



Advancing
Environmental
Solutions

2019 – 2020 Harmful Cyanobacterial Bloom Team

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ECOS

ERIS
ENVIRONMENTAL RESEARCH
INSTITUTE OF THE STATES

Great Plains and Midwest HABs Workshop

February 5, 2020

What is ITRC?

- ▶ ITRC is a state-led coalition working to advance the use of innovative environmental technologies and approaches. ITRC's work translates good science into better decision making.



Purpose and Mission

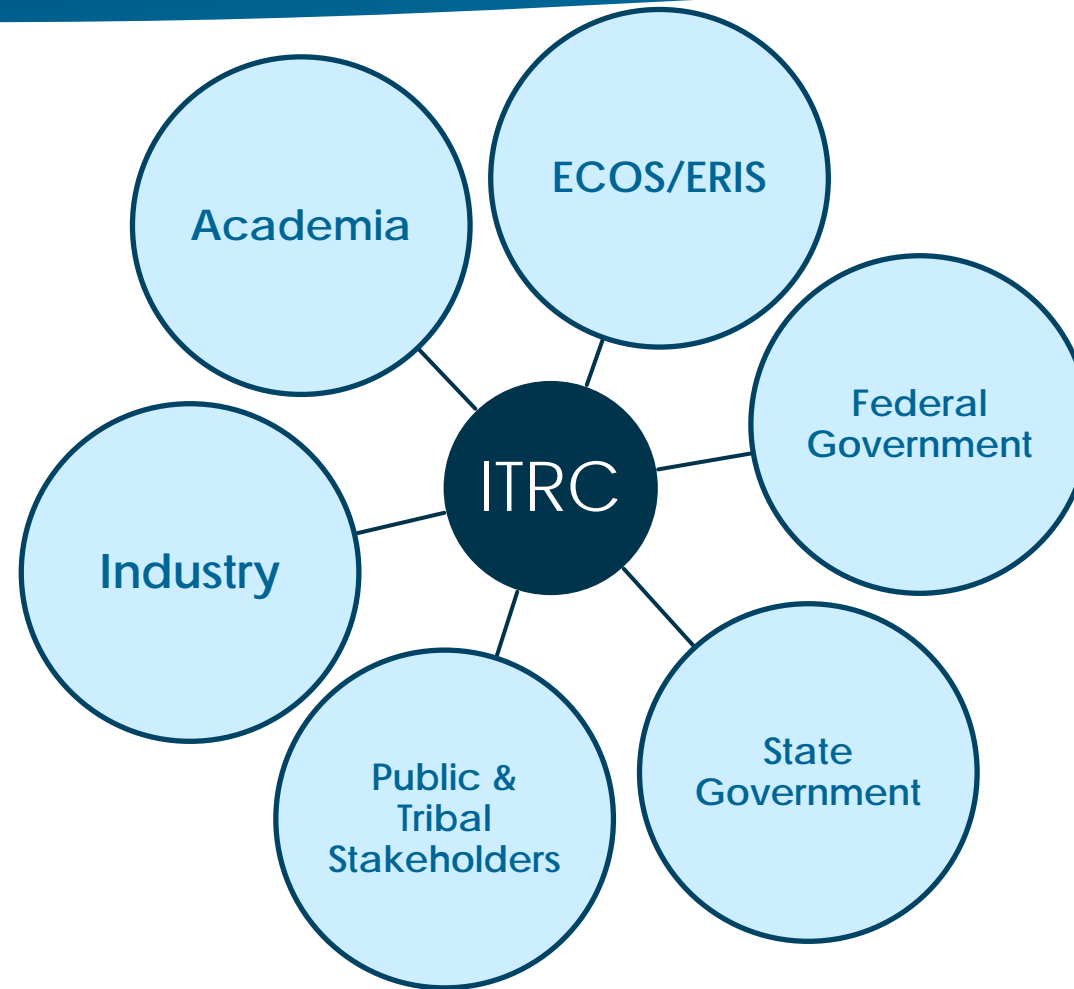
▶ ITRC Purpose

To advance innovative environmental decision making

▶ ITRC Mission

▶ To develop information resources and processes to break down barriers to the use of technically sound innovative solutions for healthy communities, economy and environment

Our Unique Network



How We Achieve Our Mission



ITRC Focus Areas

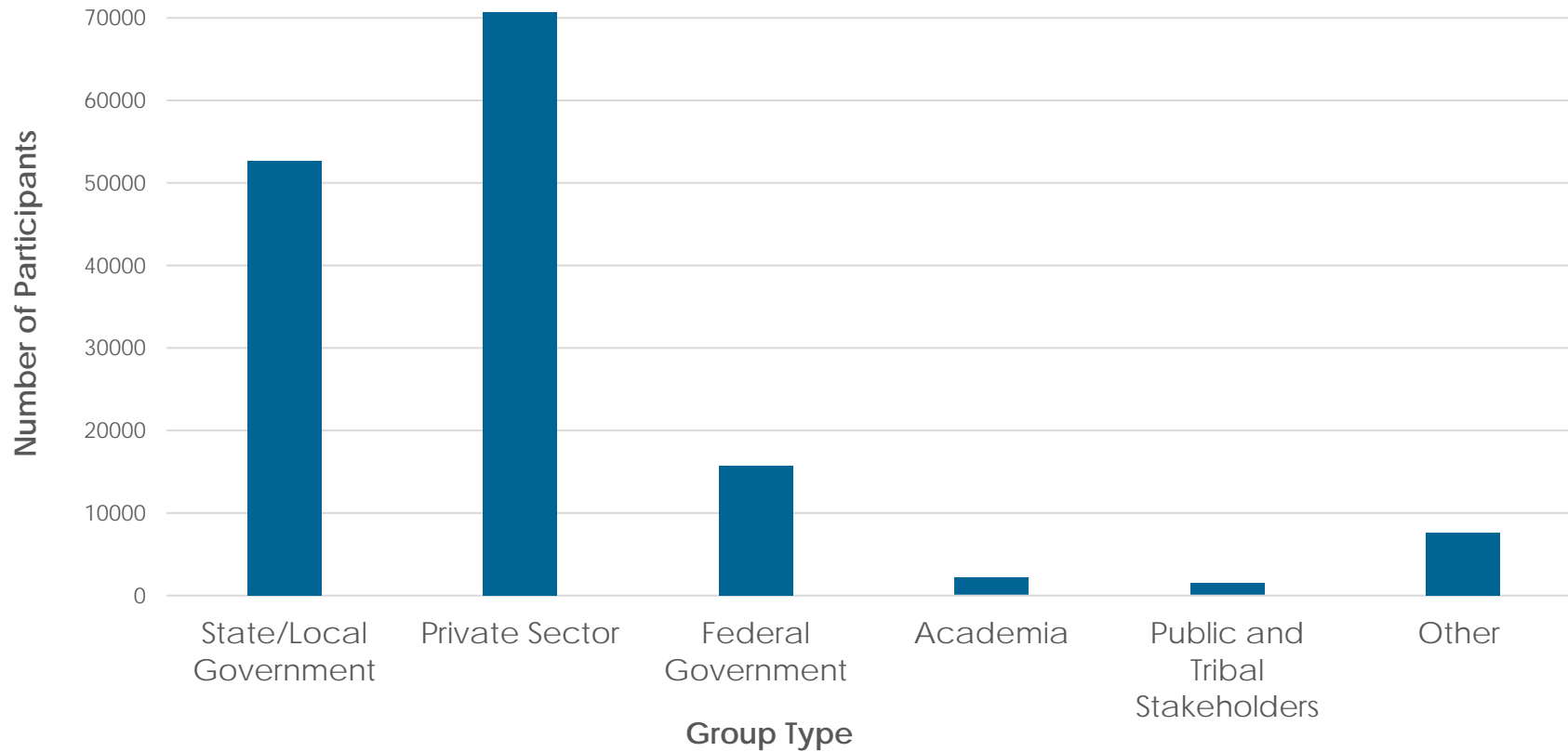


Reducing Barriers

- ▶ Providing guidance and training developed for state regulators by our Teams
- ▶ Increasing understanding and confidence in innovative technologies
- ▶ Fostering integration of new technical developments
- ▶ Creating networks of technical experts

Training: 1997 to 2018

ITRC Training Participation (By Group Type)



2019 Teams

- ▶ 1,4-Dioxane (NEW)
- ▶ Harmful Cyanobacterial Blooms (NEW)
- ▶ Incremental Sampling Methodology Update (NEW)
- ▶ Per- and Polyfluoroalkyl Substances (PFAS)
- ▶ Advanced Site Characterization Tools (ASCT)
- ▶ In Situ Optimization

2019 Teams: Harmful Cyanobacterial Blooms

- ▶ January – December 2019
- ▶ **>200** total members, **90** state members
- ▶ Will produce a web document (portal), strategy selection tools, training curricula, and fact sheets



What are Harmful Cyanobacterial Blooms (HCB)?

A complex ecological phenomenon that occurs when cyanobacteria proliferate and dominate an aquatic ecosystem. Triggers for increased HCBs include a rapidly warming climate and increased levels of nutrients in surface waters.

Team Leaders



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Current Project Overview



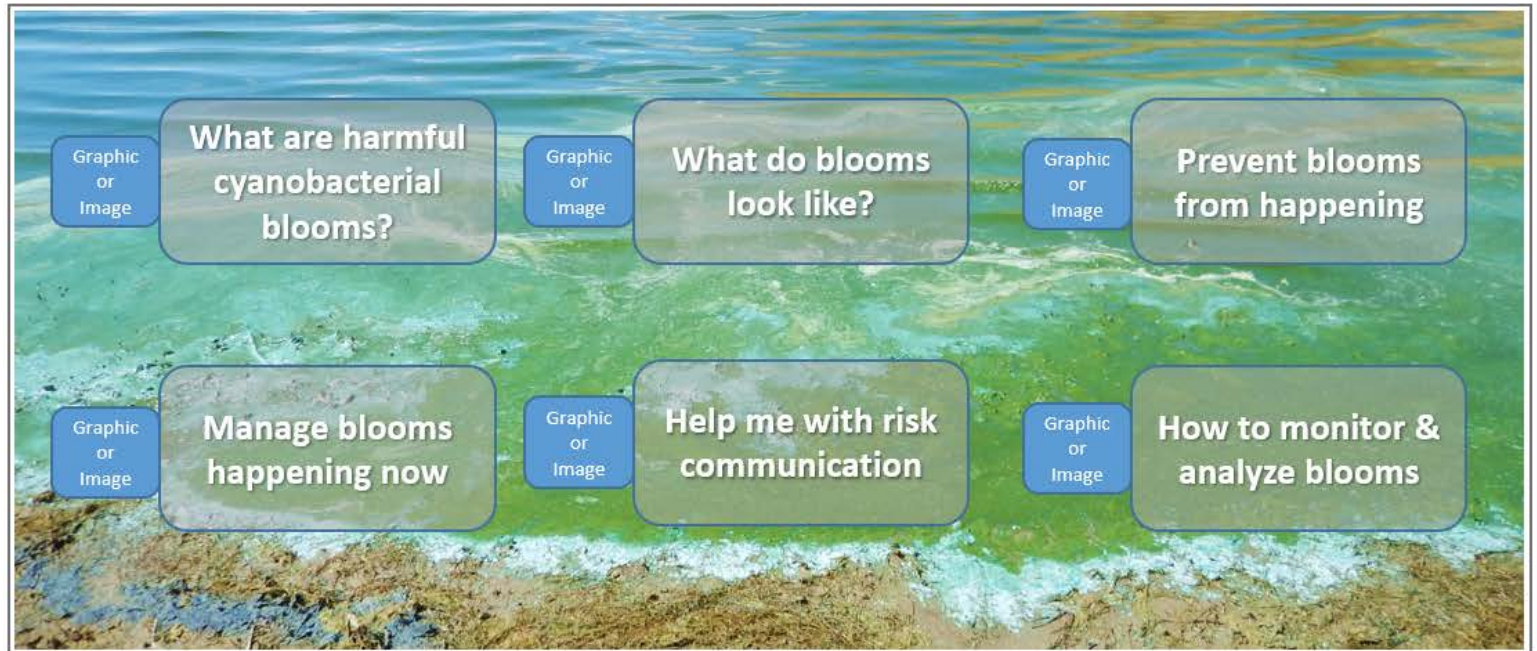
Search this website

Home

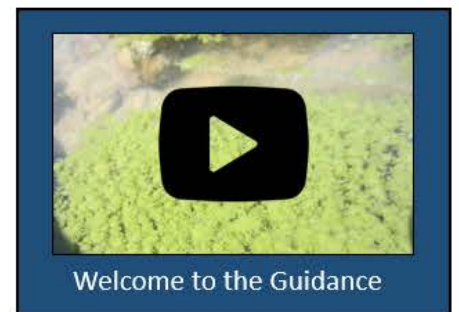
Navigating this Website

- ↓ Introduction
- ↓ Bloom Prevention
- ↓ Bloom Management
- ↓ Communication Tools
- ↓ Additional Information
- Cyanobacteria Gallery

Strategies for Preventing and Managing Harmful Cyanobacterial Blooms (HCBs)



The purpose of this guidance and interactive strategy selections tools is to: provide basic and current information on cyanobacteria ecology; summarize key strategies to prevent HCBs from occurring; summarize validated HCB management strategies; outline key elements of successful risk communication; and direct readers to case studies, online resources and other information that support the development of HCB prevention, management and communications plans.



The Intended Audience and Use



Search this website

Home

Navigating this Website

→ Introduction

1. Overview
2. Using this Guidance
3. Introduction

↓ Bloom Prevention

↓ Bloom Management

↓ Communication Tools

↓ Additional Information

Cyanobacteria Gallery

Strategies for Preventing and Managing Harmful Cyanobacterial Blooms (HCBs)

1 Overview

Cyanobacteria, also known as blue-green algae, are photosynthetic prokaryotic organisms that live in a wide range of environments, from the poles to the equator, both in the water and on the land.

▼ [Read more](#)

2 Using this Guidance

The purpose of this guidance document and the interactive strategy selection tool is to:

- Provide basic, current information about cyanobacteria ecology.
- Summarize key strategies to prevent HCBs.
- Summarize validated HCB control strategies.
- Outline key elements of successful risk communication.
- Direct readers to case studies, online resources and other information that support the development of HCB prevention, management and communication plans.

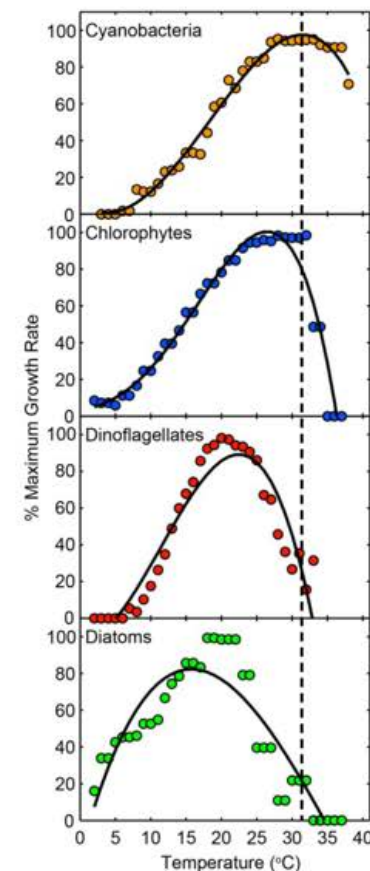
▼ [Read more](#)

3 Introduction

3.1 What are cyanobacteria?

Cyanobacteria, also known as blue-green algae, are not true algae but a normal component of the water and bottom-dwelling biological communities.

▼ [Read more](#)



Key Concepts

Nutrient Reduction Strategies

INTERSTATE TECHNOLOGY REGULATORY COUNCIL ITRC



Search this website

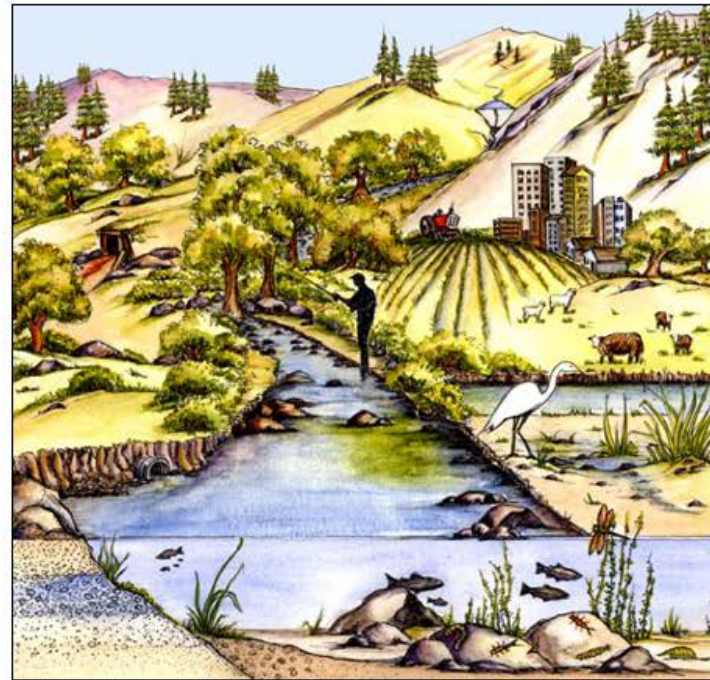
- Home
- Navigating this Website
 - ↓ Introduction
 - Bloom Prevention
- 1. General Information
- 2. Prevention Strategies
- 3. Selection Tool
- ↓ Bloom Management
- ↓ Communication Tools
- ↓ Additional Information
- Cyanobacteria Gallery

Strategies for Preventing and Managing Harmful Cyanobacterial Blooms (HCBs)

3 Selection Tool

Welcome to the Prevention Selection Tool!

Select a scenario that best describes you current situation and waterbody.



https://mywaterquality.ca.gov/eco_health/streams/index.html

1.1 Strategies for Use in Preventing Harmful Cyanobacterial Blooms

1.1.1 Strategy Name

This section should have a general description of the strategy. (limit ¼ page)

1.1.1.1 Pros (this bullet may eventually be combined with the "cons" below)

The pros of using this strategy can be listed here. You might include things like low cost, materials are generally available, extremely effective, easy to apply – or whatever fits here.

1.1.1.2 Cons

The cons or limitations of using this strategy can be listed here. You might include things like requires special equipment to apply, technique is fussy, must be reapplied, requires specific monitoring, can't be used in swimming lakes – or whatever fits here.

1.1.1.3 Regulatory or policy considerations

This section can contain items like examples of State policies created to address nutrient pollution from that sector.

1.1.1.4 Application Examples

This can be a listing of case studies or peer-reviewed articles where this strategy was used and the reference.

1.1.1.5 Other considerations

Key Concepts

In-lake Treatment Strategies



Search this website

Home

Navigating this Website

↓ Introduction

↓ Bloom Prevention

→ Bloom Management

- 1. General Information
- 2. Available Technologies
- 3. Selection Tool

↓ Communication Tools

↓ Additional Information

Cyanobacteria Gallery

Strategies for Preventing and Managing Harmful Cyanobacterial Blooms (HCBs)

3 Selection Tool

Welcome to the Management Selection Tool! Select all conditions that apply to your waterbody to identify potential management strategies.

Management Strategies for your Waterbody

- Waterbody type: *select waterbody type*
- Trophic state: *select trophic state*
- Mixing regime: *select mixing regime*
- Primary nutrient loading: *select nutrient loading*
- Salinity: *select salinity*
- Watershed to waterbody area: *select area*
- Residence time: *select residence time*
- Waterbody uses: *select waterbody uses*
- Surrounding land use: *select land use*
- Bloom frequency: *select bloom frequency*

Management strategy: [\[name and link to management strategy\]](#)

Management Fact Sheet

Name:

Summary:

Pros/Cons:

Relative Cost:

Regulatory:

Case studies:

Other:

References:

Key Concepts

Communication and Outreach



The screenshot shows the ITRC website navigation menu. At the top left is the ITRC logo (Interstate Technology Council Regulatory) and a water drop icon with 'HCB' inside. Below the logo is a search bar labeled 'Search this website'. The main navigation menu includes: Home (highlighted in yellow), Navigating this Website, Introduction (with a down arrow), Bloom Prevention (with a down arrow), Bloom Management (with a down arrow), Communication Tools (with a right arrow), a numbered list (1. Communication and Response Planning, 2. Immediate Tasks, 3. Short-term Tasks, 4. Long-term Tasks) (highlighted in green), Additional Information (with a down arrow), and Cyanobacteria Gallery.

Strategies for Preventing and Managing Harmful Cyanobacterial Blooms (HCBs)

1 Communication and Response Planning

A strategic communication and response plan should serve to coordinate communication between the agency staff responding to HCBs, the staff in partner agencies, and the public before, during and after [a](#) HCB.

▼ [Read more](#)

2 Immediate Communication and Response Tasks

- [Verifying a cyanobacterial bloom](#)
- [Evaluate and document HCB-related illnesses](#)
- [Coordinate with drinking water](#)
- [Post advisories and communicate results](#)
- [Continue monitoring and coordination](#)

3 Short-term Tasks as Time Allows

- [Maintain and improve reporting system](#)
- [Optimize data management](#)
- [Improve sampling and laboratory resources](#)
- [Evaluate and improve communication](#)

4 Long-term Tasks as Time Allows

- [Develop/improve informational resources](#)
- [Explore remote sensing opportunities](#)
- [Build/improve relationships](#)
- [Develop/improve plans](#)
- [Develop/refine plans for recreational waters and drinking water sources](#)
- [Improve sampling resources](#)



Key Concepts

Monitoring and Assessment

Table 1. Monitoring methods used to assess cyanobacteria conditions.

Types of Analysis	Description	Type of Result	Relative Cost
<u>Visual assessments</u>	Field determination of cyanobacteria presence / absence based on bloom appearance and characteristics	Qualitative	\$
<u>Jar and Stick Tests</u>	Field determination of cyanobacteria presence / absence based on bloom material floating in a jar or attaching to a stick	Qualitative	\$
<u>Remote sensing</u>	Satellite or aerial imagery that quantifies cyanobacteria density in water based on reflectance of cyanobacterial pigments	Quantitative	\$
<u>Microscopy</u>	Lab determination of cyanobacteria presence / absence and percent composition using a microscope	Qualitative / Semi-Quantitative	\$\$
	Manual identification and enumeration of cyanobacteria taxa using a lab microscope	Quantitative	\$\$
<u>Genomic</u>	Field or lab identification and enumeration of cyanobacteria using DNA analyses like qPCR	Quantitative	\$\$ (?)
<u>Pigments</u>	Field or lab quantification of cyanobacteria based on the relative concentration of chlorophyll-a, phycocyanin or phycoerythrin pigments	Quantitative	\$\$ (?)

Looking Ahead to 2020

- ▶ Finalize Document Layout
- ▶ Finalize Text, Selection Guidance, and Factsheets
- ▶ Design Graphics and Web-based Tools
- ▶ Develop Training Approach and Materials

Training Should be Underway by 2021

You Can

- ▶ Join the Team
 - ▶ We need writers, editors, and reviewers
- ▶ Help us design our trainings
 - ▶ Share your thoughts with us!

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To join – visit:
ltrcweb.org

Questions?

