



IZAAK WALTON LEAGUE OF AMERICA



IZAAK WALTON LEAGUE OF AMERICA

# Community Science Water Quality Monitoring

Maggie Dombroski, Mid-Atlantic Save Our Streams Coordinator  
Izaak Walton League of America



# Izaak Walton League of America

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*To conserve, restore, and promote the sustainable use and enjoyment of our natural resources, including **soil, air, woods, waters, and wildlife.***

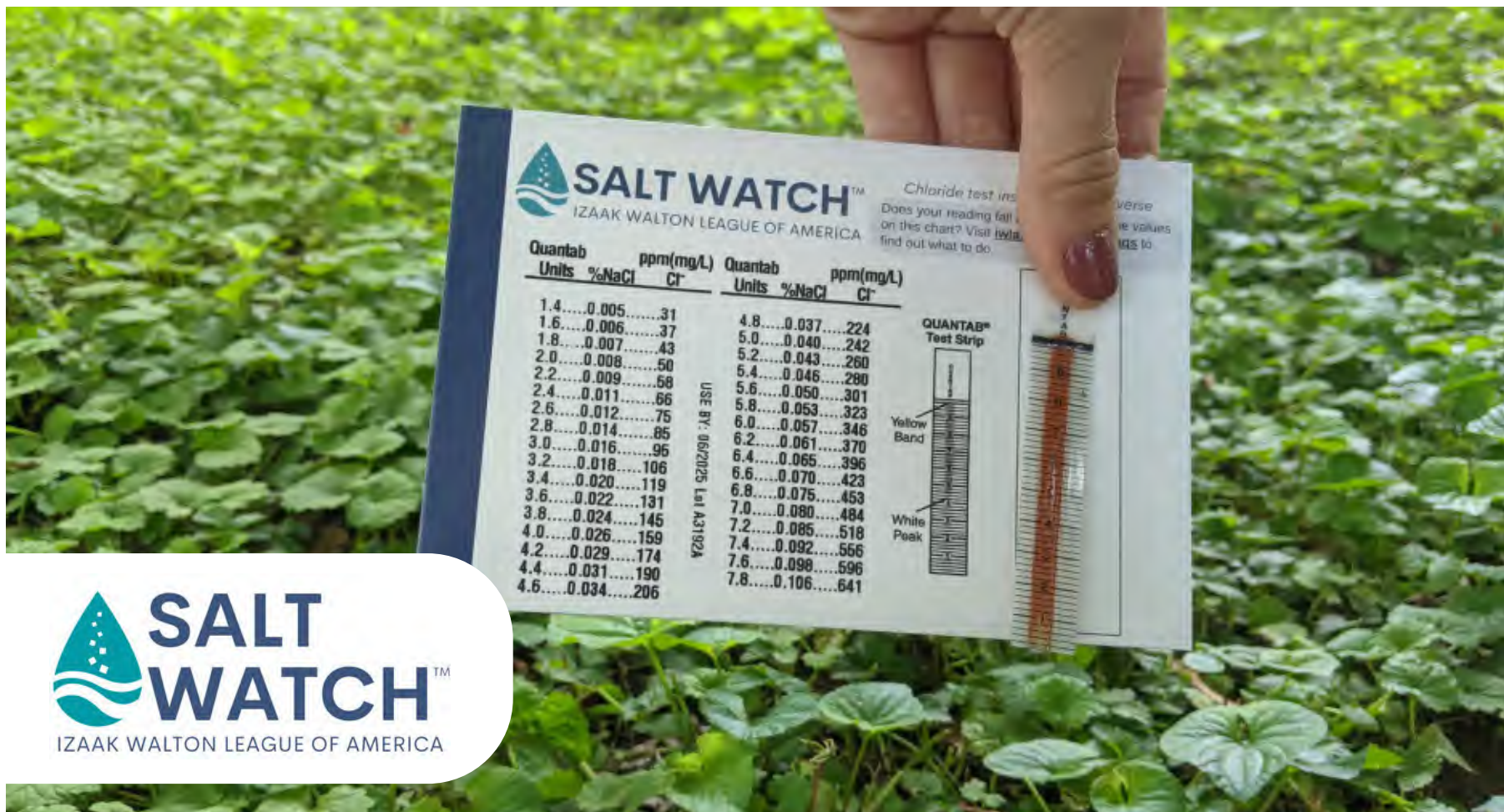
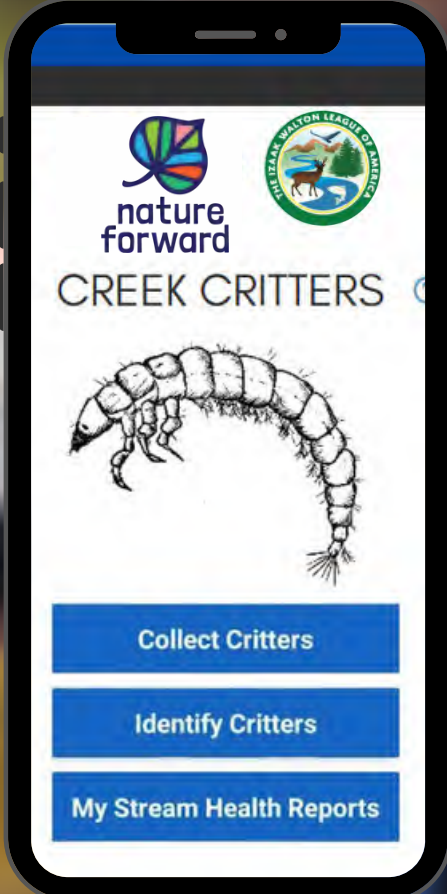




**SAVE OUR STREAMS**  
 IZAAK WALTON LEAGUE OF AMERICA



**Creek Critters!**



**SALT WATCH**  
 IZAAK WALTON LEAGUE OF AMERICA



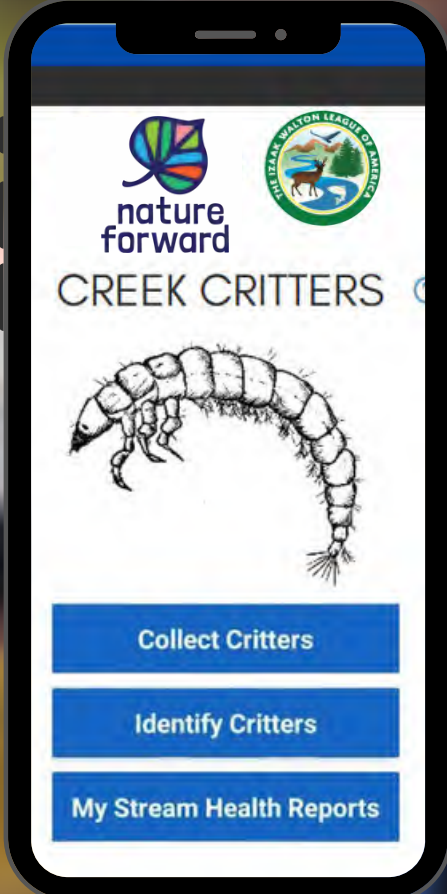
**NITRATE WATCH**  
 IZAAK WALTON LEAGUE OF AMERICA



**SAVE OUR STREAMS**  
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**Creek Critters!**



**SALT WATCH**  
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**SALT WATCH™**  
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Chloride test instructions: Does your reading fall on this chart? Visit [izalw.com](#) to find out what to do.

Quantab Units	%NaCl	ppm(mg/L) Cl <sup>-</sup>	Quantab Units	%NaCl	ppm(mg/L) Cl <sup>-</sup>
1.4	0.005	31	4.8	0.037	224
1.6	0.006	37	5.0	0.040	242
1.8	0.007	43	5.2	0.043	260
2.0	0.008	50	5.4	0.046	280
2.2	0.009	58	5.6	0.050	301
2.4	0.011	66	5.8	0.053	323
2.6	0.012	75	6.0	0.057	346
2.8	0.014	85	6.2	0.061	370
3.0	0.016	96	6.4	0.065	396
3.2	0.018	106	6.6	0.070	423
3.4	0.020	119	6.8	0.075	453
3.6	0.022	131	7.0	0.080	484
3.8	0.024	145	7.2	0.085	518
4.0	0.026	159	7.4	0.092	556
4.2	0.029	174	7.6	0.098	596
4.4	0.031	190	7.8	0.106	641
4.6	0.034	206			

USE BY: 06/2025 Lot A3102A

**QUANTAB® Test Strip**

Yellow Band

White Peak



**NITRATE WATCH**  
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**SALT WATCH™**

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# Goals of Salt Watch

- To raise awareness in the general public about the connection between salt and stream/public health
- To identify chloride hot spots in freshwater
- To advocate for smarter application of road salt by sharing results with private landowners and local and state agencies





# WHAT IS ROAD/WINTER SALT?

**NaCl - Sodium Chloride**

**KCl - Potassium Chloride**

**MgCl<sub>2</sub> - Magnesium Chloride**

**CaCl<sub>2</sub> - Calcium Chloride**



# HOW IS SALT APPLIED?



It only takes  
**1 teaspoon of salt**



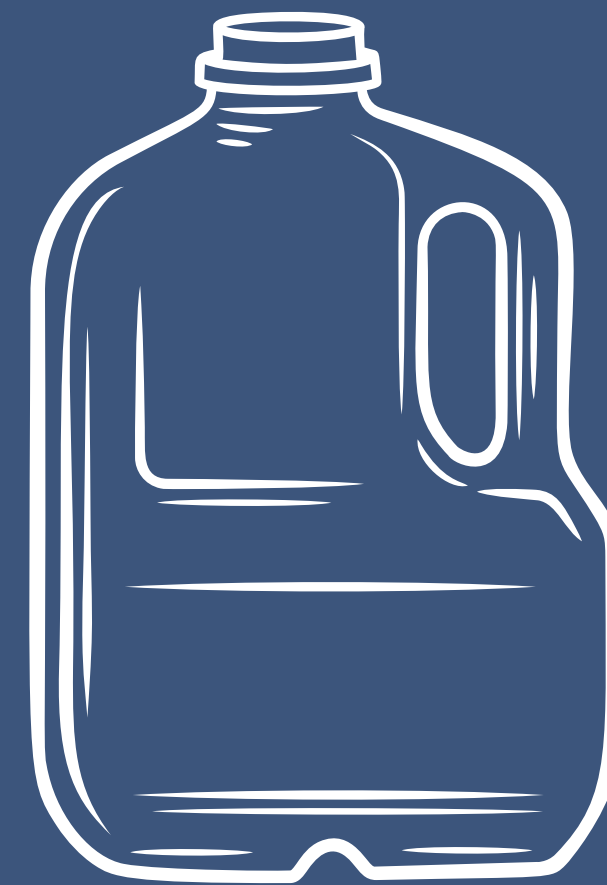
to permanently pollute  
**5 gallons of water**





**50# Bag of  
Salt**

**Pollutes**



**10,000  
Gallons of  
Water**

# IMPACTS



**Wildlife**



**Infrastructure**



**Drinking Water**



**Habitat**



**Pets**

# Wildlife Impacts



- Affects fish, but macroinvertebrates, plankton, and microbes may be even more sensitive than fish
- Vernal pools may be more intensely affected--as well as the organisms that spawn in them
- Migratory fish not able to find spawning ground due to elevated salinity

# Infrastructure Impacts

- Chloride is incredibly corrosive
- Impacts to roadways (pavement), bridges, concrete surfaces, cars, culverts, pipes, appliances, stormwater infrastructure and more!
- It is estimated to cost between \$1,740-17,086 in damages per ton of road salt used (adjusted for inflation in 2023 by Bolton and Menk, Inc)



# Drinking Water Impacts

- Chlorides not typically removed at water treatment plants due to high cost
- Higher levels of sodium in water
- Contaminated water cannot be used for dialysis treatment
- Concern of pipe corrosion leading to heavy metals in drinking water
- Well water not regulated by government



# Habitat Impacts

- Plant desiccation (drying out) and death
- Plants near sidewalks and roadways most at risk
- Aquatic plants at risk, altering freshwater habitats
- Salty soil less likely to retain water and can become compacted
- Chloride mobilizes heavy metals in the environment



# Pet Impacts

- Poisoning through ingestion
- Dehydration
- Paw and skin irritation, dryness, cuts, and burns



# Salt Watch Kit

Includes:

- 4 Hach 30-600ppm chloride test strips
- Sample testing instructions
- Conversion chart
- Data uploading instructions



# When Should Volunteers Monitor in Winter?



Before a winter weather (to get a baseline reading).



After the first winter storm (when salt has been applied to roads).



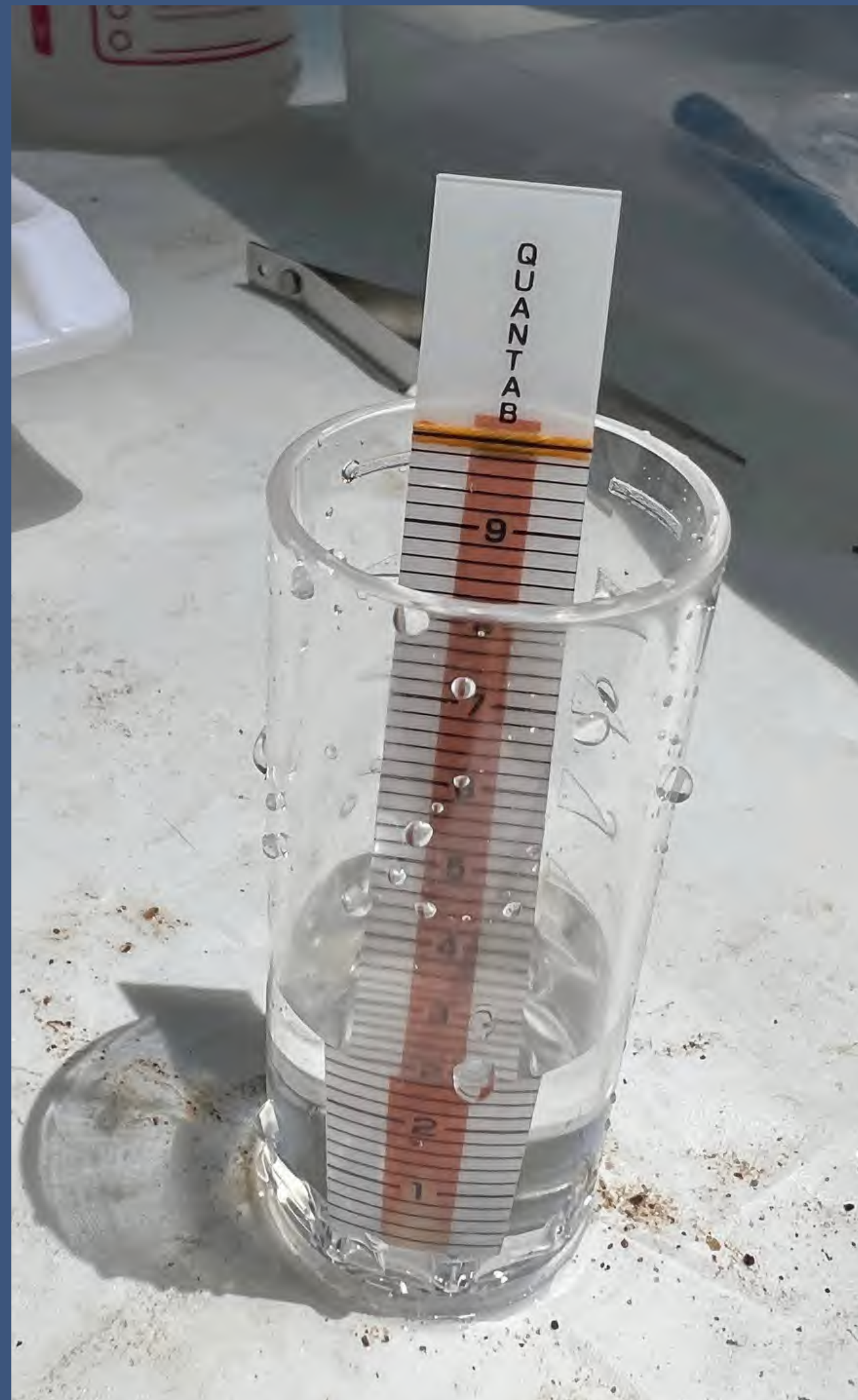
After the first thaw or rainstorm of winter.



After the next rain event.

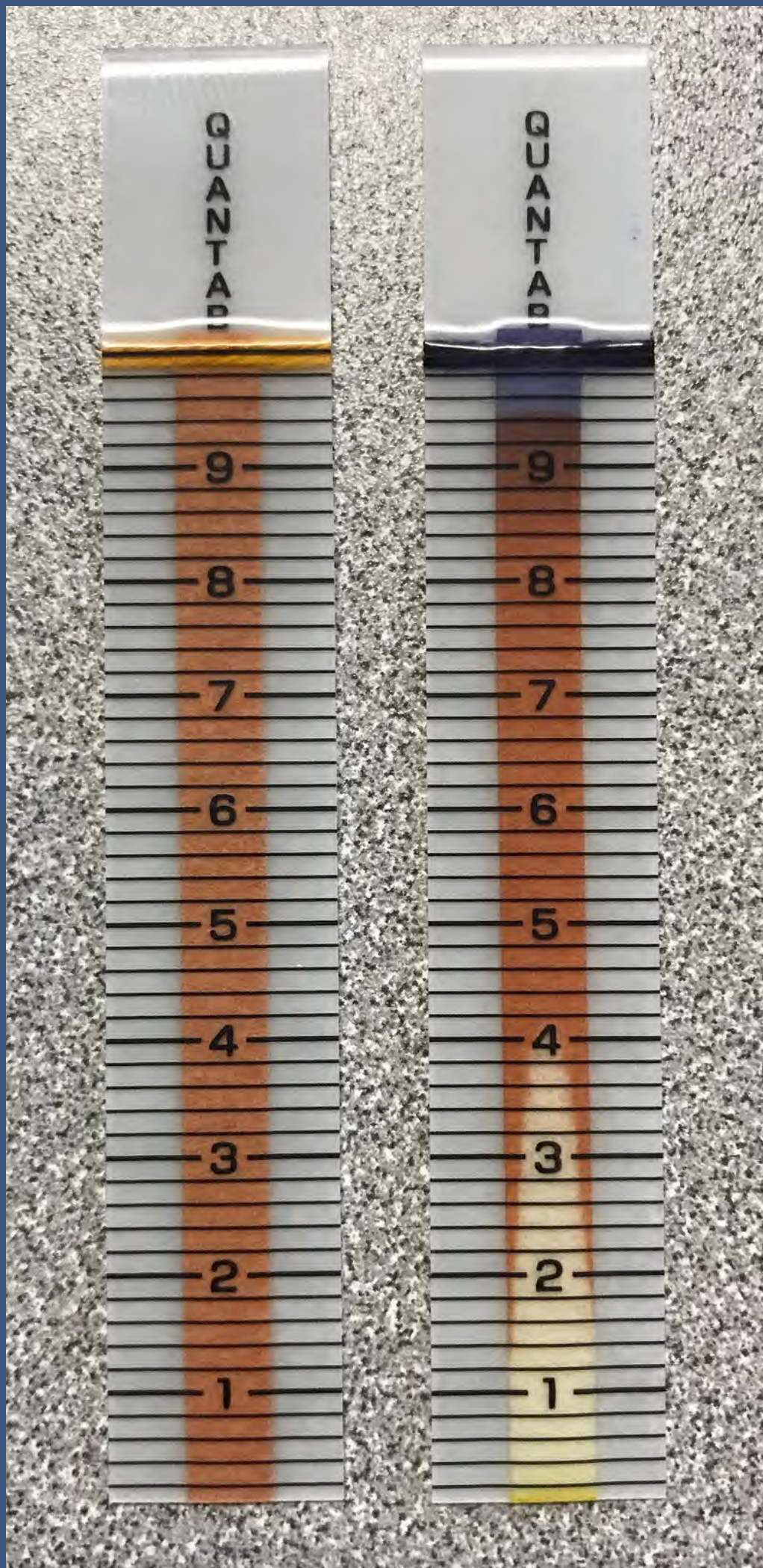


Consistently throughout the year (e.g. the first Saturday of every month).



# Taking Your Sample

- 1 test strip
- 1 small jar/cup
- Add water
  - Rinse and repeat 3x
  - Leave 1/2-1" of water
- Wait ~3 minutes



# Taking Your Sample

- 1 test strip
- 1 small jar/cup
- 1-2 inches of water
  - Add water
  - Rinse and repeat 3x
  - Leave 1/2-1" of water
- Wait ~3 minutes



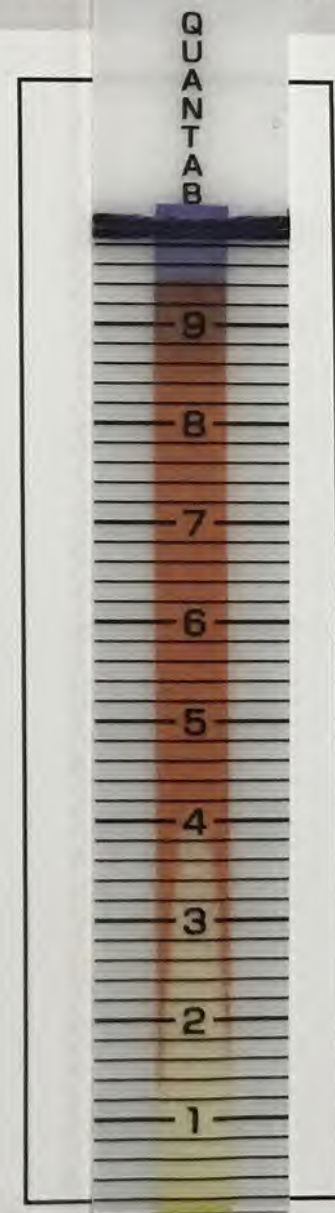
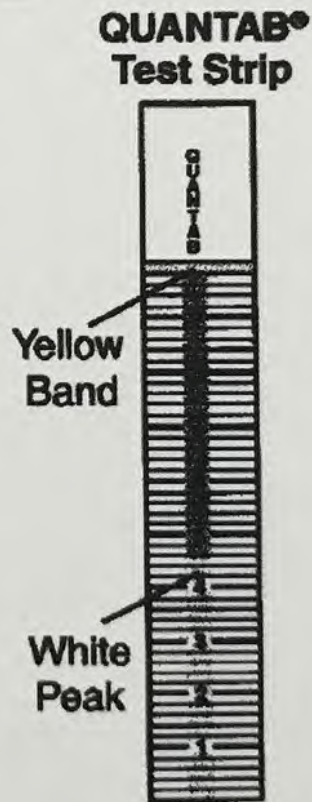
# SALT WATCH™

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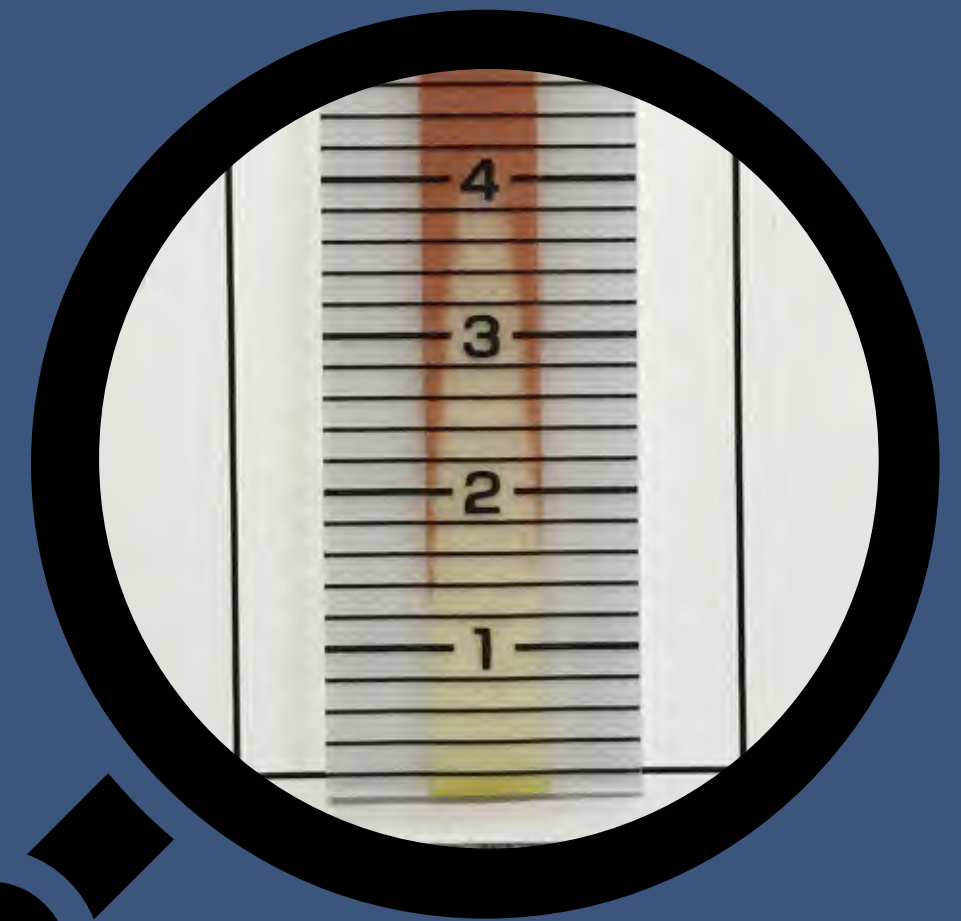
Chloride test instructions on other side.  
Need help? Visit [www.saltwatch.org](http://www.saltwatch.org).

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1.4	0.005	31	4.8	0.036	220
1.6	0.006	37	5.0	0.039	238
1.8	0.007	44	5.2	0.042	257
2.0	0.008	50	5.4	0.046	276
2.2	0.010	58	5.6	0.049	297
2.4	0.011	66	5.8	0.052	318
2.6	0.012	75	6.0	0.056	341
2.8	0.014	85	6.2	0.060	365
3.0	0.016	95	6.4	0.064	391
3.2	0.017	106	6.6	0.069	418
3.4	0.019	117	6.8	0.074	448
3.6	0.021	130	7.0	0.079	479
3.8	0.024	143	7.2	0.085	513
4.0	0.026	157	7.4	0.091	551
4.2	0.028	172	7.6	0.098	592
4.4	0.031	187	7.8	0.105	637
4.6	0.034	203			

USE BY: 08/2024 Lot A2238



This test strip reads:  
4 Quantab Units





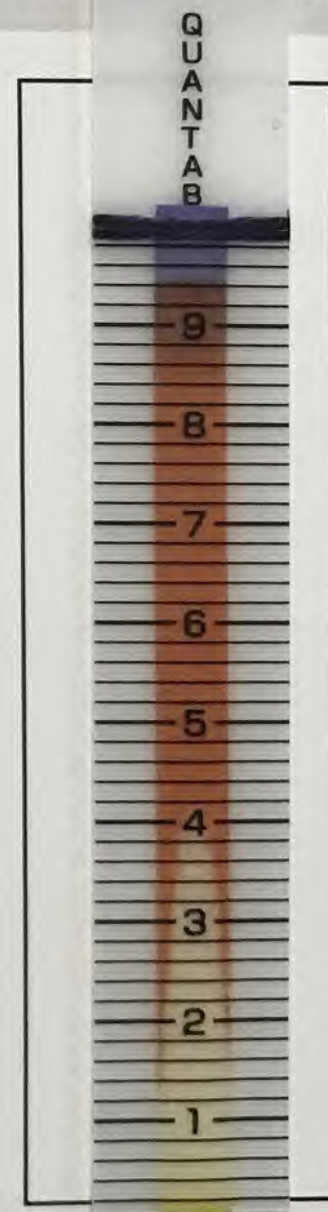
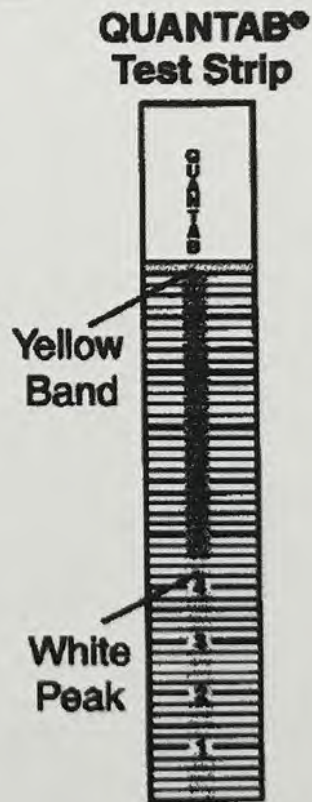
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USE BY: 08/2024 Lot A2238



This test strip reads:  
4 Quantab Units

4 Quantab Units means the  
sample is 157ppm



# What do Chloride Levels Mean?

0-100 mg/L

Chloride in freshwater naturally occurs \*

230 mg/L

Chloride is "chronically" toxic to aquatic life

250 mg/L

EPA Secondary Standard of Drinking Water

860 mg/L

Chloride is "acutely" toxic to aquatic life

# Be a Smart Salter

Once you put salt down, it doesn't go away...

Salt alters the soil, harms plants, and weakens infrastructure like bridges and roads.

It gets into our streams, lakes, and rivers, putting aquatic life and human health at risk.

It only takes 1 teaspoon of salt...  
...to pollute 5 gallons of water

Salt applied by cities, businesses, and homes adds up.



Reduce your salt use to protect our water!

## Do your own salt application?

### 1. Shovel

Clear snow from sidewalks and parking lots before it turns to ice. The more snow you remove, the less salt you'll have to use – and the more effective it will be!

### 2. Scatter

If you use salt, scatter it so there's space between the grains. A coffee mug of salt is enough to treat an entire 20 foot driveway!

### 3. Sweep

Once the salt has done its job, sweep up the extra so you can reuse it for later storms – and prevent it from washing away.

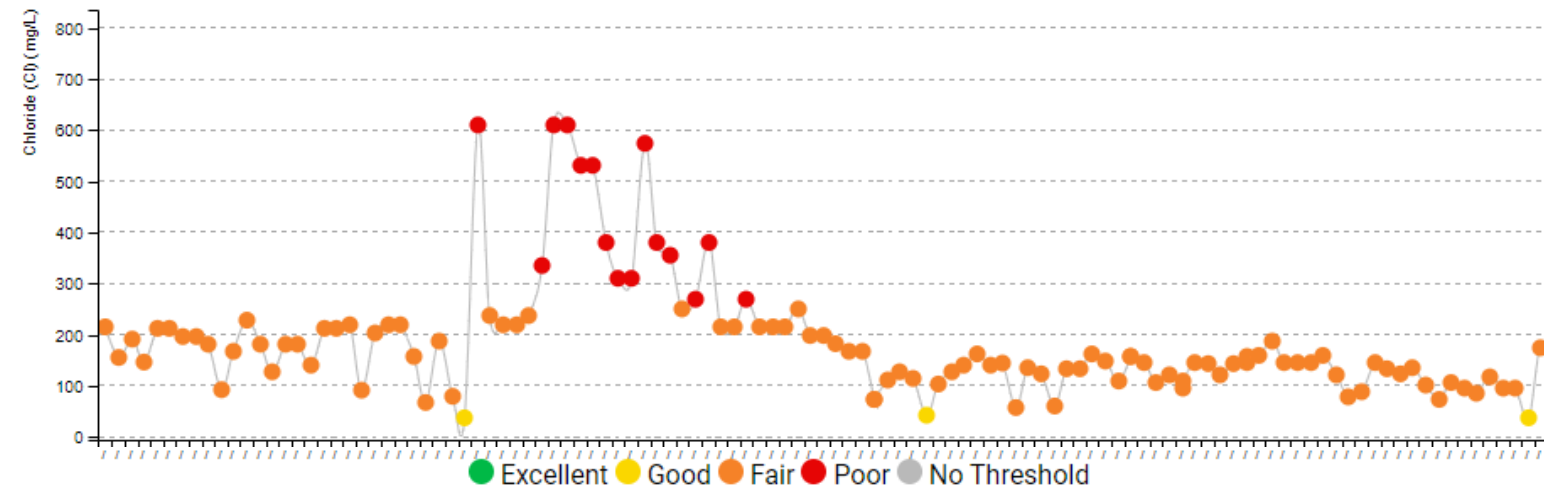
### 4. Switch

Salt doesn't work when the pavement temperature is 15 degrees or lower. Switch to sand or use a different deicer that works at low temperatures.

## Hiring a snow removal contractor?

Choose a contractor who is certified through a winter salt certification program.

Find out about salt application courses from your state Department of Transportation or visit [www.saltwatch.org](http://www.saltwatch.org)



**Data**  **Action**

# TTF Streamkeeper Testifies at Philadelphia City Council about Road Salt

Jamilee Hoffman  
Mar 17, 2022



**The Washington Post**  
Local Opinions  
Democracy Dies in Darkness

## Opinion: The true cost of salt on the D.C. area's roads

An Annapolis city employee spreads salt on the downtown sidewalk as a snowremoving winter storm dumped snow and ice across the region in February 2021. (Jonathan Newton / The Washington Post)

By Kari Van Neste  
January 19, 2022 at 2:45 p.m. EST

# ACTION ALERT

**Keep freshwater fresh for future generations!**

**Abby – Stand up for clean water in Minnesota by reducing salt pollution!** In many areas of the United States, road salt is used in the winter to create safe travel conditions, but excessive salting is a growing problem. Excess road salt ends up in our waterways, creating toxic conditions for aquatic life and threatening human health.

You can take action on this pervasive problem! [Let your state representatives know that you would like to see reduced road salt pollution in Minnesota.](#)





## Shovel

Clear walkways before snow turns to ice.



## Scatter

A 12 oz mug holds enough salt to treat a 20-foot driveway or 10 sidewalk squares.



## Sweep

Sweep up excess salt and reuse it!



# Resources

**SALT WATCH™**  
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## Chloride in Drinking Water

Road salt pollution is the leading cause of chloride pollution in waterways throughout the United States. Chloride pollution also comes from other sources including water softener discharge and sewage discharge. The impact of chloride on human health is an area of ongoing research, but there are several health risks that are known to be linked to increased chloride in drinking water.

**DRINKING WATER STANDARD**

The drinking water standard for chloride is 250 mg/L, as established by the US Environmental Protection Agency (EPA) in 1988. At this level, water starts to taste "salty." There is no health-based guidance for chloride in drinking water, but there are health implications for consuming sodium. Sodium and chloride concentrations in water are often related since sodium chloride (NaCl) is the most common type of road salt being applied in the winter. The EPA recommends sodium in drinking water be less than 20 mg/L for individuals on severely restricted sodium diets.

250 mg/L

Fact Sheets

## Be a Smart Salter

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It only takes 1 teaspoon of salt... to pollute 5 gallons of water

Salt applied by cities, businesses, and homes adds up.

Americans use 20 million tons of road salt every year.

**Reduce your salt use to protect our water!**

Do your own salt application?

- 1. Shovel**  
Clear snow from sidewalks and parking lots before it turns to ice. The more snow you remove, the less salt you'll have to use - and the more effective it will be!
- 2. Scatter**  
If you use salt, scatter it so there's space between the grains. A coffee mug of salt is enough to treat an entire 20 foot driveway!
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Once the salt has done its job, sweep up the extra so you can reuse it for later storms - and prevent it from washing away.
- 4. Switch**  
Salt doesn't work when the pavement temperature is 15 degrees or lower. Switch to sand or use a different deicer that works at low temperatures.

Hiring a snow removal contractor?

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Find out about salt application courses from your state Department of Transportation or visit [www.saltwatch.org](http://www.saltwatch.org)

**SALT WATCH™**  
IZAAK WALTON LEAGUE OF AMERICA

**Salt Wise**

Flyers

## How to Start a Salt Watch Campaign in Your Community

**SALT WATCH™**  
IZAAK WALTON LEAGUE OF AMERICA

Advocacy Guide

## ¿Cuánta sal de carretera hay en sus arroyos?

¡Solicite un kit de prueba GRATIS para averiguarlo!  
Ideal para estudiantes y científicos comunitarios de todas las edades.

[www.SaltWatch.org](http://www.SaltWatch.org)

**SALT WATCH**  
Español

ÚNETE A SALT WATCH

Spanish Resources

**Bonus: Letter to State Representative**  
(edit with your own experience and voice)

Dear Representative/Senator [your rep's name],

Every winter, snowy weather creates dangerous conditions on our roads. Since the 1940s, communities across the U.S. have been spreading road salt on streets, sidewalks and parking lots to melt ice and create safer traveling conditions. Road salt is effective when used correctly, but we have fallen into a pattern of over-applying and misusing road salt in ways that have damaging side effects on wildlife, human health and the environment. I am asking that you work towards salt reduction in [the name of your community/state].

Road salt inevitably ends up in our streams, rivers and lakes. USGS monitored 30 streams from 1980-2011 in Wisconsin, Illinois, Colorado, Michigan, Ohio, Pennsylvania, Maryland, Texas and the District of Columbia and found that 84 percent of those streams experienced high chloride concentrations due to road salt. And once road salt enters bodies of water, it is extremely difficult and expensive to remove; it's simply not feasible to filter it out at water treatment plants.

Road salt threatens our water quality in multiple ways, by contaminating drinking water, corroding pipes and leaching metals into our water. High levels of chloride are dangerous to human health, especially for people with pre-existing conditions such as high blood pressure. Chloride is also toxic to aquatic life and can degrade vegetation and soil. All told, our current road salt practices cost the U.S. \$18-19 billion a year in damages.

It's possible to reduce salt usage without endangering travelers; some communities are already doing it. Minnesota, for example, has substantially reduced salt usage without seeing any loss of safety on the roads. They've accomplished this through strategies including training salt applicators in smarter salting practices, offering a smart-salting certification to professional applicators and private property owners, drafting model contracts between applicators and owners (<https://www.ncstate.gov/water/smart-salting-training>), and requiring applicators and manufacturers to properly store salt supplies.

[Your community/state] can take these steps too. By supporting smarter salting practices, you will be protecting water quality for generations of [Marylanders/Iowans/etc.] to come. Please [insert specific action you want legislator to take: introduce a bill requiring smarter salting practices, co-sponsor an existing bill, etc.].

Sincerely,

[Your Signature]

[Your Name]

Template Letters

# SALT RESPONSIBLY



Visit:  
[www.saltwatch.org](http://www.saltwatch.org)

Email:  
[saltwatch@iwla.org](mailto:saltwatch@iwla.org)

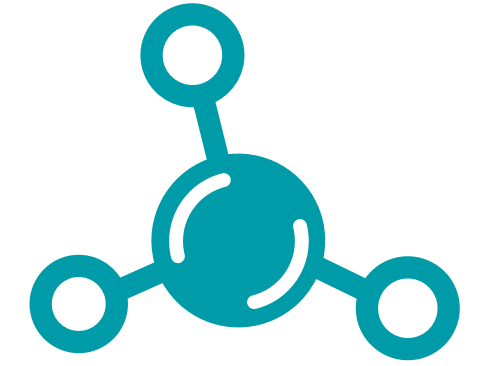


# NITRATE WATCH<sup>SM</sup>

IZAAK WALTON LEAGUE OF AMERICA



# What is nitrate pollution?



- Nitrate (NO<sub>3</sub><sup>-</sup>) is naturally occurring
- Nitrogen is important for plant growth
- Soils and plants aren't able to take up all the nitrate that is applied
- Excess nitrate is carried to surface water via runoff or groundwater via infiltration



# Sources of excess nitrate

**Fertilizers**

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**Animal Feedlots**

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**Wastewater treatment**

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**Atmospheric deposition**

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# Nitrate pollution impacts...

Environment



Human Health



Economy

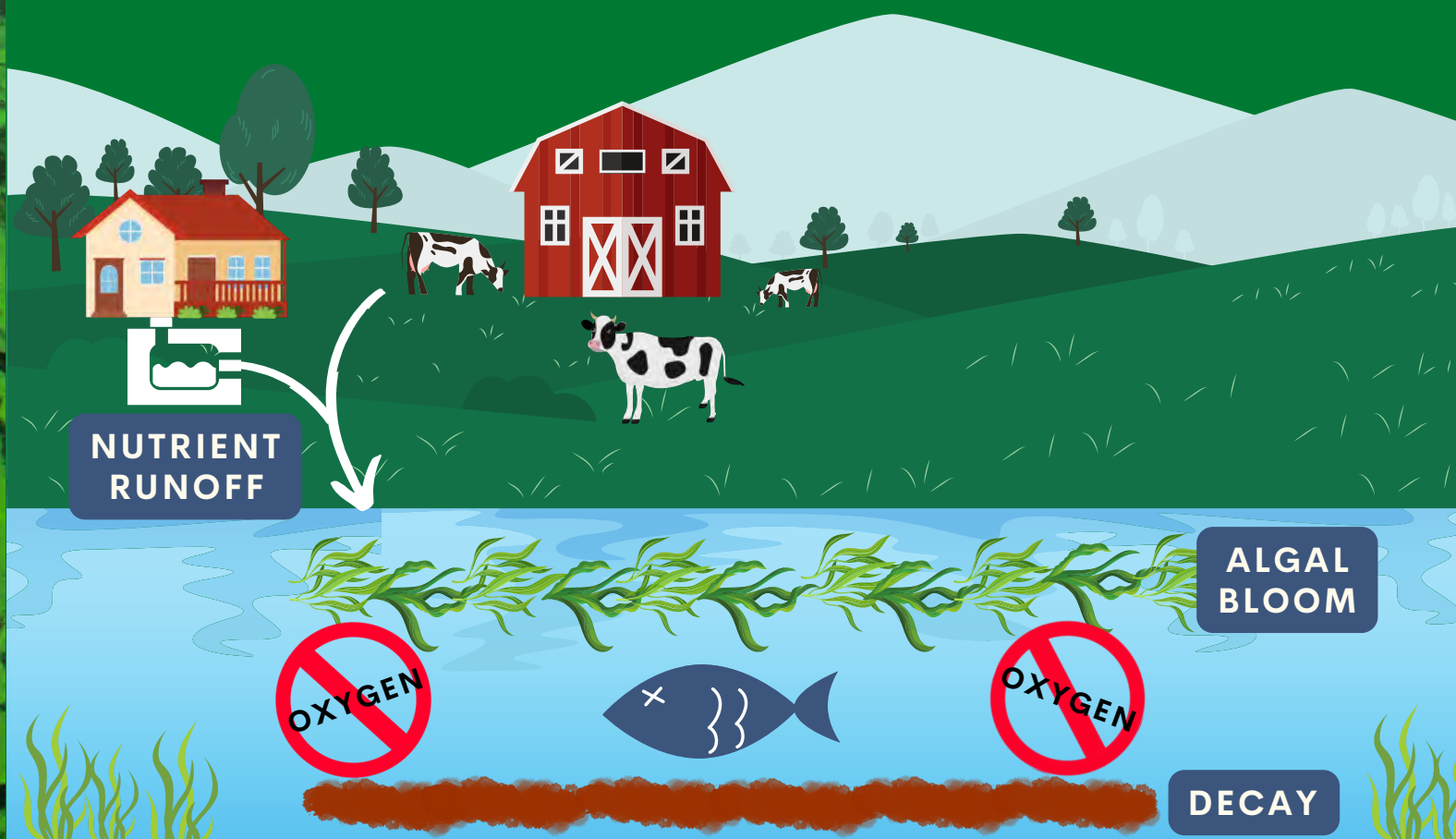


# Environment



# Environmental impact

- Excess nutrients lead to:
  - Algae blooms
  - Fish kills
  - Dead zones



Human Health



## Human Health impact

In surface water:

- Toxins from harmful algae blooms

In drinking water:

- Methemoglobinemia (blue baby syndrome)
- Thyroid disease
- Birth defects
- Colon cancer

# Drinking water standard

US EPA maximum contaminant level: 10 mg/L

- created in 1992
- to prevent blue baby syndrome
- other health effects observed with prolonged exposure to lower concentrations

Private wells are not regulated



Human Health



## Economy



# Economic impact

- Drinking water treatment
- Medical costs
- Fishing industry
- Recreation
- Property values

Estimated US economic impact: **\$210 billion/year**





Mobilizing volunteers to monitor nitrate in surface water & drinking water

Goals:

- **Raise awareness** about the impacts of nitrate on the environment and human health
- **Identify hotspots** of nitrate pollution
- **Advocate for solutions** that reduce nutrient pollution.



# How to Participate

## What you need:

- smartphone or computer
- free Nitrate Watch kit

## Kit includes:

- 25 nitrate test strips
- sample testing instructions
- data uploading instructions
- Nitrate Watch Sticker

Request a free kit at  
[www.nitratewatch.org](http://www.nitratewatch.org)



# How to Participate

1. Dip test strip in any source of water (pond, stream, tap etc.) for 1 second
2. Wait 30 seconds
3. Take reading by comparing color to bottle at exactly 30 seconds
4. Enter data on Clean Water Hub

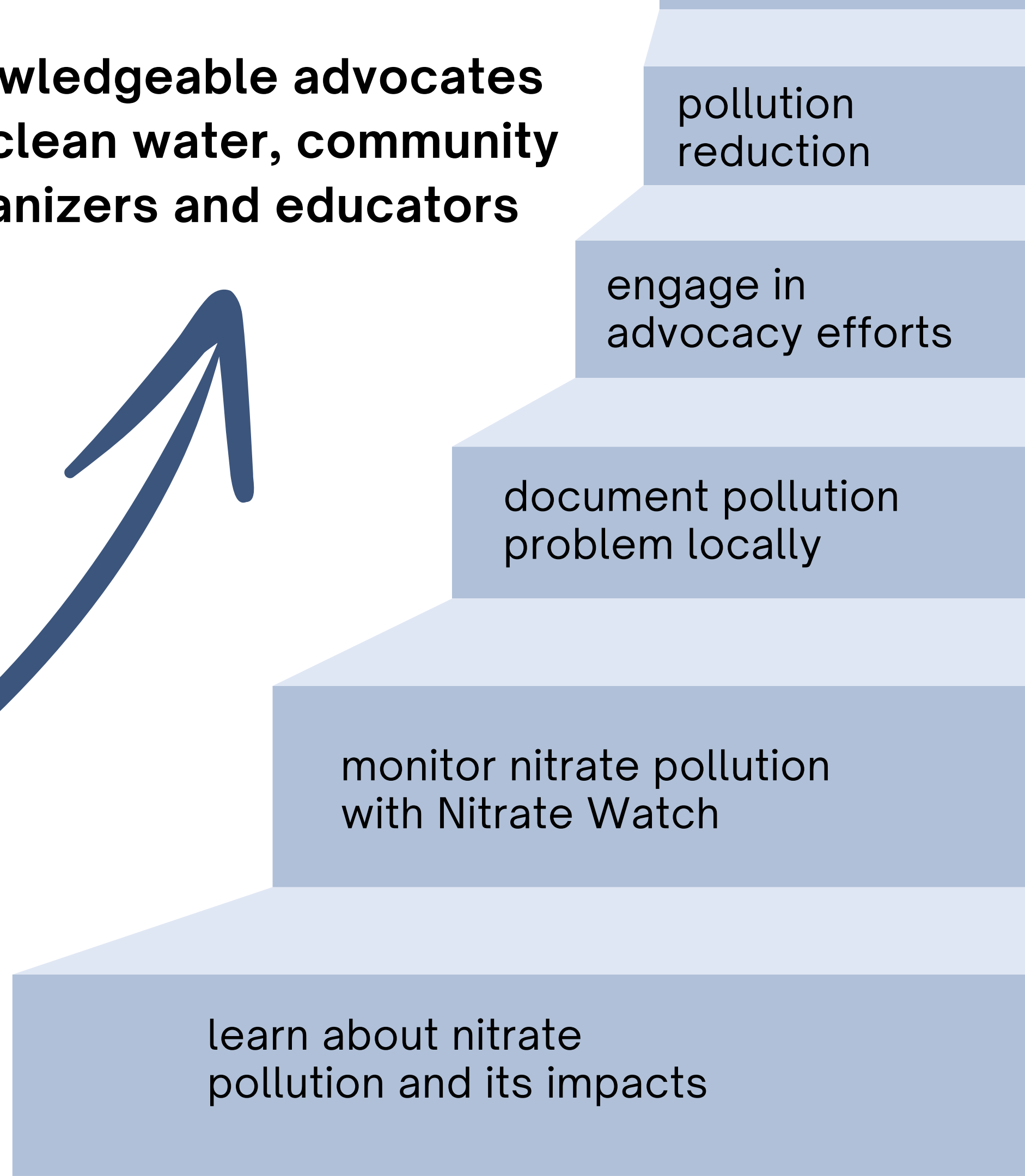
Monitor consistently throughout the year (ideally monthly)



**Knowledgeable advocates  
for clean water, community  
organizers and educators**



**Un-engaged, little to no  
knowledge of local or  
regional water quality issues**



# Resources for Monitors: *advocacy*

## Petition



### Time to Call a Halt to Harmful Nitrate Pollution

Nitrate is a well-known and highly prevalent water pollutant with harmful impacts to human and environmental health. Nitrates are abundant in synthetic fertilizers, animal manure, and sewage. They are easily picked up by rainfall and frequently run off into water bodies and seep through soil into the groundwater below. Dangerously high levels of nitrate present in our surface waters and drinking water sources are unacceptable and demand action.

High nitrate levels lead to algae blooms which deplete the oxygen in waterways, creating dead zones where aquatic life is scarce. Algae blooms may also harbor toxic cyanobacteria, which can cause rashes, nausea, and in some cases death to humans and animals that come into contact with the bacteria.

Consuming nitrates in drinking water is known to have negative impacts on human health, including methemoglobinemia ("blue baby syndrome"), thyroid disease, central nervous system birth defects, and colorectal, bladder, ovarian, and kidney cancers. While the EPA has set a drinking water standard of 10 mg/L for nitrates, private water supplies from groundwater wells are not regulated and do not have established standards for

## Letters to the editor & Letters to representatives

A little fertilizer goes a long way.

Many modern agricultural practices depend on synthetic fertilizers that are high in nitrates to produce crop yields that will support a growing population. Unfortunately, those nitrates can be harmful to human health and the environment when they run off into waterways. From July 2017 to June 2018, Iowa distributed 4,486,121 tons of fertilizer. Runoff from rain and snow may carry the nitrates from fertilizers into groundwater or into drainage systems which empty into streams. About 80% of the nitrogen in fertilizers is lost from the fields where they are applied. Iowa has more than 22 million acres of row crop agriculture, and most of it remains incompletely or inadequately treated for nitrate pollution.

High levels of nitrates in streams can lead to unsafe drinking water. More than 118 million Americans depend on local streams for drinking water. In 1990, the Environmental Protection Agency (EPA) established the drinking water standard for nitrates as 10 mg/L. But studies have found that water with nitrate levels even lower than that may not be safe to ingest. Some health risks related to ingesting high levels of nitrate include methemoglobinemia (blue baby syndrome), cancer, thyroid disease, respiratory issues, and birth defects. Only about 10% of public water suppliers in Iowa treat their water for nitrate, and private water supplies, such as groundwater wells, are not regulated and do not have standards for contaminants. Together, that means that about one third of the households in Iowa are at high risk of nitrate exposure.

[Add data from your Nitrate Watch testing and/or share why this issue is important to you personally]

As an Iowan, I understand the responsibility that our state has for providing food for our people and country. However, our current farming practices can be modernized to improve soil health and reduce runoff so fertilizers applied to fields don't poison our water. Our agriculture systems must evolve so that we can continue to feed a growing population without harming our waters. Government officials and our communities need to unite to reduce chemical fertilizer use, advocate for alternative farming practices, and stop polluting our waterways.

For more information about nitrate pollution, visit [nitratewatch.org](http://nitratewatch.org).

## Fact Sheets

### The Cost of Nitrate Pollution

The contamination of surface water and drinking water with nitrate is dangerous to human health and harmful to the environment. But what is the economic impact of nitrate pollution?

#### WATER TREATMENT COSTS

When nitrate is present in drinking water sources, water utilities must remove the excess to meet the EPA standard. Specialized nitrate removal infrastructure is required, which is expensive to install and operate.

#### MEDICAL COSTS

Health conditions associated with nitrate pollution - like thyroid disease, birth defects, and some cancers - are costly to treat.

#### IMPACT ON THE FISHING INDUSTRY

Algae blooms that harbor toxic cyanobacteria can contaminate fish and shellfish, meaning the commercial fishing industry suffers.

#### DECLINING PROPERTY VALUES

Unsightly and dangerous algae blooms affect the value of waterfront property.

Visit [www.nitratewatch.org](http://www.nitratewatch.org) to learn about nitrate pollution and how you can help protect clean water in your community.



#### LOSS IN RECREATION

Nitrate pollution can lead to unsightly and dangerous algae blooms. It makes sense that this would negatively impact recreation activities, like fishing and paddling.

ESTIMATED U.S. ECONOMIC IMPACT: **\$210 BILLION/YEAR**<sup>1</sup>

1. Sobota, D. J., Compton, J. E., McCrackin, M. L., & Singh, S. (2015). Cost of reactive nitrogen release from human activities to the environment in the United States. Environmental Research Letters, 10(2). <https://doi.org/10.1088/1748-9326/10/2/025006>

# Clean Water Hub Overview

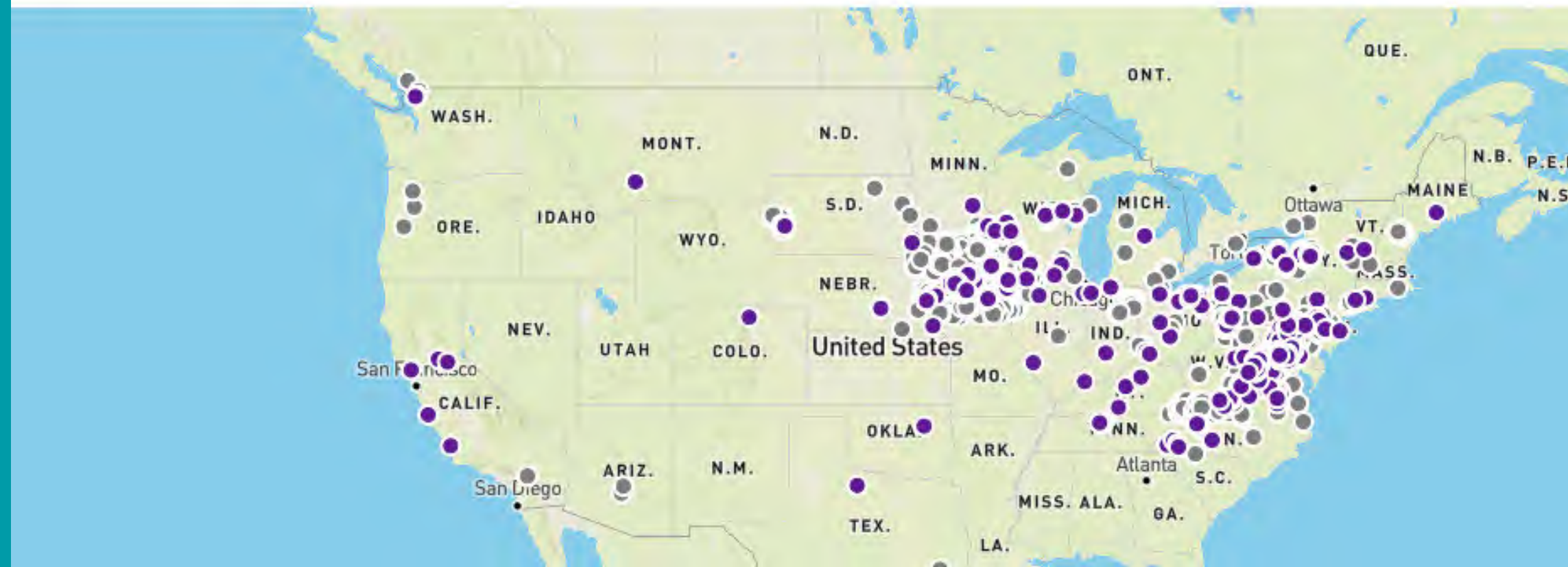
## Clean Water Hub™

Share the water quality data from your local streams. Make an impact in communities across the nation.

SIGN UP

SIGN IN

EXPLORE THE MAP



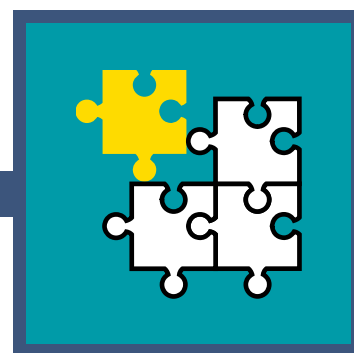


# What is the Hub?

## National water quality database

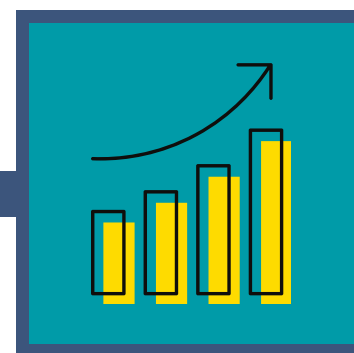
**Collaborative tool** to help volunteers and organizations track water quality in local creeks and streams

A place to view and share **local data** with the goal of making a **broader impact**



### **SHARE**

Share water quality data from your local streams.



### **TRACK**

See changes in water quality in your community.



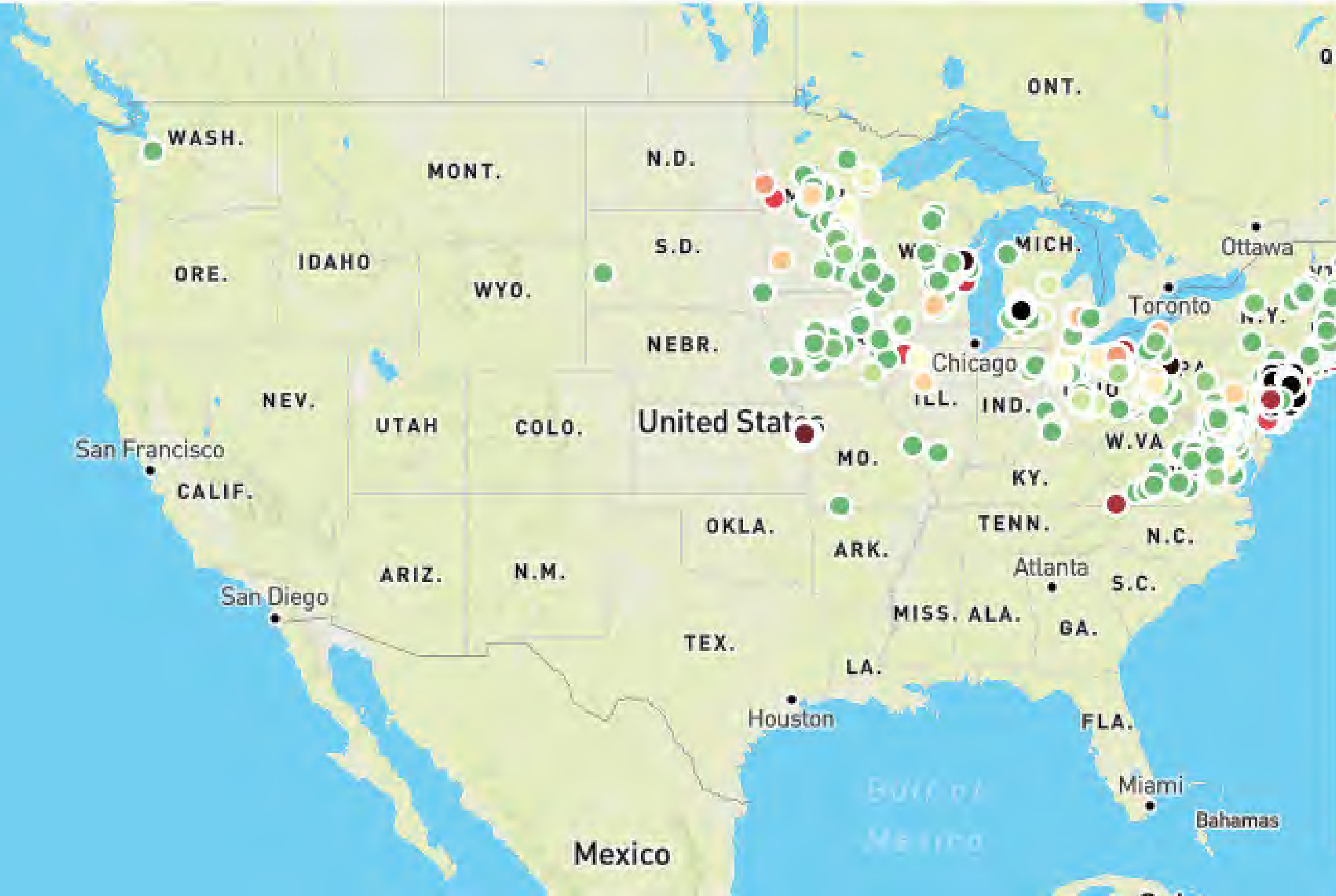
### **DISPLAY**

Connect with, join, and explore the nationwide effort.

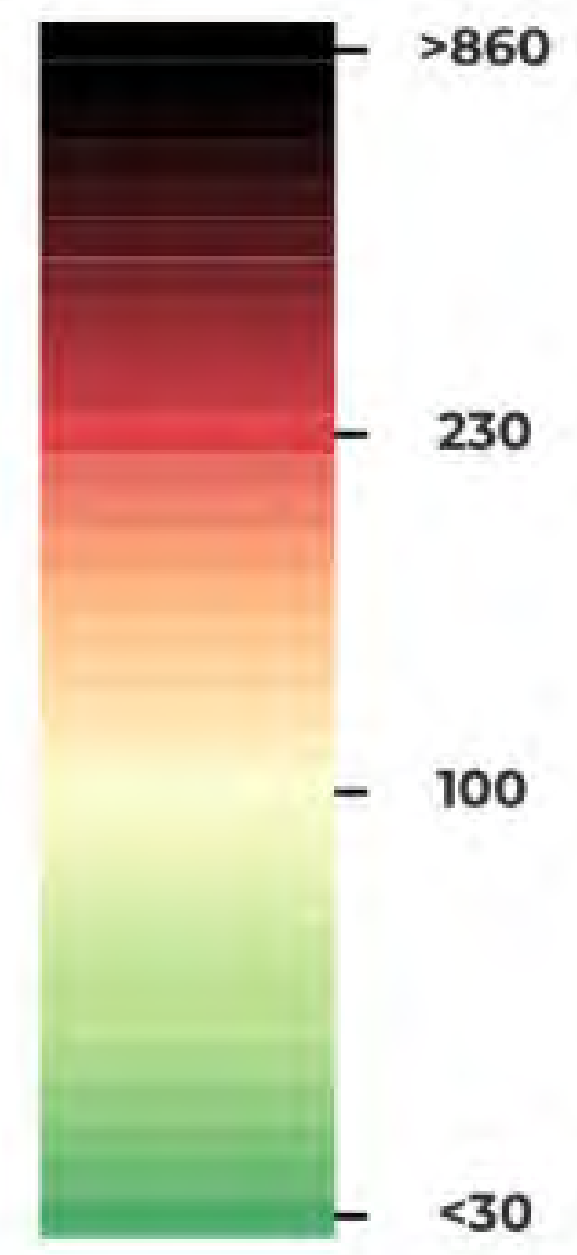
# Salt Watch Map

Start Date   End Date   Filter by Dates

Satellite



Filter By Water Source  
Legend

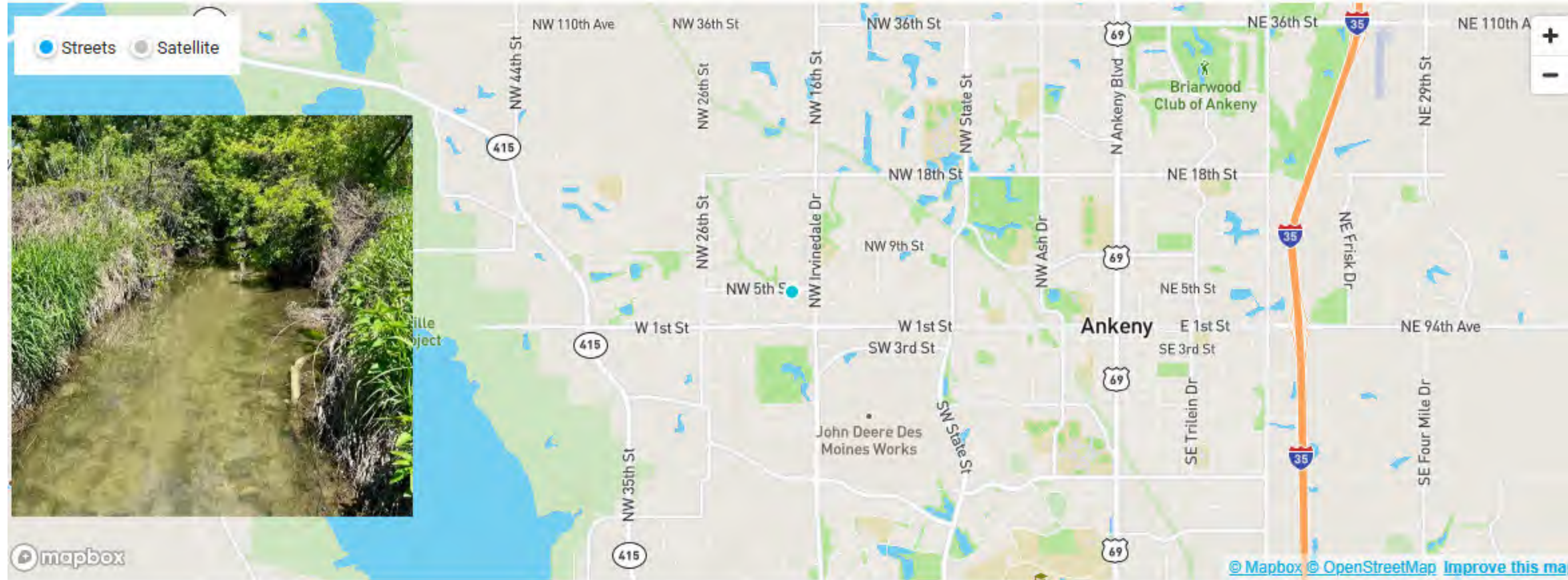


# Nitrate Watch Map

Start Date   End Date







## ROCK CREEK

Creek runs through more recently developed areas and neighborhoods.



**ROCK CREEK**  
Ankeny, IA

[SOS BIOLOGICAL](#)

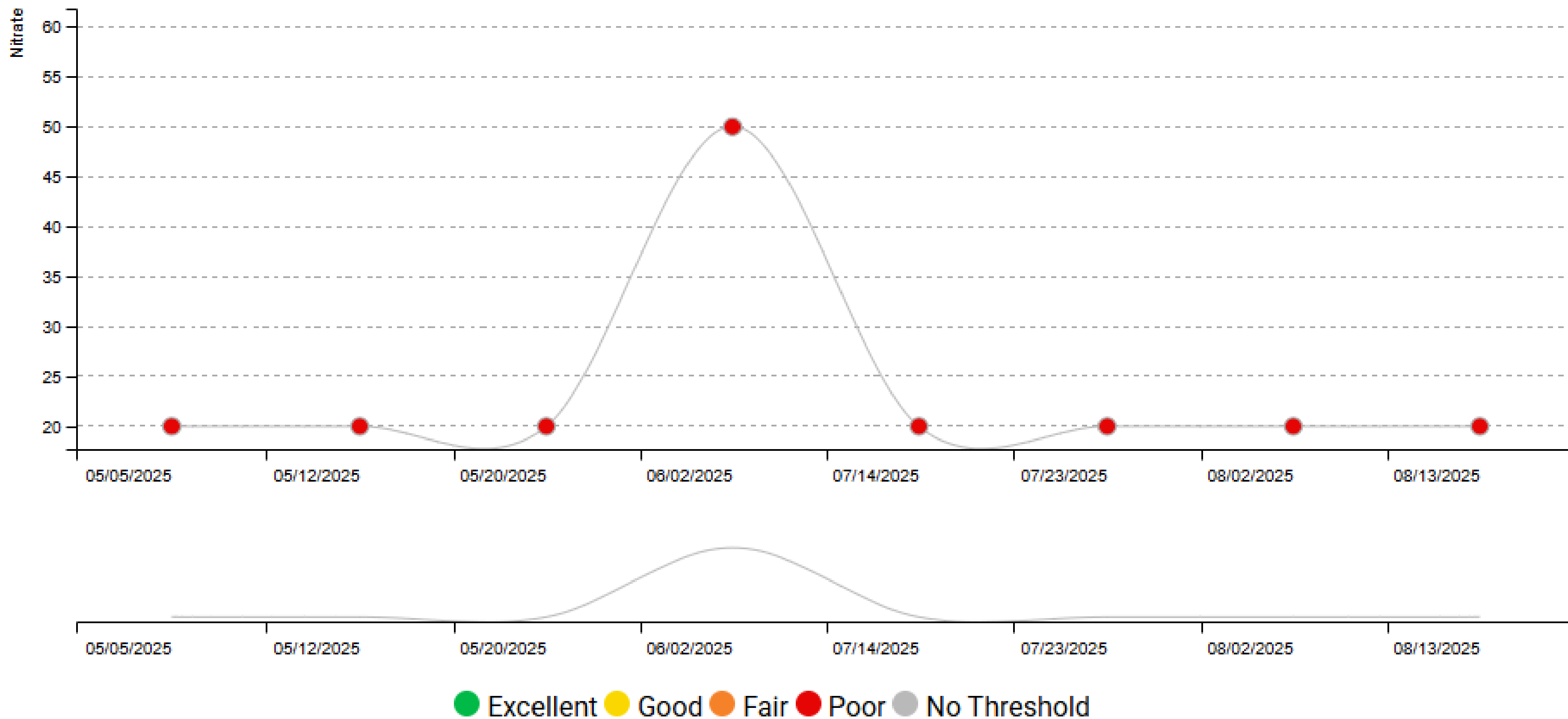
[SOS CHEMICAL](#)

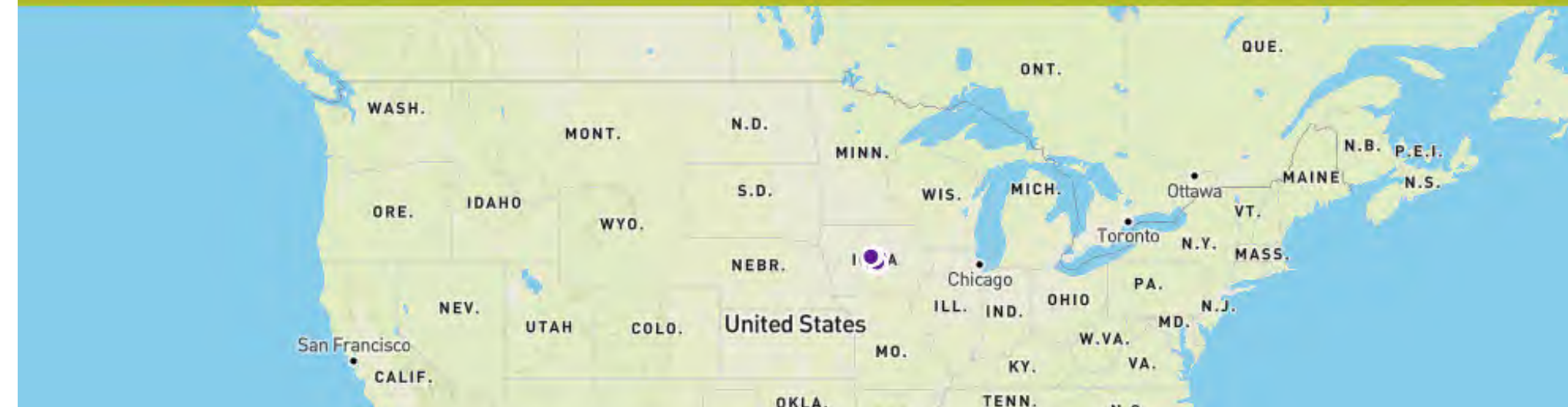
[SALT WATCH](#)

**NITRATE WATCH**

# LATEST READING - NITRATE WATCH

 Aug 13, 2025



STORY COUNTY CONSERVATION 

JOIN ORGANIZATION

## ABOUT

Connecting people with nature and improving natural resources – making Story County a great place to live, work, and recreate. Story County Conservation manages more than 3,100 acres of parks and natural areas, including lakes, campgrounds, and trails, and an additional 5,500 acres of roadside habitat through our Integrated Roadside Vegetation Management program. The environmental education staff serves Story County schools and the public with interpretive and informational programs for all ages. Story County Conservation's volunteer program provides volunteer opportunities to individuals and groups interested in making a difference in local natural resources.

56461 180th St.  
Ames, Iowa 50010

[Story County Conservation](#)

DOWNLOAD SITES AND READINGS

# Data Export

- Site Data
  - View & Screenshot graphs
  - View all site data
  - View individual readings
- Organization Data
  - **Export dataset**

DOWNLOAD SITES AND READINGS 



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