

Forest Service Cyanobacteria Bloom Monitoring for Recreational Waters in Oregon and Washington

January 11, 2023

**Al Johnson
USDA Forest Service**

Direction for National Forests in Oregon and Washington

- Emphasis of monitoring is on high use developed recreation sites
- On affected waterbodies, educational posters are placed at public access points prior to the recreational use season
- When visual assessment of a water body indicates a potentially toxic bloom may be present, a Forest Service approved caution sign will be posted.
- If samples are collected for laboratory toxin analysis, results will be shared with state and local health authorities.
- If a public health advisory is issued the Forest Service will promptly post the appropriate notices. Removal will follow establish procedures.

HARMFUL ALGAE BLOOMS IN OREGON WATERS

What is this stuff?

Harmful algae blooms (HABs) are not algae at all. They're actually made of cyanobacteria, also called blue-green algae. Many cyanobacteria species create toxins that can make people and pets sick.



So, what's the problem? HABs can:

- Create toxins that can cause illness in humans and animals
- Pollute Oregon lakes and other fresh waters with scums
- Limit recreational activities in lakes, reservoirs and rivers
- Cause challenges for public water suppliers including taste and odor problems and water filtration difficulties



How can I help prevent a HAB?

- Be sparing in fertilizer and pesticide application
- Don't leave animal waste on the ground — pick up after your pet
- Regularly check and maintain septic tanks
- Maintain native plants along shorelines or ponds when possible



Common cyanobacteria that make up HABs in Oregon

How can I keep my family and pets safe?

- Do not wade, swim or water ski in waters that have signs of an algae bloom
- Never drink lake or river water
- If you decide to eat fish from affected waters, remove all fat, skin and organs before cooking
- Never cook with natural water from areas suspected to have a harmful algae bloom
- If you or your pet becomes ill, seek medical or veterinary attention immediately



When in doubt, stay out!

Know the signs of an algae bloom. Don't go in water that is foamy, scummy, thick like paint, pea-green, blue-green or brownish red.



Oregon Health
Authority

PUBLIC HEALTH DIVISION
Oregon Harmful Algae Bloom Surveillance

Learn more about HABs at healthoregon.org/hab or call 971-673-0400.

Dog safety alert

Algae are common in fresh waters.

One type, blue-green algae, sometimes grows into a large bloom that may contain dangerous toxins.

If you arrive at a lake or river and find thick, brightly colored foam or scum, do not let your pet drink or swim in the water!

Dogs have become very sick and even died after swimming in and swallowing bloom-affected water.

If your dog goes into the water:

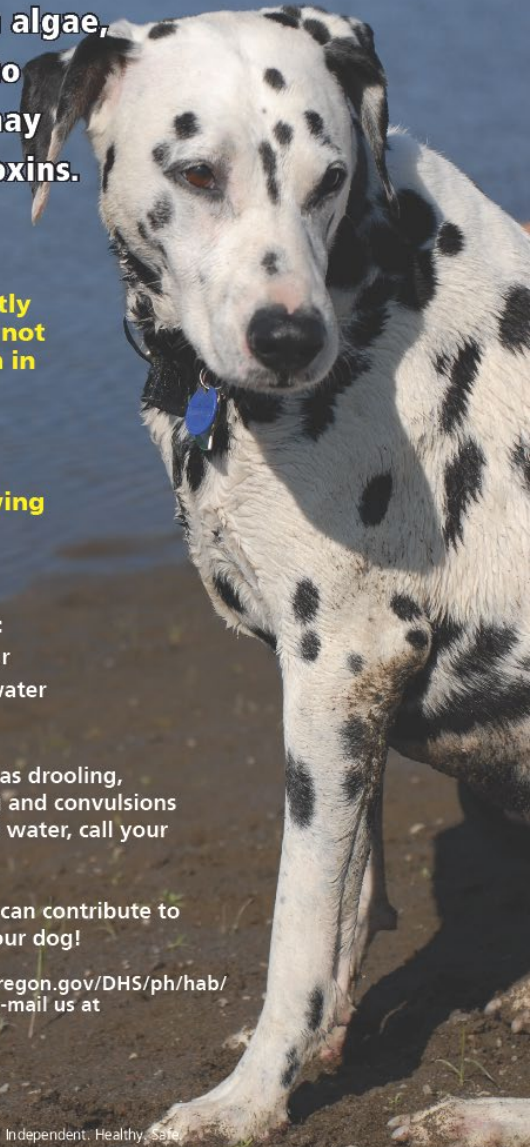
- Don't let your pet lick his fur
- Wash your pet with clean water as soon as possible.

If your dog has symptoms such as drooling, weakness, vomiting, staggering and convulsions and has been in bloom-affected water, call your veterinarian immediately.

Improper disposal of pet waste can contribute to algae problems. Pick up after your dog!

For more information visit www.oregon.gov/DHS/ph/hab/ or call toll free 1-877-290-7676 or e-mail us at Hab.health@state.or.us.

DHS | Independent. Healthy. Safe.



CAUTION

TOXIC ALGAE MAY BE PRESENT **Lake may be unsafe for people and pets**

Until further notice:

- **Do not swim or water ski in areas of scum.**
No nade o practique el esquí acuático en áreas con espuma o verdín.
- **Do not drink lake water.**
No tome el agua del lago.
- **Keep pets and livestock away.**
Mantenga alejados las mascotas y el ganado.
- **Clean fish well and discard guts.**
Limpie bien el pescado y deseche las tripas.
- **Avoid areas of scum when boating.**
Evite las áreas con espuma o verdín cuando ande en lancha.
- **Toxins may be present even when there is no visible scum.**
Toxinas pueden estar presentes aunque no haya espuma visible.

Call your doctor or veterinarian if you or your animals have sudden or unexpected sickness or signs of poisoning.

For health information contact the Oregon
Health Authority at: 971-673-0400 or
www.healthoregon.org/hab

Call your local health department:

**For local information contact
the Forest Service at:**



HEALTH ADVISORY AVISO DE SALUD

Detroit Reservoir

Toxins Produced by Blue-Green Algae Are Present

Debido a la presencia de algas verde azules toxicos

**AVOID AREAS WITH VISIBLE SCUM THAT LOOKS
THICK LIKE PAINT, PEA-GREEN OR BLUE-GREEN**

HOW AM I EXPOSED?

By swallowing affected water in and around a bloom.
Toxins are not absorbed through the skin.

DO NOT USE this water for drinking or cooking.
No use el agua para beber o cocinar.

Toxins are not removed by boiling or using camping filters or
treatment. Local wáter supplies should not be affected.

CHILDREN and ANIMALS are at greatest risk.
Los niños y las mascotas corren mayor riesgo.



For more information contact:

Oregon Health Authority at: 877-290-6767 or www.healthoregon.org/hab

Willamette National Forest, Detroit Ranger District: 503-854-4239 or
www.fs.usda.gov/alerts/willamette/alerts-notice

Linn County Department of Health Services at: 541-475-4456 or
www.linncountyhealth.org

Marion County Health Department at 503-588-5342 or
www.co.marion.or.us/HLT



Marion County
OREGON

HEALTH ADVISORY AVISO DE SALUD



Lake Billy Chinook Reservoir

AVOID WATER CONTACT EVITE EL CONTACTO CON EL AGUA

Due to high levels of toxic blue-green algae.
Debido a los altos niveles de toxicos algas verde azules

Do not use this water for drinking or cooking.
No use el agua para beber o cocinar.

Children and pets are at greatest risk.
Los niños y las mascotas corren mayor riesgo.

For more information contact:

Deschutes National Forest, Sisters Ranger District: 541-549-7700 or
www.fs.usda.gov/alerts/deschutes/alerts-notice

Jefferson County Public Health Dept. at: 541-475-4456 or
www.co.jefferson.or.us/

Oregon Health Authority at: 877-290-6767
or www.healthoregon.org/hab





United States Department of Agriculture
Forest Service

Harmful Algal Bloom (HAB) Detection with Remote Sensing

Project Overview

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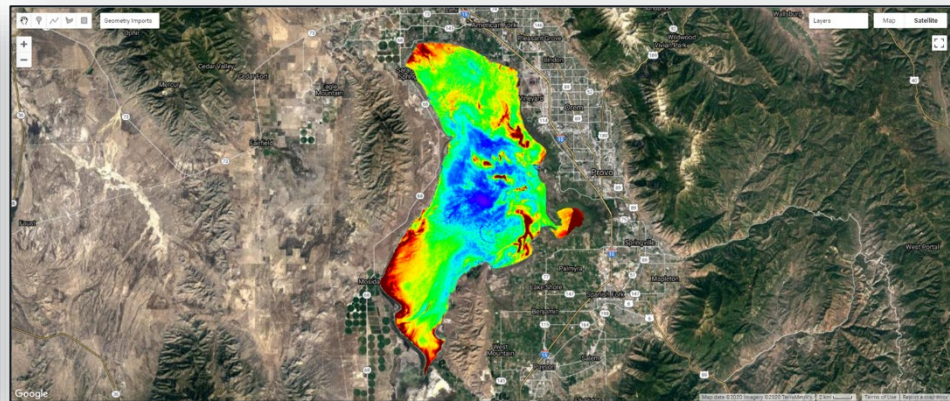
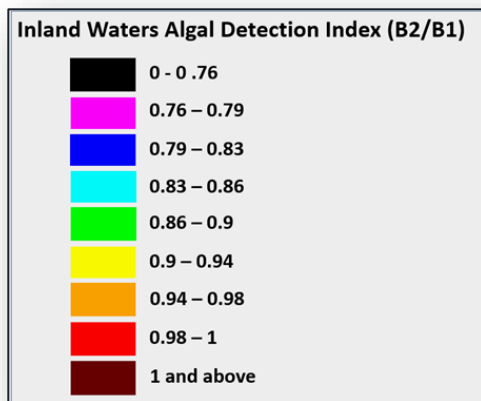
Geospatial Technology and Applications Center



Meeting the Mission Through Geospatial Solutions

Project Collaboration

- Beginning In 2020, a proof-of-concept methodology that utilizes Google Earth Engine and publicly available satellite imagery was established
 - ✓ The Geospatial Technology and Applications Center (GTAC)
 - ✓ Forest Service Region 6 (R6)
 - ✓ The Office of Sustainability and Climate (OSC)
 - ✓ Watershed, Fish, Air, and Wildlife (WFAW)
- Successfully mapped small lakes – greater than 1.5 acres
- Received funding to begin operationalizing this work



Project Goals

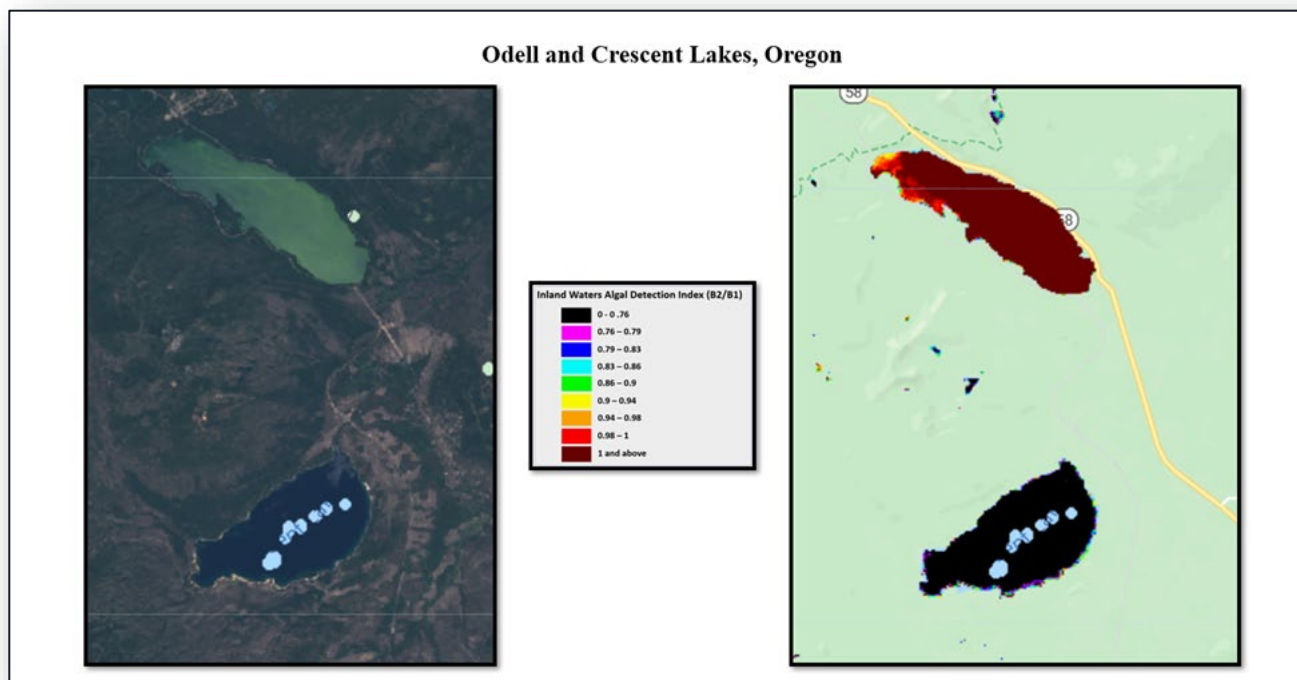
- Reduce costs and increase effectiveness of HAB detection and monitoring
 - ✓ Identify when and where to target onsite monitoring
 - ✓ Advance continuous and near-real time monitoring capabilities
 - ✓ Support adaptive management processes
 - ✓ Ensure safe recreational opportunities for public recreators
- Map historic HAB trends to better understand lake/HAB dynamics



GTAC Project Parameters

■ GTAC's Workflow

- ✓ Water bodies greater than 1.5 acres
- ✓ Captures historic trends
- ✓ Provides a relative measure of potential HAB presence
- ✓ New measurements available up to every 5 days





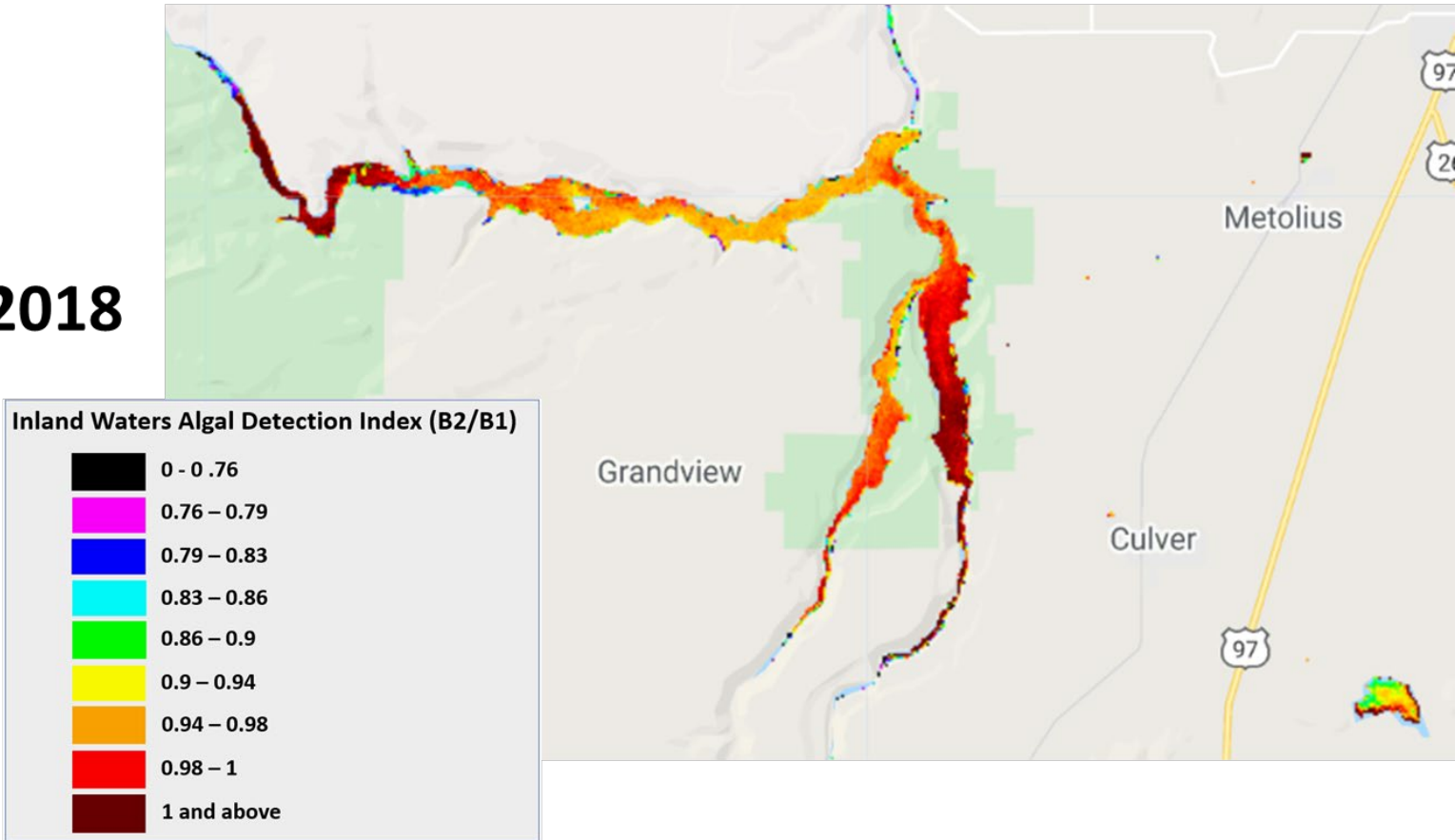
Accomplishments

- **Developed an algal bloom detection GEE script**
- **Utilizes various remote sensing data sources:**
 - ✓ Landsat-8 OLI
 - ✓ Sentinel-2 MSI
 - ✓ Hybrid composites of L8 and S2
- **Examined Oregon lakes for which field measurement data exist**
- **Match up image acquisition and field measurement dates**
 - ✓ 16-day time span applied for image data search
- **Examine not just highest algal concentrations, but also lower values and not-detected dates**

Lake Billy Chinook Oregon

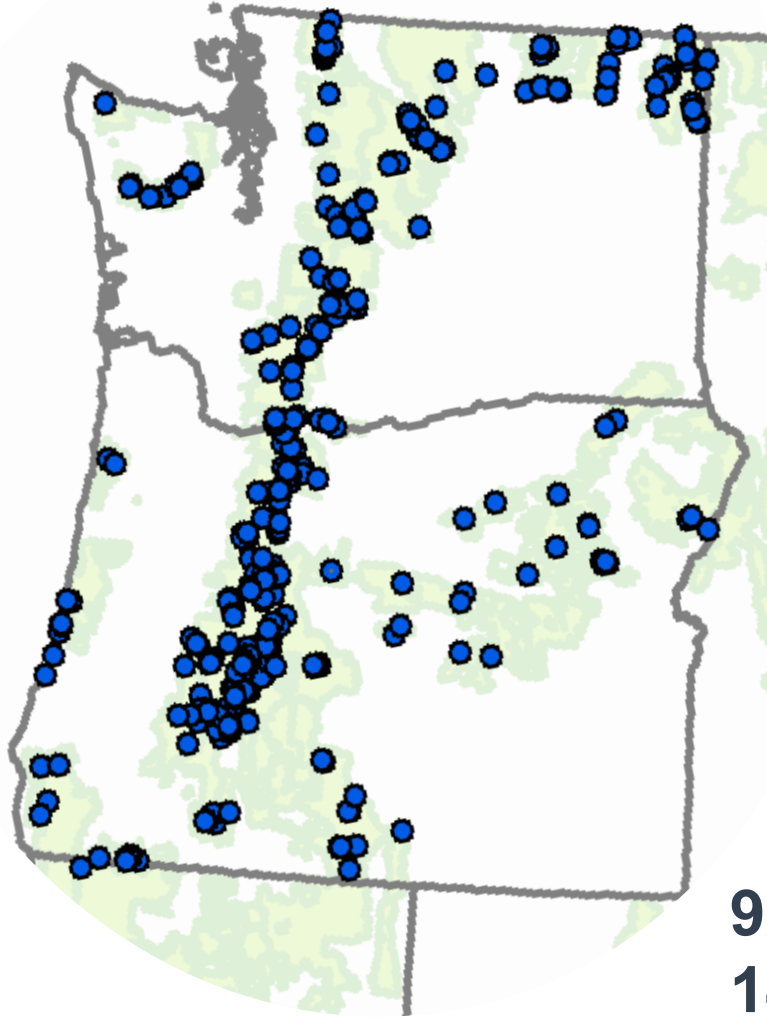
Lake Billy Chinook measured
Microcystin 9.1 µg/L

2018



Sentinel-2 Results of algal bloom detection algorithm

Lakes Assessed in Oregon and Washington



Region 6
92 Lakes in Washington
148 lakes in Oregon

A photograph of a forest stream. The water is a vibrant green color, likely due to algae or moss. The stream flows from the background towards the foreground, where it meets a rocky bank covered in green grass. The background is filled with a dense forest of tall evergreen trees. The text "Al Johnson" and "USDA Forest Service" is overlaid in yellow on the water.

Al Johnson
USDA Forest Service