

# Autonomous sailboat/ (floating working platform) for Cyanobacteria blooming Prevention and remediation

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## Abstract

Cyanobacteria blooms are a growing issue in the US and World that cause harmful cyanotoxins release. This technology is for an autonomous sailing rig and system that cleans reservoir water of cyanobacteria blooms, providing a vital environmental and public health service. This system requires less maintenance and continuous treatment compared to alternative cyanobacteria bloom treatments.

## Problem

Cyanobacteria blooming is uncontrollable growth of cyanobacteria in freshwater and is increasing in frequency and intensity. Cyanobacteria blooms produce toxins

that pose health risks to humans and animals and are a growing issue in Utah.

## Solution

This technology is an autonomous sailboat that cleans water reservoirs and prevents future cyanobacteria growths. This provides a vital environmental and public health service that is needed due to increasing drought conditions.

## Value Proposition

This technology can kill cyanobacteria and remove cyanotoxins from polluted water. Additionally, it can prevent cyanobacteria blooms from redeveloping in reservoir by continual unmanned treatment.

## Benefit

Cyanobacteria blooms are increasing due to the rise of eutrophication, the abundance of nitrogen and phosphorous fertilizer runoff in water. Cyanobacteria blooms produce toxins that pose health risks to humans and animals. These toxins can cause skin rashes, eye irritation, respiratory issues, stomach pains, vomiting, diarrhea, and liver damage.

Cyanobacteria is a growing issue in Utah. It is damaging many reservoirs such as Utah Lake and Mantua Reservoir. The current strategies for managing cyanobacteria blooms are, (1) communicating to the public about the presence of cyanobacteria blooms, (2) closing the reservoir, (3) monitoring cyanobacteria levels, and (3) identifying point sources of nutrient pollution.

USU Researchers have developed an autonomous sailboat that treats a lake surface with ozone (O<sub>3</sub>) to inhibit cyanobacteria and degrade cyanotoxins. The sailboat, powered by a solar panel, provides O<sub>3</sub> treatment and removes nitrogen and phosphorous species from the lake. The removal of nitrogen and phosphorous species from water prevents cyanobacteria growth.

This technology offers a cost-effective solution to water treatment by simultaneously removing cyanobacteria and cyanotoxins from polluted water without demanding continuous manpower.

## Market Application

This technology can be licensed to water treatment companies to sell to government agencies, or rented to various locations needing cyanobacteria bloom treatment.

## Inventors

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