



# Smith River Nuisance Algae Study

Montana DEQ  
Water Quality Division

## What is this project for?

In recent years, there have been numerous reports that algae growth is increasing and interfering with recreational activities on the Smith River. Algae has been reported to be occurring earlier and more severe than past accounts. Due to these reports, additional efforts are being made to determine the cause of algal growth so solutions can be developed.

This presentation will explain how DEQ intends to study nuisance algae growth in the Smith River.





## Factors affecting Algae Growth Rate

- Nitrogen and Phosphorus
- Light
- Water Temperature



## Factors affecting Algae Accumulation Rate

- Scour (Ice and High Flows)
- Timing of algae growth
- Water Hardness, pH



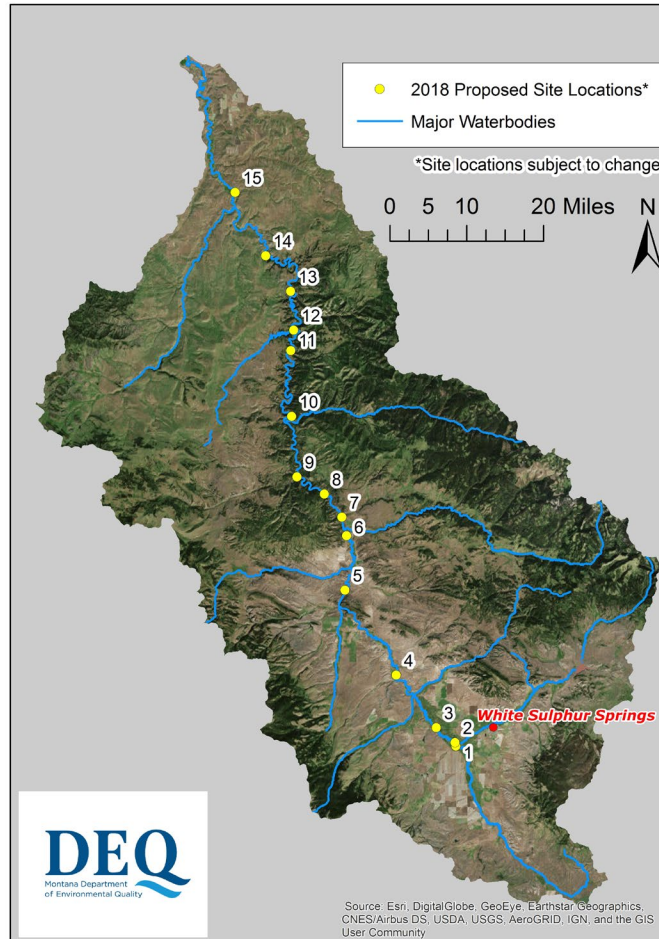
## Ideal conditions for algae (Cladophora) growth

- Flowing water
- pH of greater than 7.0
- Hard to very hard water (>121 mg/L Calcium Carbonate)
- Measurable concentrations of Total Recoverable Nitrogen and Phosphorus
- High light levels

To what extent are these conditions achieved in the Smith River?

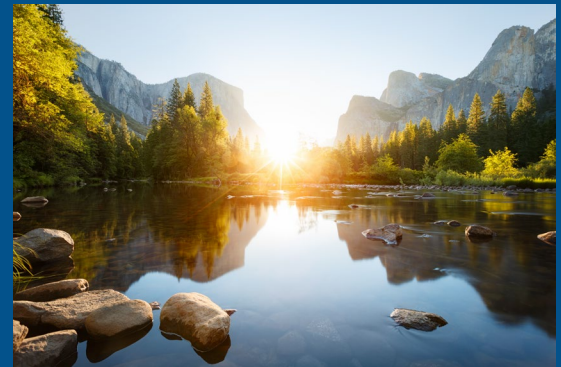
# PROPOSED APPROXIMATE SITE LOCATIONS

Site Number	Site Name (Site locations subject to change)
1	North Fork Smith River
2	South Fork Smith River
3	Smith R. @ Headwaters
4	Smith R. d/s Newlan Cr.
5	Smith R. d/s Camas Cr.
6	Smith R. nr. Camp Baker
7	Smith R. u/s Eagle Creek
8	Smith R. d/s lower Spring Cr. boat camp
9	Smith R. d/s Rock Cr.
10	Smith R. @ Canyon Depth boat camp
11	Smith R. @ Bear Gulch boat camp
12	Smith R. @ Crows Foot boat camp
13	Smith R. @ Paradise Bend boat camp
14	Smith R. @ Rattlesnake boat camp
15	Smith R. @ Eden Bridge



## Nitrogen and Phosphorus evaluation

- Characterize longitudinal and seasonal conditions in the Smith
  - Chlorophyll-a
  - Water Chemistry - Nitrogen and Phosphorus



# Light – Conditions that promote aquatic plant growth

- River corridor
- Stream Channel
- Water conditions



# Water Temperature

- Cladophora growth occurs at a temperature range of 50-77 degrees Fahrenheit
  - “Sweet Spot” 59-63 Degrees F.
- Temperature Monitoring

# Scour – High Flows

- High Flows
  - River bed stability
  - Average cobble size and cross sections
  - Stream slope for velocity modeling
  - Bank full channel forming flows.
- Compare calculated minimum high flow to what is actually happening.

# Timing of Algal growth

- Low flow non-disturbance period

# pH and River hardness

- Monitor pH and river hardness to characterize the current conditions and compare the values to what is known about desired conditions of cladophora growth
  - pH of greater than 7.0
  - Hard to very hard water greater than 121 mg/L CaCO<sub>3</sub>