulations on the shoreline and surface; foul odors and soupy-consistency of the water; and fish kills.

One or more field screenings may be performed to verify whether a potential HAB is present. These procedures are described in the Monitoring SOP (**Appendix A)**.

4.2 Reporting, Sampling, and Analysis of Potential HABs

If during routine monitoring a potential HAB is identified, a report should be submitted to NDEP (see NDEP HAB webpage for reporting instructions). NDEP staff will review reports and other supporting documentation and data, such as photographs, field test reports, and reports of visual assessments, to determine whether a **HAB WATCH** advisory should be issued by OSE and if additional monitoring actions should take place.

For a summary, see the HAB Response Flowchart (**Appendix E**).

When reports of potential HABs are submitted to NDEP, qualified staff will analyze the reports and supporting documentation to determine if hazardous conditions may be present. Methods used for making these determinations could include reviewing photographic evidence, corroborating reports with satellite data, and analyzing historic data. If NDEP staff determine that a potentially hazardous cyanobacteria bloom is present, they may recommend sample collection for cyanotoxin analysis. Cyanotoxin samples should not be submitted to NDEP for analysis without first receiving confirmation from qualified NDEP staff that a potentially hazardous cyanobacteria bloom is suspected to be present at a level that could potentially warrant an advisory, and that samples should be submitted. If a partner agency wishes to conduct cyanotoxin analysis at their own expense, they may submit samples to a certified analytical laboratory and results should be submitted to NDEP for advisory determinations and database entry.

After confirmation of a potentially hazardous cyanobacteria bloom, NDEP staff or other trained state staff may collect water samples for cyanotoxin analysis. Sampling must be conducted in accordance with the HAB Monitoring SOP (**Appendix A)**. Cyanotoxin samples should be submitted to NDEP for analysis (see SOP for submission procedures). Analysis will be conducted by NDEP staff in a timely manner, and results of analysis will be made available to stakeholders within 48 hours of receipt. If cyanotoxin concentrations prompt a change in advisory status, NDEP will notify the partner agencies via the HAB Taskforce Listserv. If a change in advisory level is warranted, advisory response procedures may take place.

5. Field Assessment and Sampling Procedures

Field assessment and sampling procedures should follow the HAB SOP. NDEP will be offering trainings with partner agencies to ensure familiarity with protocols to ensure to ensure protocols are implemented correctly. See HAB Monitoring SOP (**Appendix A)**.

6. Data and Resources

NDEP maintains a large database of water quality data, including hundreds of parameters, for thousands of monitoring stations. HAB monitoring data will be kept and maintained by NDEP in accordance with their normal data handling procedures. Data to be kept will include:

- Photographic documentation
- Visual and field assessment reports
- HAB reports
- Taxonomic data
- Cyanotoxin data
- Enumeration data

Data will be collected, reviewed, stored, and managed in accordance with the Nevada Quality Assurance Program Plan for the State of Nevada (https://ndep.nv.gov/uploads/water-wqm-docs/QAPP_FINAL_2020.pdf). All data analyzed or received by NDEP will be organized and disseminated to the partner agencies via two methods:

1. New data that result in a new exceedance of recreational risk thresholds, or conversely, a new non-exceedance of recreational risk thresholds, will be communicated through **Nevada HAB Updates Listserv**. OSE and NDSP staff can take advisory issuance and advisory response actions based on these notifications.
2. Weekly reports will be issued by NDEP that summarize changes in waterbody status for all monitored waters, in addition to other relevant programmatic updates (**Appendix F)**.

A record of the issuance and lifting of advisories will be kept by OSE within their database including CDC's OHHABS.

Other resources, such as signs, posters, pamphlets, etc., will be available to the partner agencies on the NDEP HABs webpage.

Sources

CDC. “Illness and Symptoms: Cyanobacteria in Fresh Water | Harmful Algal Blooms | CDC.” *Www.cdc.gov*, 2 May 2022, www.cdc.gov/habs/illness-symptoms-freshwater.html#:~:text=People%20exposed%20to%20cyanotoxins%20by.

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