

## Leveraging Participatory Science to Advance Water Quality Reporting and Partnership-Building Part 2



Thursday, July 11, 1:00pm – 3:00pm Eastern

### Speakers:

- **Liz Chudoba**, Water Quality Monitoring Initiative Director at the Alliance for the Chesapeake Bay
- **Dr. Julia Parrish**, Associate Dean, College of the Environment, University of Washington
- **Mara Dias**, Water Quality Initiative Senior Manager, Surfrider Foundation
- **Dr. Steve Morton**, Research Oceanographer, NOAA NCOS, Phytoplankton Monitoring Network
- **Adam Griggs**, Ecologist, U.S. EPA Office of Water, Water Data Integration Branch

## Watershed Academy Webcast

- The slides for today's presentations are posted on the Watershed Academy webpage.
- A recording of the webcast will be posted within the next month.

[www.epa.gov/watershedacademy](http://www.epa.gov/watershedacademy)

## Webcast Logistics

- **To Ask a Question** – Type your question into the “Questions” tool box on the right side of your screen and click “Send.”
- **To Report any Technical Issues** (such as audio problems) – Type your issue in the “Questions” tool box on the right side of your screen and click “Send” and we will respond by posting an answer in the “Questions” box.

## Audience Polling



## National Water Quality Monitoring Council

Working together for clean water

- The NWQMC was created in 1997 to foster collaboration, communication, and coordination across the nation's water quality monitoring community. The NWQMC serves as an informational resource seeking to advance monitoring through collaboration and information exchange.
- The Council works together to share best practices through a range of activities like hosting webinars, supporting data access through water quality portal, organizing the National Monitoring Conference, promoting diversity and inclusion, and generally sharing information across the monitoring community to support data-driven decision making.
- The Council has two work groups:
  - Volunteer Monitoring
  - Justice Equity Diversity Inclusion



## National Water Quality Monitoring Council

Working together for clean water

### Volunteer Monitoring Workgroup

- The Volunteer Monitoring Workgroup was developed in 2016 to foster a national community and to encourage integration between volunteer monitoring activities and water quality monitoring conducted by Tribal Nations, and local, state and federal agencies.
- Deliverables include 3-4 annual webinars, support volunteer monitoring sessions and activities at the National Monitoring Conference.
- Includes 39 people (11 state agencies, 9 academic institutions, 9 federal staff, 6 non-profits, 2 research centers, 1 Tribal Nation, and 1 county).



# Coastal Observation and Seabird Survey Team

Watershed Academy on Participatory Science



Julia K Parrish  
Coastal Observation and Seabird Survey Team  
College of the Environment  
University of Washington, Seattle, WA USA



COASST

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COASST



Photo: Hillary Burgess

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



## COASST Beached Bird Stats



- 25 years
- ~400 sites from Mendocino to Utqiagvik
- 90 coastal communities
- 700 active participants
- ~5,500 people since inception
- >100,000 bird carcasses
- 207 bird species

as of Mar 2024

COASST

## COASST Principles

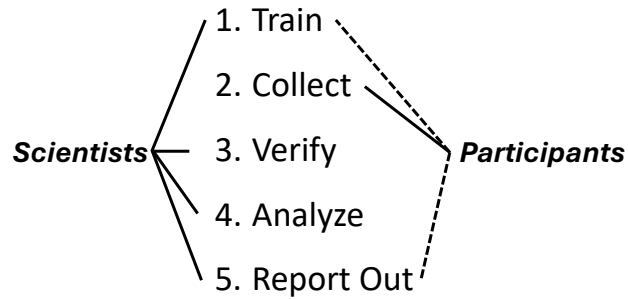
- **Deconstructing science:** evidence first, deduction second
- **Demystifying science:** lose the jargon, daylight the process
- **Using science:** bear witness (monitor scientifically), take action (move into resource management, conservation and public education)

### **“Sun Rising in the East” Life Clue:**

Everyone’s secret desire is not to become a scientist, but almost everyone has a strong attachment to somewhere (sense of place), wants information about it, and is invested in stewarding it.

COASST

## Rigorous Citizen Science



— primary job

- - - secondary job

## How Does COASST Work?

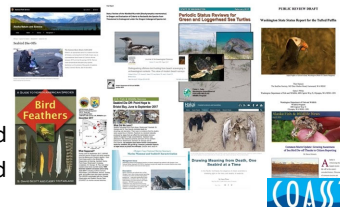
1. Recruit and train local citizens
2. Protocol, field guide, and datasheets
3. Web-based “smart” data input



4. Final verification by experts



5. Data analyzed and presented



## You Get STUFF, and It's Useful



## Who is COASST?

### Occupations:

Retired	33%
STEM	15%
Education	12%
Business	10%
Health	8%
Student	8%
Self employed	5%

average age = 51  
(range=7-87)

female 65:male 35

2-3 generation families 15%



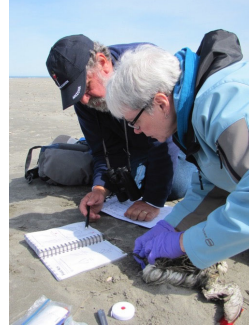


## Beached Birds

What does it mean to participate?

*(1-5 hours/month, depending on the beach)*

- **survey** for beachcast carcasses of marine birds on **your** beach
- **measure, collect condition information, identify** and **photograph** carcasses



Evidence 1<sup>st</sup>

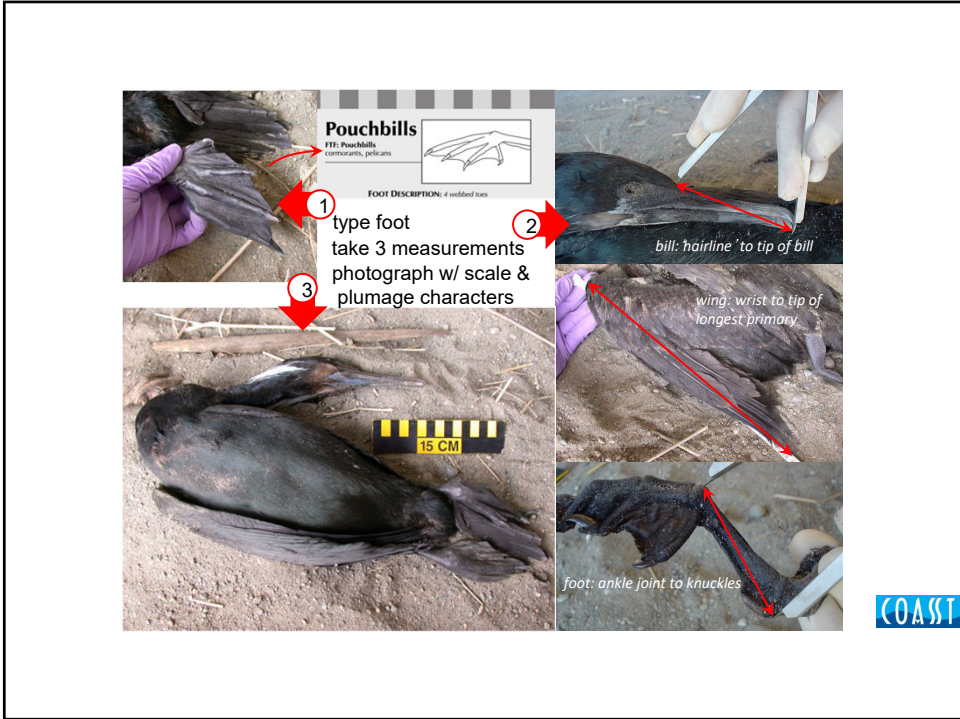
*(easy to collect)*

Deduction 2<sup>nd</sup>

*(Aha!)*







## Record on Paper (!) Datasheet

Measurements Foot Type Plumage Tagging Photos

Body Condition

Bind #:	Body Parts:	Bill (mm):	Foot Type Family:	A or I	Tag #:	Comments:
WF:	Wing (cm):	Species:	M or F	Body Part Tagged:		
RF:	FC:	Eyes:	Tarsus (mm):	If no species, list Group:	B or NB	# of Photos:

Bind #:	Body Parts:	Bill (mm):	Foot Type Family:	A or I	Tag #:	Comments:
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RF:	FC:	Eyes:	Tarsus (mm):	If no species, list Group:	B or NB	# of Photos:

**BEACHED BIRDS**

WHERE FOUND: High, Wreck, Surf

REFOUND? Yes/No

BODY PARTS: Intact, or Bill, Head, Breast, Feet (if), Wing(s)

FOOT CONDITION: Pristine, Slight, Better

EYES: Clear, Sunk, Gone

ADULT/IMMATURE

MALE/FEMALE

BREEDING/NON-BREEDING

BANDED (OWNER, Research)

COLLECTED

ORIENTED

Refud fields

Photo required

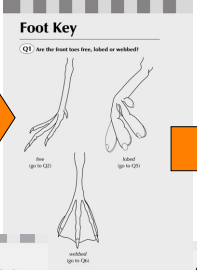
Date: \_\_\_\_\_

Age: \_\_\_\_\_



**COASST**  
Bird ID  
in 3 Easy Steps

**Find the Foot Type**




**Find the Family**



**Thick-billed Murre**  
*Uria lomvia*



**Find the Species**



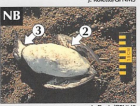


### Common Murre (Adult)

*Uria aalge*

**PLUMAGE VARIATION**

I-A      B-NB      M-F

- 1 **WING**  
white trailing edge on 2<sup>nd</sup>s
- 2 **WING**  
white underwing linings
- 3 **HEAD**  
B: dark face, throat and neck  
NB: throat and side of head mostly white

**AL2**

#### BEACHED CARCASS ABUNDANCE

WASHINGTON	OREGON
J F M A M J J A S O N D	J F M A M J J A S O N D

**DESCRIPTION**

FTF: Alcids 3 webbed toes, 4<sup>th</sup> absent; football-shaped body; short neck and tail

Common Murre **white-tipped 2<sup>nd</sup>s and white underwing linings**; dark brown/white countershading of body and wings

*breeding* head and neck completely dark

*non-breeding* white throat and face bisected by thin, dark line from eye to nape

*juvenile* like NB, w/ smaller bill

**MEASUREMENTS**

bill	42-53 mm	wing	19-22 cm	tarsus	35-42 mm
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**SIMILAR SPECIES**

Thick-billed Murre	bill depth at gonys > 1/3 bill length [c1 B] thin, white moustache on bill [dark bill]
breeding	white lower cheek [white face, dark eyeline]
non-breeding	larger; flat tarsus, minute 4 <sup>th</sup> toe [round, absent]; dark 2 <sup>nd</sup> s [white-tipped]
Pacific Loon	dark underwing [white wing linings]; white upperwing patch [dark]; red feet [orange-to-dark]
Pigeon Guillemot	

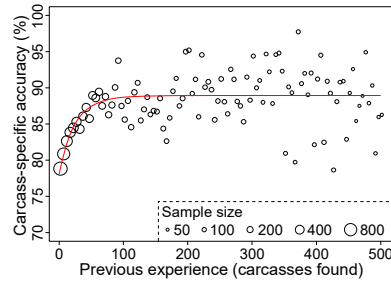
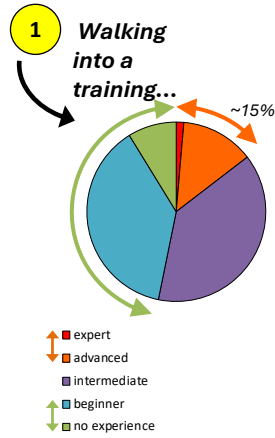
**DID YOU...?**

- Determine foot type?
- Check Common Murre (juvenile) page?
- Note color of underwing linings and trailing edge of 2<sup>nd</sup>s?
- Compare bill length to depth?
- Note color pattern of head and throat?

**AL3**



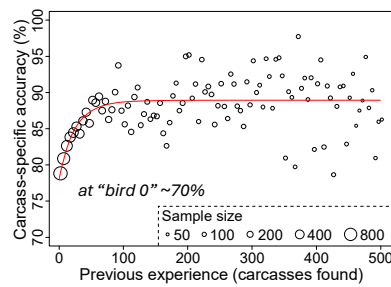
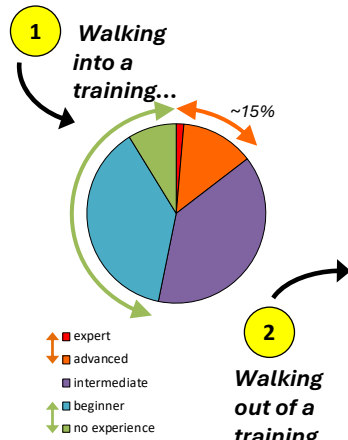
## Education: They Get Pretty Darned Accurate



left: Haywood et al. 2016 Conservation Biology 30(3):476-486. right: Parrish et al. 2019 PNAS 116(6):1894



## Education: They Get Pretty Darned Accurate



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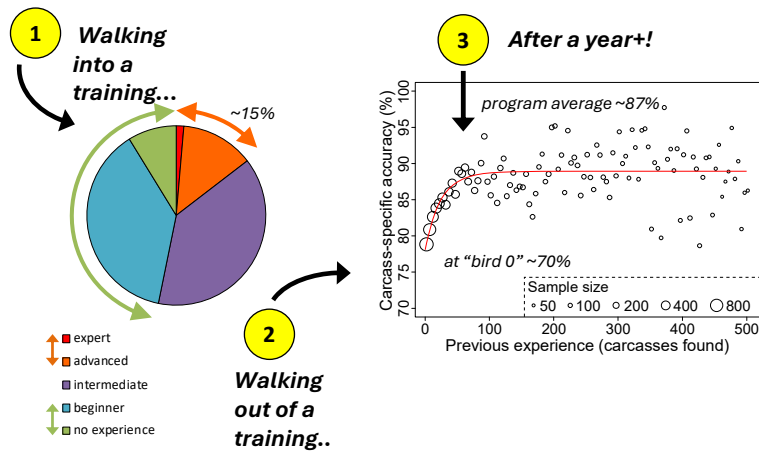


## The Training!!!!



COAST

## Education: They Get Pretty Darned Accurate



left: Haywood et al. 2016 Conservation Biology 30(3):476-486. right: Parrish et al. 2019 PNAS 116(6):1894-1901.

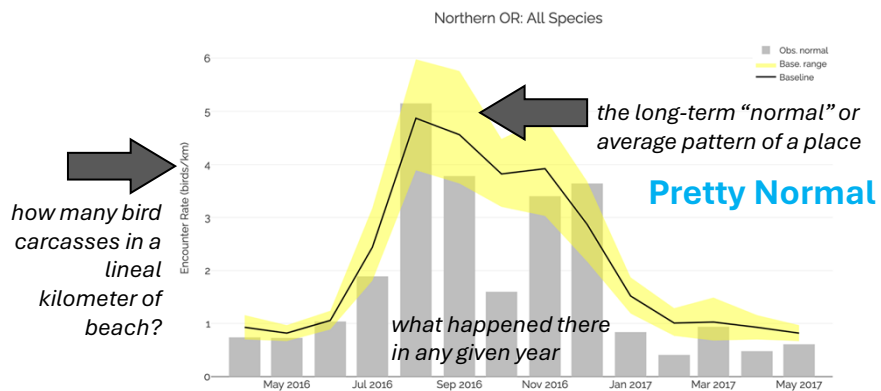
COAST

## Practice Makes Perfect



COAST

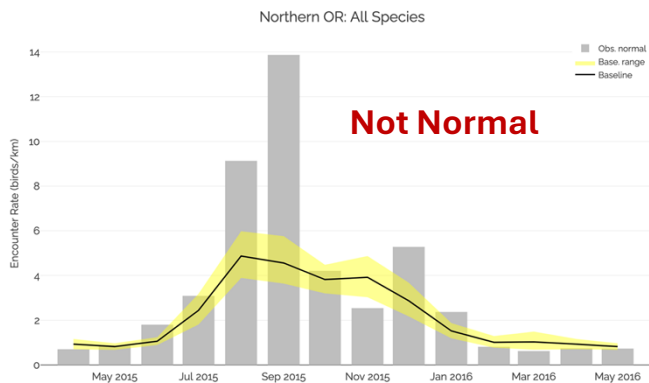
## The Natural History of Dead Birds



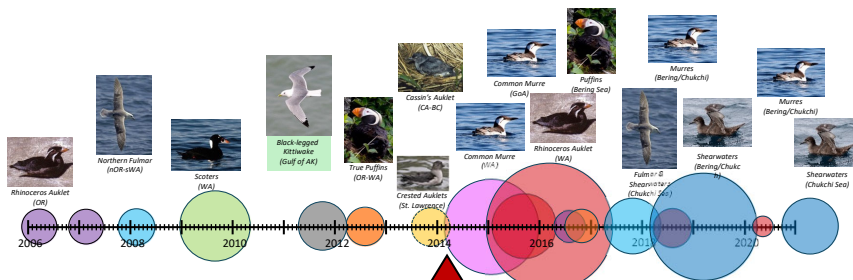
COAST

# The Natural History of Dead Birds

9-14 carcasses/km = 3,000 carcasses every day



# Marine Bird Mass Mortality Events in the Northeast Pacific

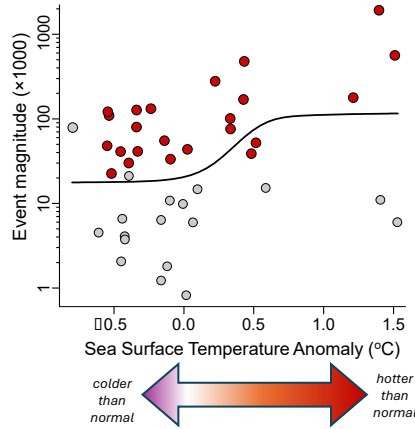


Ocean got stuck on warm

Jones et al. 2024 MEPS 737:161-181



## Marine Bird Mass Mortality Events in a Warming Ocean



### Translation:

Ocean temperature 1°C

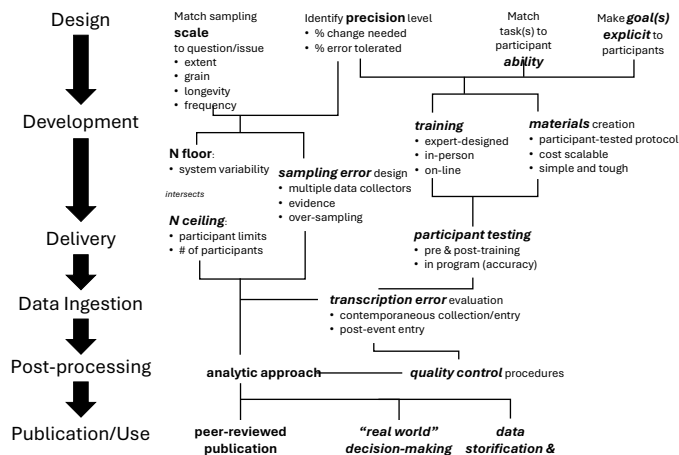
Ecosystem millions of marine birds



Jones et al. 2024, *MEPS* 737:161-181



## Intentional Design in Science and *Citizen Science*



Parrish et al. 2024, *Journal of Experimental Biology* and *Comparative Biology* 58:150-160



**Building community power to protect safe  
recreation at the coast with the Surfrider  
Foundation's Blue Water Task Force**



Mara Dias  
Water Quality Initiative  
Sr. Manager

**WHO IS SURFRIDER?**

The Surfrider Foundation is a non-profit grassroots organization dedicated to the protection and enjoyment of our world's ocean, waves and beaches









**OUR VISION:**  
Clean & Healthy Beaches  
for All People, Always



## Clean Water Initiative

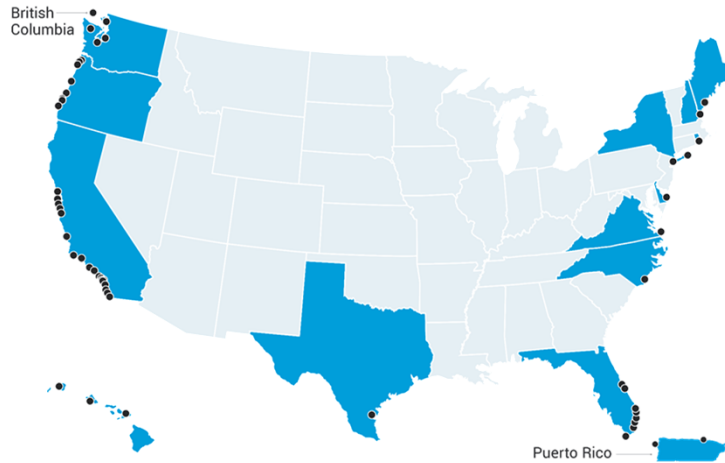
To protect water quality and reduce pollution so it is safe to surf, swim and play at the beach and in coastal waters.



### Surfrider's volunteer water testing program

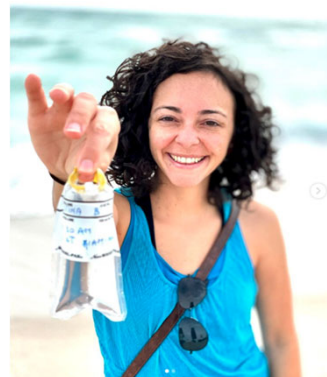
Operating through a national network of 60 labs, Surfrider volunteers are providing critical water quality information to protect public health at the beach, raise awareness of local pollution problems and to bring together communities to implement solutions.

## Water Testing Lab Locations



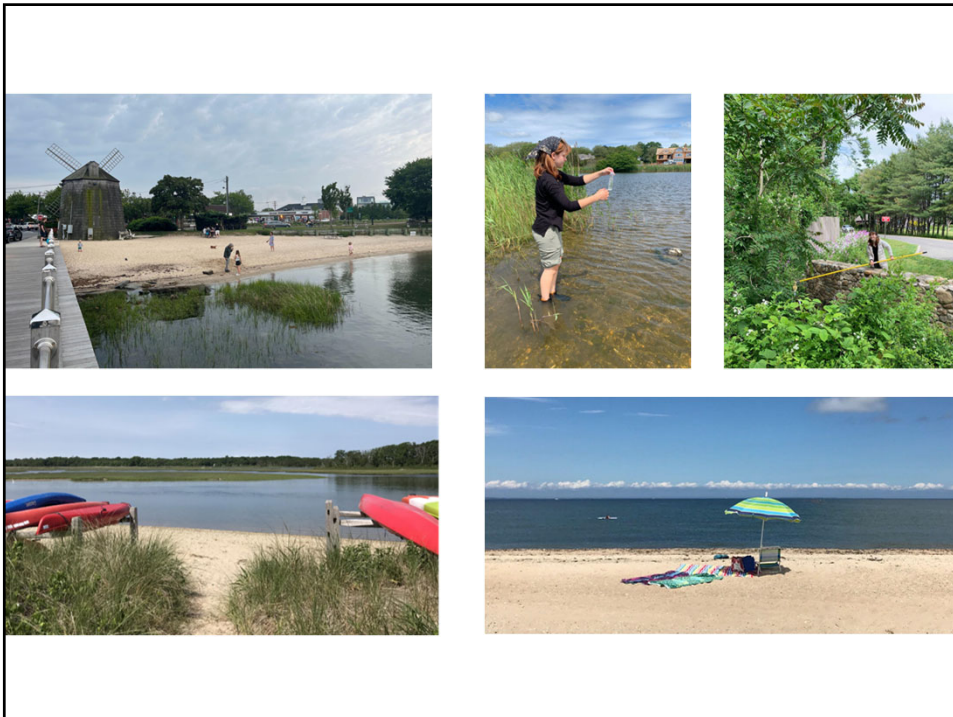
## Blue Water Task Force

- Sampling plans complement agency-run beach programs
  - Fill in seasonal gaps, cover popular surf and recreation spots & sources of pollution
- Test beaches and access points into diverse recreational waterways
  - bays, estuaries, harbors, coastal ponds, intercoastal waterway, canals
- Freshwater sources of pollution
  - Creek & river mouths, stormwater flows
- Measure enterococcus bacteria with Enterolert & IDEXX Quanti-Tray system



## Agency Beach Monitoring Programs

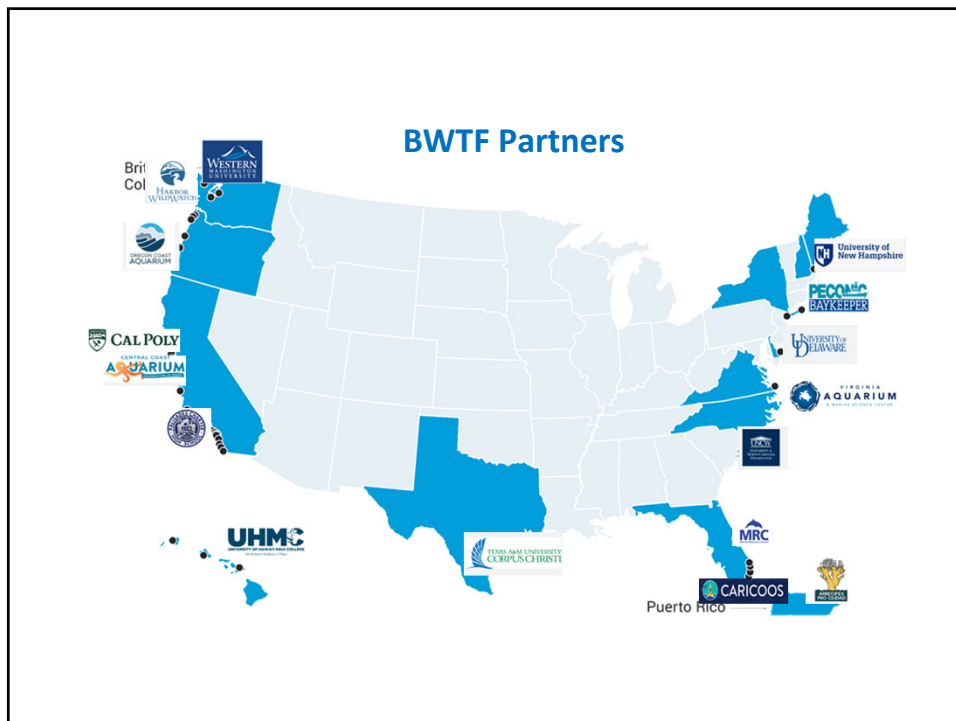
- Seasonal only in nearly all states – even FL & CA
- Primarily life-guarded beaches – weekly, monthly or less
  - Leaves many recreational areas untested.





## Chapter-run BWTF labs rely on Partner Power

- Chapter maintained labs often use borrowed space from local partners
  - Other local environmental groups, aquariums, universities
- Collect samples for partner organizations & help communicate data
  - State & local beach programs, other watershed groups
- School & youth programs



# SOUTH BAY BLUE WATER TASK FORCE

## TEACH AND TEST



### Community Outreach



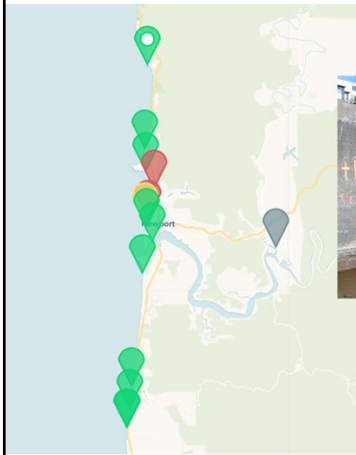


## Surfrider chapters collaborate with agency-run beach programs

- Trained volunteers collect samples for agency-run beach programs
  - Washington State Department of Ecology
  - Olympia, Olympic Peninsula, Bellingham
- Provide off-season coverage
  - South Sound Chapter in Tacoma
  - Coordinate sampling locations & method



## BWTF in Newport, Oregon



## Communication & collaboration with City of Newport, Oregon to find & fix infrastructure problems



- [bwtf.surfrider.org/resources](http://bwtf.surfrider.org/resources)



Find a lab **BWTF.Surfrider.org** Explore Resources Enter Data Sign Out

### General Blue Water Task Force Information

- [Frequently Asked Questions](#)
- [Planning a Water Testing Program](#)
- [One-Stop-Shop for Beach Water Quality Monitoring across the U.S.](#)
- [BWTF Coordinator Handbook](#)

### Standard Operating Procedures: Sampling and Lab Instructions

- [Data Sheet](#)
- [Water Sampling Instructions & Sample Collection Video Demonstration](#)
- [Written BWTF Lab Instructions for IDEXX Quantitray/ Enterolert method & Surfrider Lab Tutorial video](#)
- [Enterolert & Colilert IDEXX how-to videos](#)
- [MPN Table for the Quanti-Tray 2000](#)
- [Training Checklist](#)
- [Participatory Waiver](#)
- [Source Tracking Protocol](#)

[BWTF.surfrider.org](http://BWTF.surfrider.org)



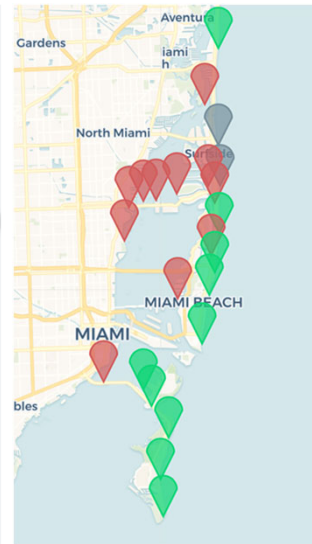
**Key**

Enterococcus (MPN/100mL)  
Based on water quality standards set by Florida Dep of Health

- Low Bacteria (0 - 35)
- Medium Bacteria (36 - 70)
- High Bacteria (> 70)

**Latest Results**

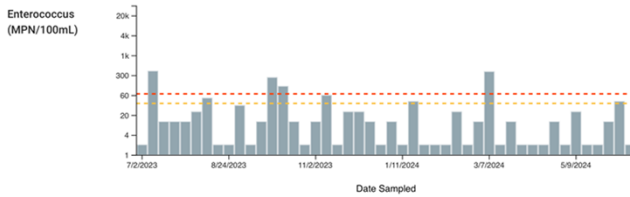
- Key Biscayne: Beach Club  
Tested on 6/27/2024
- Key Biscayne: Bill Baggs Cape Florida State Park  
Tested on 6/27/2024
- Key Biscayne: Crandon Park South  
Tested on 6/27/2024
- Miami Beach: 53rd St Beach  
Tested on 6/27/2024
- Miami Beach: 6500 Indian Creek  
Tested on 6/27/2024
- Miami Beach: Parkview / Kayak Launch  
Tested on 6/27/2024
- Miami Beach: Purdy/Sunset Harbor Kayak Launch  
Tested on 6/27/2024
- Miami Beach: South Pointe Park  
Tested on 6/27/2024
- North Bay Village: 360 Condo  
Tested on 6/27/2024
- North Biscayne Bay: Haulover Sandbar N  
Tested on 6/27/2024



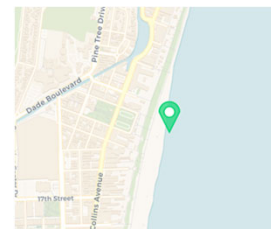
**Miami Beach: Collins Park, 21st St**

Last sampled 6/20/2024

- The latest test result for this site meets water quality standards set by Florida Department of Health
- 91% of samples collected at this site over the last 12 months meet water quality standards set by Florida Department of Health



Test Results	Date	Enterococcus	Indication Of
	6/20/2024	<10	Low Bacteria
	6/13/2024	41	Medium Bacteria
	6/6/2024	10	Low Bacteria
	5/30/2024	<10	Low Bacteria



**Key**

Enterococcus (MPN/100mL)  
Based on water quality standards set by Florida Dep of Health

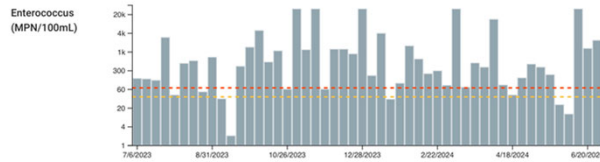
- Low Bacteria (0 - 35)
- Medium Bacteria (36 - 70)
- High Bacteria (> 70)

## Miami Beach: Parkview / Kayak Launch

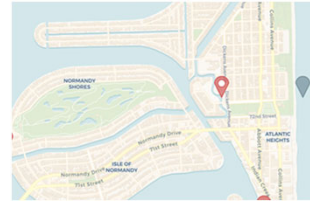
Last sampled 6/27/2024

▲ The latest test result for this site exceeds water quality standards set by Florida Department of Health

▲ 20% of samples collected at this site over the last 12 months meet water quality standards set by Florida Department of Health



Date	Enterococcus	Indication Of
6/27/2024	2359	High Bacteria
6/20/2024	1296	High Bacteria
6/13/2024	>24196	High Bacteria
6/6/2024	10	Low Bacteria
5/23/2024	20	Low Bacteria
5/16/2024	185	High Bacteria
5/9/2024	323	High Bacteria
5/2/2024	404	High Bacteria



### Key

Enterococcus (MPN/100mL)

Based on water quality standards set by Florida Dep of Health

- Low Bacteria (0 - 35)
- Medium Bacteria (36 - 70)
- High Bacteria (> 70)

## Communicating Blue Water Task Force Results

### Digital

- BWTF website & chapter website
- Email
- Social media posts
- Blogs & other media
- Annual Report



### In-Person

- Community presentations
- Outreach events


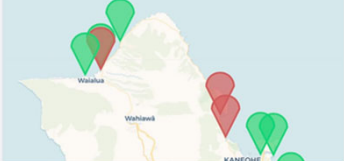


**Surfrider Foundation - Oahu Chapter**  
November 6 at 5:31 PM · 🌐

📍 **WATER QUALITY REPORT IS IN**

These past few weeks have brought lots of rain - which means spikes in bacteria across our 🌴. Click the link [bwtf.surfrider.org/report/44](https://bwtf.surfrider.org/report/44) to check out all the beaches we've tested for enterococcus and hit the 🙌 to thank our #BlueWaterTaskForce volunteers.

- 📍 Pua'ena Point
- 📍 Wa... See More

**Surfrider Foundation - Oahu Chapter**  
November 6 at 5:31 PM · 🌐

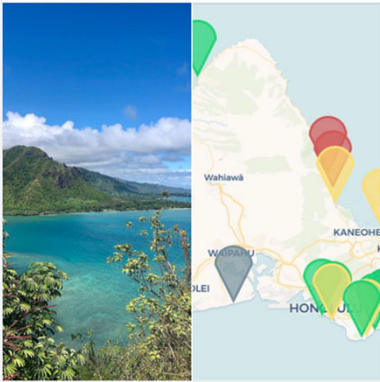
📍 **WATER QUALITY REPORT IS IN**


Checking our local water quality is just as important as checking the surf report because health=FUN 🌊

On Sunday, our #BlueWaterTaskForce 🙌 tested bacteria levels at 16 beaches around the 🌴 and the results are in:

- 📍 Waiahole Beach Park
- 📍 Black Point-East
- 📍 South Kaneohe Bay
- 📍 Waiiupu Beach Park
- 📍 Waimanalo Bay Beach Park

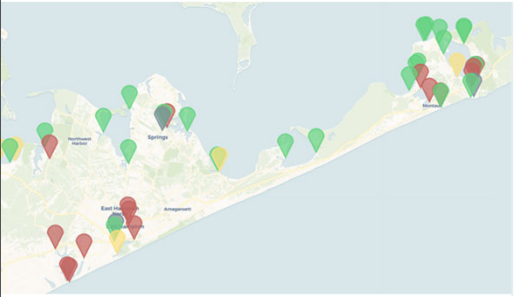
📍 Visit <https://bwtf.surfrider.org/report/44> to check our full report and to keep informed of Oahu's water quality!





## Water Quality Report

### 7.1.24



Enterococcus (MPN/100 ml)

(0 - 35) Low Bacteria  
 (36 - 103 ) Medium Bacteria  
 (> 104) High Bacteria

Site	Bacteria Level	History
Accabonac Harbor: East of Old Stone H	Low	<a href="#">Report</a>
Accabonac Harbor: Louse Point Beach	Low	<a href="#">Report</a>
Accabonac Harbor: Shipyard Ramp	High	<a href="#">Report</a>
Ditch Plains: East of Jetty	Low	<a href="#">Report</a>
EH Fithian Lane: South Drain	High	<a href="#">Report</a>
EH Methodist Lane Swale	High	<a href="#">Report</a>
EH Town Pond	Low	<a href="#">Report</a>
Fort Pond: Industrial	High	<a href="#">Report</a>
Fort Pond: Ramp	High	<a href="#">Report</a>
Fresh Pond: Beach	Medium	<a href="#">Report</a>
Fresh Pond: Creek	Low	<a href="#">Report</a>
Georgica Beach Ass./ Third Jetty	High	<a href="#">Report</a>
Georgica Pond Beach-side	High	<a href="#">Report</a>
Georgica Pond: Cove Hollow Access	High	<a href="#">Report</a>
Georgica Pond: Rte 27 Kayak Launch	High	<a href="#">Report</a>

Maui News

## Surfrider Foundation's Blue Water Task Force reports high bacteria levels at five Maui sites

By [Wendy Osher](#)


July 17, 2022 · 8:28 AM HST

\* Updated July 18, 2022 · 6:51 AM

 Recommend 58 



 6  
COMMENTS

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2 minutes

A A A

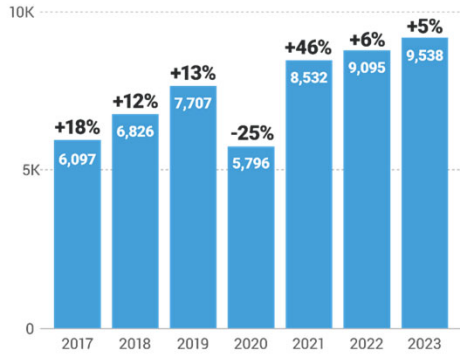


Five locations on Maui have high levels of enterococcus bacteria, according to samples taken on July 13, as part of a citizen scientist program conducted monthly by the Surfrider Foundation.



## Annual Growth in Water Testing

Number of BWTF Tests Per Year



## Priority Blue Water Task Force Beaches

Beach/Location	High Bacteria Rate
<b>Flying Point: Mecox Bay</b> Southampton, New York	<b>46%</b>
<b>Ballard Park</b> Melbourne, Florida	<b>37%</b>
<b>Park View Kayak Launch</b> Miami Beach, Florida	<b>73%</b>
<b>Playa Crashboat</b> Aguadilla, Puerto Rico	<b>26%</b>
<b>South Sound Thea Floss Floating Dock</b> Tacoma, Washington	<b>47%</b>
<b>Linda Mar Beach</b> Pacifica, California	<b>54%</b>
<b>San Luis Creek Mouth</b> San Luis Obispo, California	<b>35%</b>
<b>Imperial Beach</b> San Diego, California	<b>100%</b>
<b>Kahalu'u</b> Kahalu'u, O'ahu, Hawaii	<b>86%</b>
<b>Nāwiliwili Stream at Kalapaki Bay</b> Lihue, Kauai, Hawaii	<b>100%</b>



## Los Angeles Times

California beach is most polluted seen in new study. People are 'getting sick left and right'



FLORIDA

**2 Florida beaches among the most polluted in the U.S., according to the Surfrider Foundation**



## Eastern Long Island BWTF Annual Water Quality Report



TABLE 2. SUMMARY OF RESULTS FOR EAST HAMPTON SITES IN 2023.

EAST HAMPTON	Site Type	Sample Count 2023	% High Samples 2023
Accabonac Harbor: Louse Point Beach	Bay Beach	20	10%
Accabonac Harbor: Shipyard Ramp	Harbor	20	10%
EH Town Pond	Pond	16	6%
Fresh Pond: Beach	Bay Beach	24	13%
Fresh Pond: Creek	Creek	22	18%
Georgica Beach Assoc./ Third Jetty	Ocean Beach	26	0%
Georgica Pond Beach-side	Pond	26	50%
Georgica Pond: Cove Hollow Access	Pond	25	72%
Georgica Pond: Rte 27 Kayak Launch	Pond	25	72%



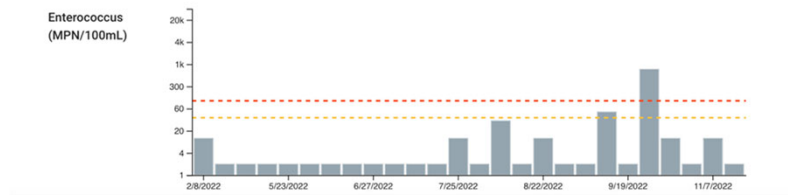


### SURFSIDE PLACE: OCEAN BEACH

This site is located on the ocean beach in front of the Mostrador Marram hotel, formerly Atlantic Terrace. It is a beautiful location where sunbathers and surfers can enjoy clean waters, as we only had one high result in 2022. However, there's potential for the ocean beach to be contaminated with stormwater from the outfall pipe that drains from the dune (see below).

**4%**  
OF SURFSIDE OCEAN  
SAMPLES IN 2022  
EXCEEDED HEALTH  
STANDARDS FOR  
BACTERIAL COUNTS

#### Surfside Place: Ocean Beach Results

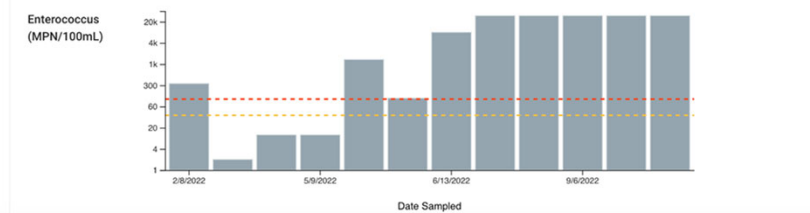



### SURFSIDE PLACE: OUTFALL PIPE

What was once a creek that received runoff from the nearby properties, is now channeled into an outfall pipe that discharges onto the same beautiful beach described above. Samples can only be collected here when stormwater flows through the pipe after it rains, with a 75% chance of bacteria concentrations being unsafe for recreation, people and especially children should refrain from entering this water and use caution if it is flowing enough to reach the ocean.


**75%**  
OF OUTFALL SAMPLES  
IN 2022 EXCEEDED  
HEALTH STANDARDS  
FOR BACTERIAL  
COUNTS

#### Surfside Place: Outfall Pipe Results





**BLUE WATER TASK FORCE**  
**HAWAII WATER QUALITY REPORT**  
 2023




CB HONOLULU CIVIL BEAT
 Hawaii News Maui Fires Ideas Spe

Environment

## Hawaii Moves To Improve Water Testing At Popular Beaches

Advocates have been pushing the state for years to increase how often it tests popular swimming and surfing beaches for harmful bacteria.



HAWAII NEWS NOW SUNRISE  
**BACTERIA AT BEACHES**  
 POLLUTION AT POPULAR SPOTS IN HAWAII



Nāwiliwili Stream  
at Kalapakī Bay

LĪHU'E, KAUA'I, HI

100%

of samples collected in 2023 failed to meet state health standards.

⚠ CAUTION




HIGH BACTERIA  
LEVELS FOUND

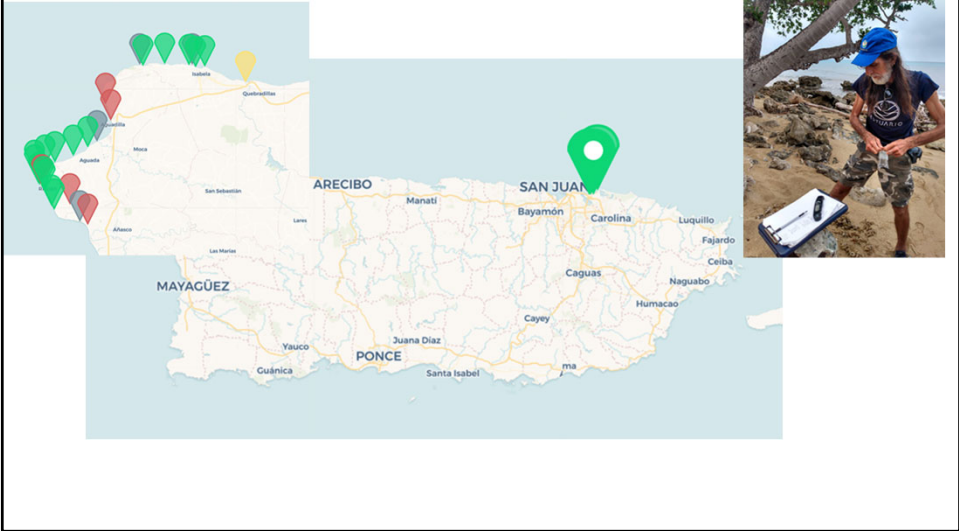
in ocean and stream  
especially after heavy rainfall

Contact with water may cause illness



For more information contact  
 (808) 635-2593

# Blue Water Task Force in Puerto Rico

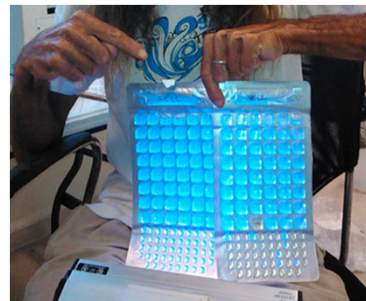


## Surfrider Rincon, Puerto Rico *Post-Maria Water Sampling Program*

- Days, weeks & months after Hurricane Maria: electricity, potable water, communications and travel were challenging.
- Rincon BWTF has established a strong reputation & many community partners over last decade.
- 1 month post-storm, BWTF lab re-located to Costa Salud Health Center with generator powered electricity.
- Weekly sampling of beaches resumed, conditions mostly good. Sewage infrastructure problems reported.



## Rincon BWTF starts freshwater sampling program



## Maui Post-Fires Coastal Water Quality Monitoring Program

- Worked with other NGOs, State & federal agencies and University of Hawaii
- Tested recreational coastal waters on west Maui near *Lāhainā*
  - *Heavy metals, PAHs, fecal bacteria, suspended solids*
- [maui.surfrider.org/lahainawaterquality](http://maui.surfrider.org/lahainawaterquality)



## Blue Water Task Force

- Activate volunteers
- Educate students & nurture future leaders
- Build chapter credibility & legitimacy
- Form community partnerships
- Build community awareness of water quality issues
- Identify sources of pollution
- Advocate for solutions







## CITIZEN SCIENTISTS MONITORING HARMFUL ALGAL BLOOMS

*Promoting a better understanding of Harmful Algal Blooms  
by way of volunteer monitoring.*

Steve L. Morton, Ph.D.

HAB Monitoring & Reference Branch  
Stressor Impacts Division



NATIONAL CENTERS FOR COASTAL OCEAN SCIENCE  
[coastalscience.noaa.gov](http://coastalscience.noaa.gov)

## Internal HAB Portfolio

### HAB Forecast Branch

- Conducts applied research needed to inform ecological forecasts
- Advances satellite methods for detecting HABs
- Develops and delivers ecological forecasts
- Helps stakeholders mitigate HAB impacts

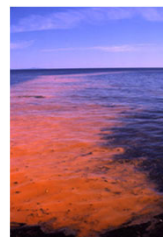
### HAB Monitoring & Reference Branch

- Develops monitoring technology
- Validates methods (human & autonomous)
- Validates measurements
- Serves as reference laboratory
- Trains managers and volunteers



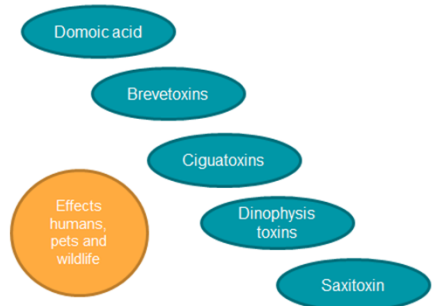
NATIONAL CENTERS FOR COASTAL OCEAN SCIENCE  
coastalscience.noaa.gov

## Harmful Algal Blooms

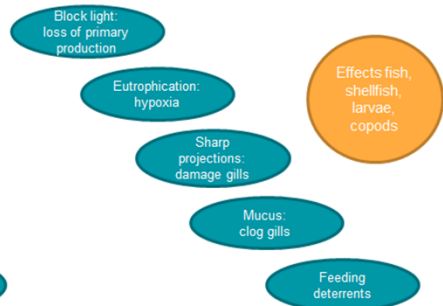


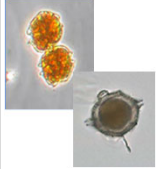

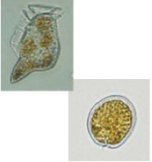

## HARMFUL ALGAL BLOOMS

### TOXIN MEDIATED



### PHYSICAL/CHEMICAL MEDIATED



Paralytic Shellfish Poisoning (PSP)	Amnesic Shellfish Poisoning (ASP)	Diarrhetic Shellfish Poisoning (DSP)	Neurotoxic Shellfish Poisoning (NSP)
			
<b>dinoflagellate <i>Alexandrium</i> <i>Pyrodinium</i></b>	<b>diatom <i>Pseudo-nitzschia</i></b>	<b>dinoflagellate <i>Dinophysis</i> spp. <i>Procentrum</i> <i>lima</i></b>	<b>dinoflagellate <i>Karenia brevis</i></b>
<b>saxitoxins</b>	<b>domoic acid</b>	<b>okadaic acid and congeners</b>	<b>brevetoxins</b>
<b>0.8 ppm 0.8 mg STX equiv/kg</b>	<b>20 ppm 20mg/kg</b>	<b>0.16 ppm 0.16 mg OA equiv/kg</b>	<b>5000cells/L 20MU/100g 0.8mg PbTx- 2equiv/kg</b>

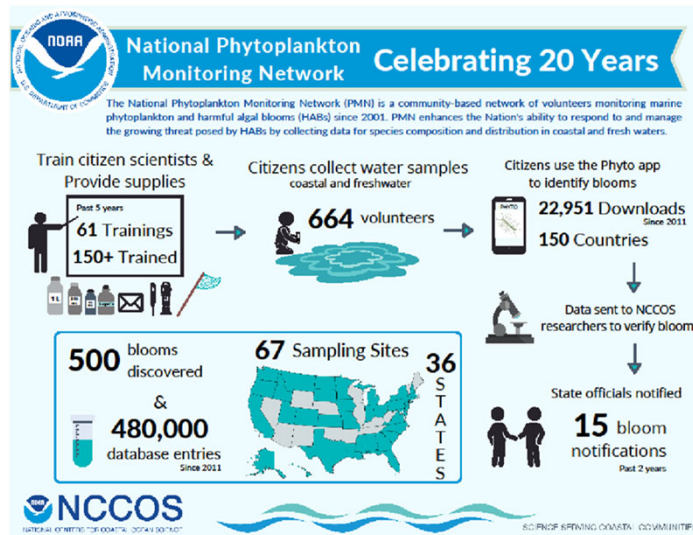
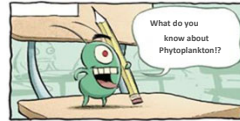


## Phytoplankton Monitoring Network



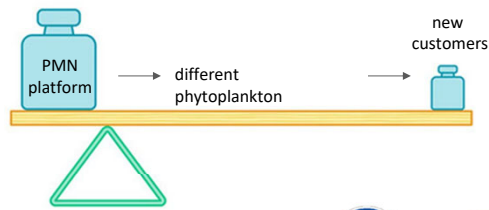
### PMN Mission ~

*“To educate the public on harmful algal blooms (HABs) while expanding the knowledge of phytoplankton that exist in coastal waters.”*



## PMN Leverage Opportunities

**additional benefits**  
that can be developed around  
the technology transfer itself



2013-present  
**Tribal Nations PMN**  
*Coupling PMN with  
NCCOS developed  
toxin detection  
methods*

2015-2020  
**Freshwater PMN**  
*cyano-HABs*

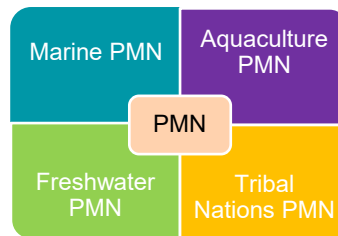
2020-2025  
**Aquaculture PMN**  
*ichthyotoxic-HABs*



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coastalscience.noaa.gov

Train citizen scientist to monitor harmful phytoplankton and environmental conditions in marine and estuarine waters

Train citizen scientist to monitoring harmful cyanobacteria in Great Lakes and inland water bodies



Empower shellfish farmers with advance warning of HABs, mitigating the threat of HABs, and minimizing economic losses to the aquaculture shellfish industry

Empower tribal communities to monitor the growing threat of HABs to subsistence-harvested resources and transfer NCCOS developed toxin detection methods

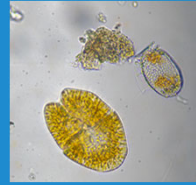
## Coastal PMN

Train citizen scientists to monitor harmful phytoplankton and environmental conditions in marine and estuarine waters



"PMN volunteers at the UGA Aquarium represent our longest standing community science effort. Our team of volunteers have dedicated over 18 years and almost 700 hours of their time to monitoring for HABS, learning about phytoplankton and teaching others." *Kate Higgins (left), UGA Marine Education Center and Aquarium*

- 75 active sites in CONUS
- Newest site is Pago Pago, American Samoa
- Train diverse participant groups and individuals to identify and monitor for HAB organisms



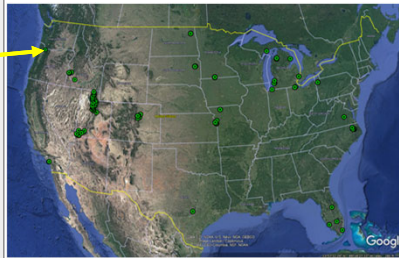
SCIENCE SERVING COASTAL COMMUNITIES

## Freshwater PMN

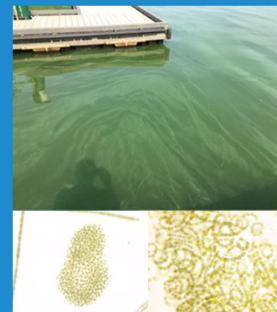
Train citizen scientists to monitoring harmful cyanobacteria in Great Lakes and inland water bodies



"Gathering low cost yet authoritative data on the critical status of our lake's health helps us support our key decision-makers in their efforts to allocate resources for lake health. Without this program, we were 'swimming upstream!'"  
- *Marie Tabata-Callera, Lacamas Lake Watershed Council*



- Began with IAA with EPA Office of Water
- 25 active sites
- 5 Target cyanobacteria



SCIENCE SERVING COASTAL COMMUNITIES

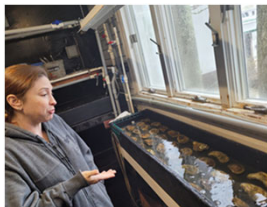
**Tribal Nations PMN**

Establish HAB monitoring programs and laboratories throughout Alaska where subsistence harvesters are at risk of illness or death because toxin levels are unknown.



**Aquaculture PMN**

Empower shellfish farmers with advance warning of HABs, mitigating the threat of HABs, and minimizing economic losses to the aquaculture shellfish industry



“Thank you for this information, it’s exactly what I thought was happening to our larvae. We have since switched from bay water to well water in hopes to eliminate [the chance of] any toxic algae effecting the larvae.”

*Lizzie Savage, Hart Lobster Hatchery*



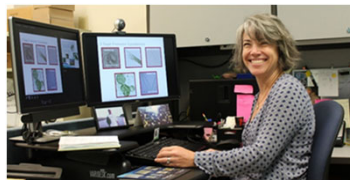
“I am beyond thrilled and very thankful to you both for this opportunity. You could easily be saving the future of our company/hatchery/nursery along with a few hundred small lease farmers across Florida that cannot get oyster seed. Thanks for giving us some hope.”

*Gayle Johnson, Director of the Apalachicola Oysters Company*

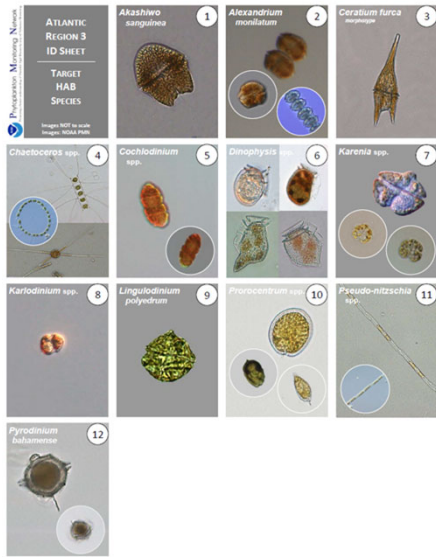


## Use of Technology

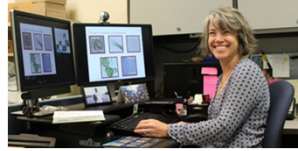
Rigour: combination of staff experience & use of tools delivers quality results: Interfacing users with technology



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[coastalscience.noaa.gov](http://coastalscience.noaa.gov)

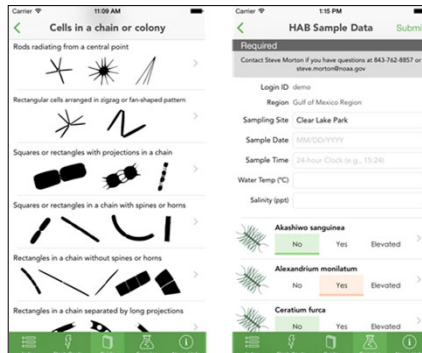
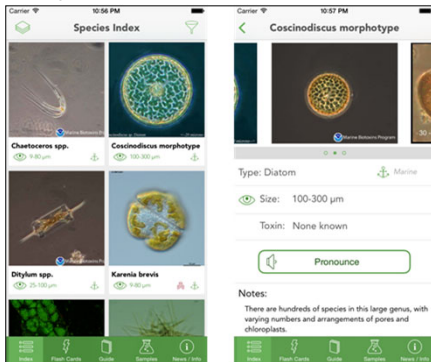


## Training



- Usually done remotely
- Background of algae/cyano
- What puts the H in HAB?
- Sampling protocols
- How to ID Target species

## Phyto free download for both Android and Apple



## For More Information

Steve Morton  
Research Oceanographer  
NOAA/NOS/NCCOS  
Hollings Marine Laboratory  
331 Fort Johnson Road  
Charleston, SC 29412

[steve.morton@noaa.gov](mailto:steve.morton@noaa.gov)



Links:

<https://coastalscience.noaa.gov/research/stressor-impacts-mitigation/pmn/>- PMN website

<http://youtu.be/ltxoB06De0-> Phyto app demo



## EPA Water Data Tools for Participatory Science

Adam Griggs

USEPA, Office of Water, Water Data  
Integration Branch

# Connected Water Quality Data Systems

## View/Integrate

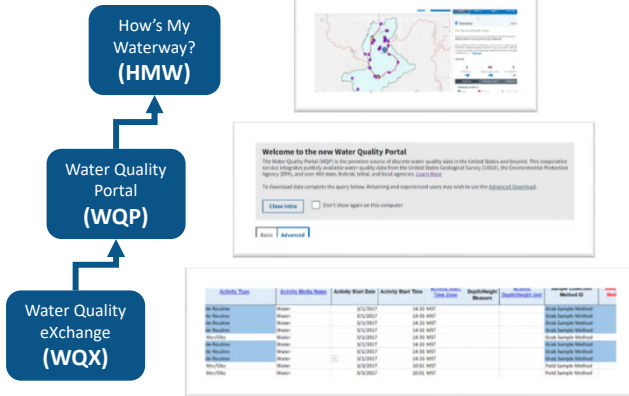
Explore your data alongside listings, point sources, and protection information

## Download/Use

Download or Retrieve/Use your data alongside data from others. Develop custom data apps

## Share/Manage

Make your data available to your community and decision makers



# Who is using WQX?

- Federal and State Agencies and Programs
- Tribes, Pueblos, First Nations
- Local Government
- Research/Academia
- Private Industry
- Non-Governmental Organizations
- Volunteer Monitoring

**1,589 WQX/USGS  
'Organizations' with data**

**Download Status**

Your query will return **427,630,128** sample results from **1,092,472** sites:  
 From BIODATA: 0 sample results from 0 sites  
 From NWIS: **115,179,226** sample results from **427,247** sites  
 From STEWARDS: 0 sample results from 0 sites  
 From STORET: **312,450,902** sample results from **665,225** sites

Click Continue to download the data



## How can sharing data to WQX help your program?



**Data Security** – You’ve invested a lot in your monitoring data. Sharing it to WQX ensures that there will always be a copy in case something happens on your end



**Data Sharing** – Sharing the data you collect can help inform your community, decision-makers, and researchers working to protect water resources and human health.



**Data Management** – Relational data management and dataset integration. Organize data by Projects, locations, etc. Attach your relevant files. Manage data and metadata. \*Some programs are now relying solely on WWX/WQP to be their database.

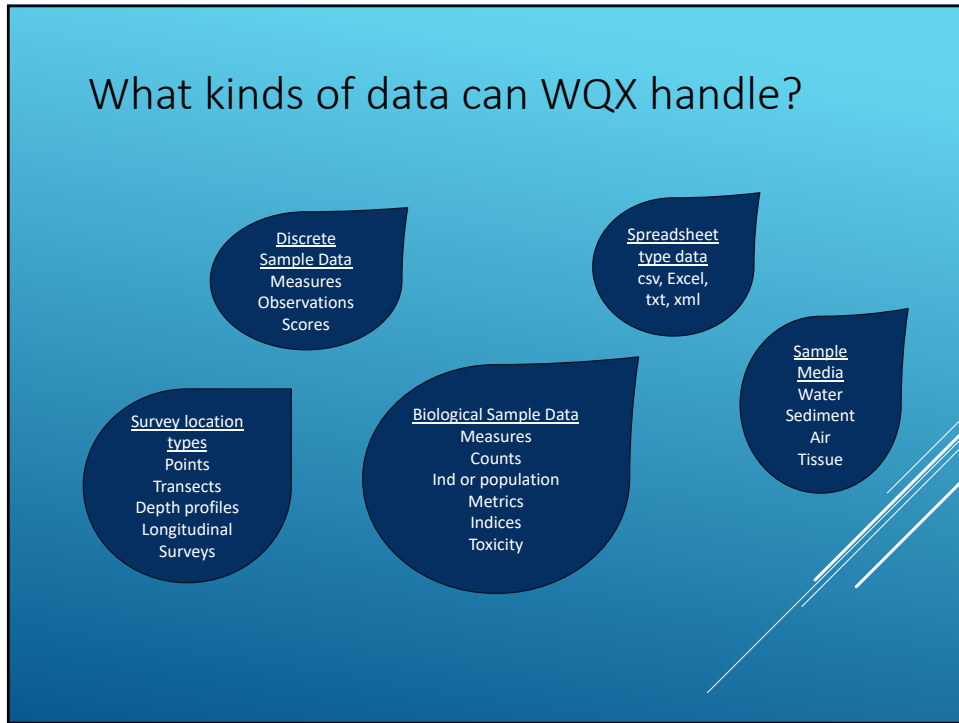


**Data Use** – The WQP is a modern data delivery service. Your data analysis team can build projects that call the WQP, allowing you to build online data portals, maps, and reports with ease. Data also natively flows to HMW, TADA, other tools.

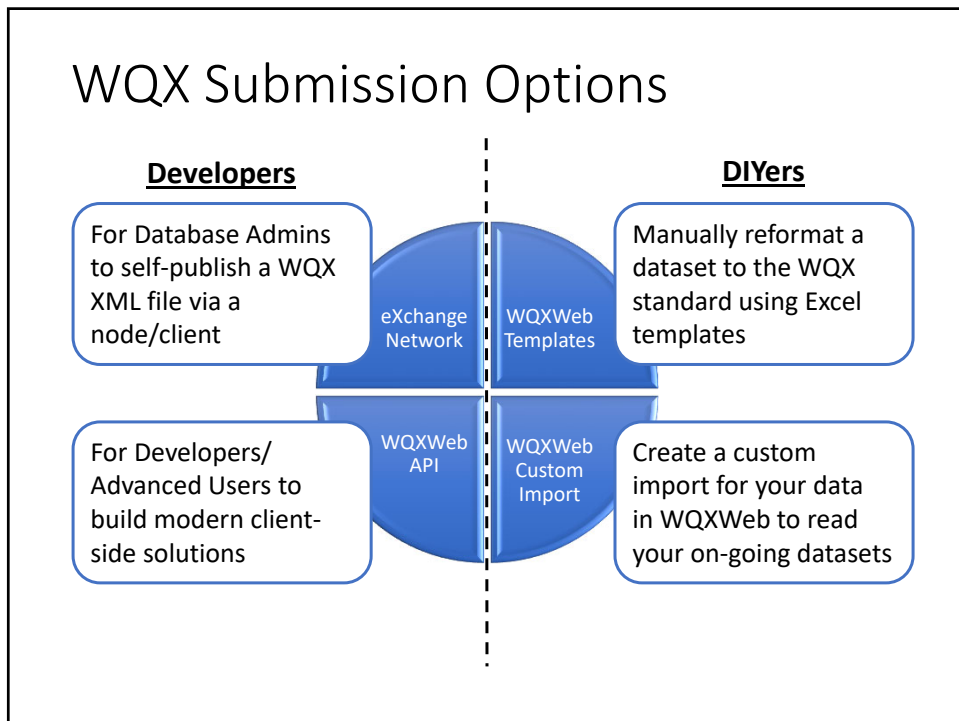
## Two Main Types of Data Warehouses

	<b>Dataset Catalogue</b>	<b>Shared Relational Database</b>
<b>Data Provider</b>	Unformatted Datasets	Standardized Datasets
<b>Data Warehouse</b>	Who? What? Where?	Who? Why? What? How? Where?
<b>Data User</b>	Limited value Doesn't add up easily Requires person power to use	Comparable datasets Statistical power Machine readable
	Easy to submit	Some effort Required
	Min Metadata	More Metadata
	Effort Required	Data into Information

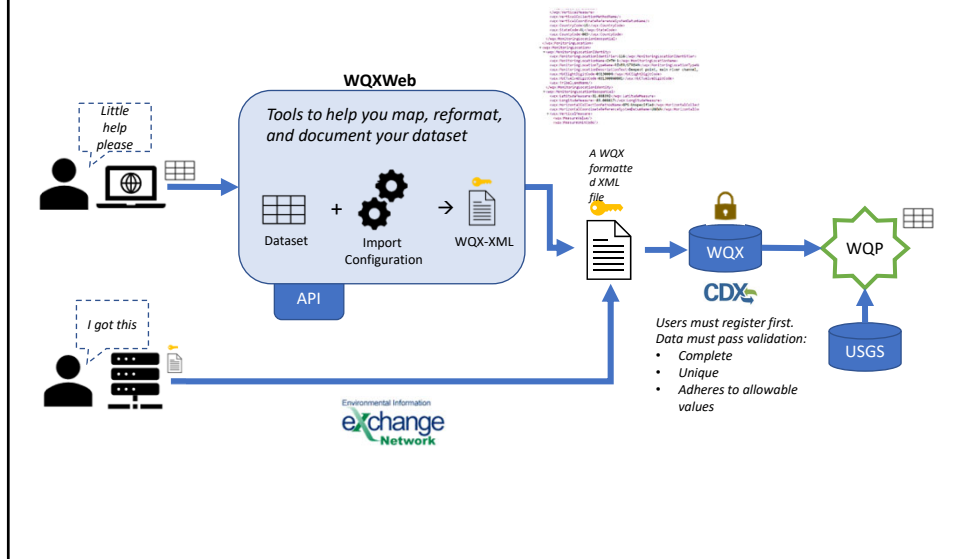
## What kinds of data can WQX handle?



## WQX Submission Options



# Pathways to WQX and the Portal



## What is WQXWeb?

WQXWeb is the web application that allows users to import, manipulate, validate, and upload their datasets to WQX.

The screenshot shows the WQXWeb Home Page. It features the EPA logo and a navigation menu with options like Home Page, Setup, Domain Values, Import & Submit, Review, Administrator, and Help. The main content area includes a "Welcome!" message and a list of links for "Edit or Review Domain Values", "Create or Edit an Import Configuration", "Import a File", and "Continue with an Existing Dataset".

# Submitting Data to WQX

When you submit data to WQXWeb, you submit three tables, one each for Projects, Locations, and Activities/Results.

**All Project Info**

Project ID	Project Name
001	Cyano Monitoring
002	Probabalistic mon
003	Trends Program

**Project ID**  
Project Name  
Project Description

**All Location Info**

Loc ID	Location Name
001	Deep Blue Lake
002	Muddy Run
003	Fishing Creek

**Location ID**  
Location Name  
Location Type  
Coordinates  
Location Method

**All Result-level Info and metadata**

Activity ID	Sample Date	Characteristic	Value	Unit
003	5/3/2012	pH	7.6	SU
003	5/3/2012	Temperature	19.1	Deg C
003	5/3/2012	Conductivity	236	µS/cm

**Project ID**      Characteristic Name  
**Location ID**      Result Value  
Start Date      Result Unit  
Collection Method      Result Status  
Sample Media      Analytical Methods  
Collection Equipment      Result Value Type

# Using the WQX Web Templates

<https://www.epa.gov/waterdata/water-quality-exchange-web-template-files>

<b>Using WQX – Templates</b>	<a href="#">Water Quality Exchange Web Template User Guide   US EPA</a> <a href="#">Link to Web Templates</a> <a href="#">Web Templates Overview Video</a>
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### Available WQX Web Templates

Physical/Chemical	Metrics/Indices
Biological	Lab Data
Habitat	Continuous Template

[Link to Web Template](#)

The Biological Template is provided to assist in formatting biological results.  
\*Note this template does not include the data elements for submitting biological results or indices; these are handled using a separate WQX web template file.

Element	Type of Data
WQX 3.0 - Template Biological (Template) - Data	Results & Activities

[Link to Web Template](#)

The Habitat Template is provided to assist in formatting habitat results.  
\*Note this template does not include the data elements for submitting metrics or habitat indices; these are handled using the WQX web metrics index Template.

Element	Type of Data
WQX 3.0 - Template Habitat (Template) - Data	Results & Activities

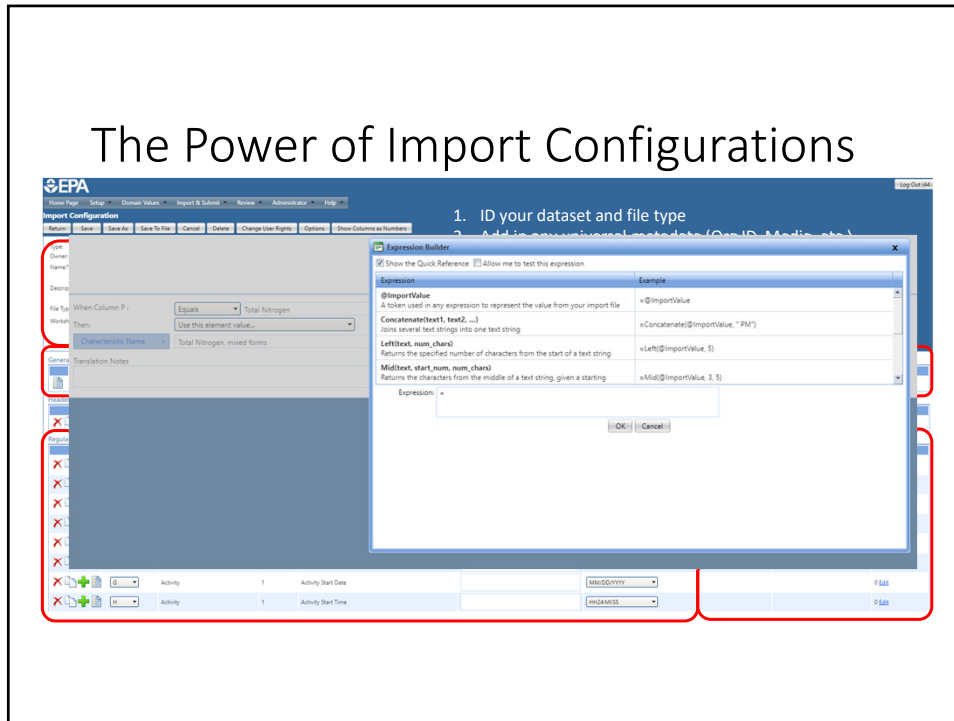
[Link to Web Template](#)

The Metrics Index Template is provided to assist in formatting biological and habitat metrics and indices.

Element	Type of Data

Each Template Tab has a matching Import Configuration in WQXWeb!

# The Power of Import Configurations

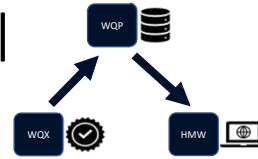


## Quick Example

- Recently received dataset
- Contacted the Helpdesk, received support mapping their format in WQXWeb
- Uploaded >25 years' worth of data without changing their table below

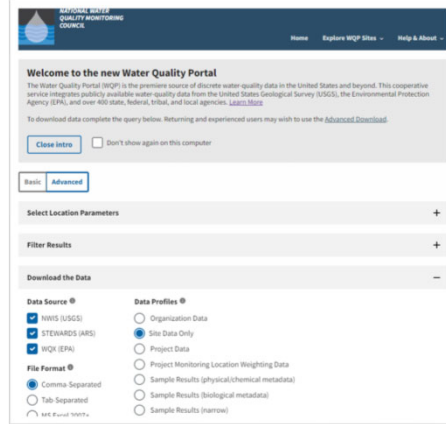
RecNo	SiteID	Waterbody_Name	Site Location	Sample Date	Sample Time	Air Temp °C	Water Temp °C	Sample Volume (ml)	E. coli / 100 mL (cfu)	Tot coli / 100 mL (cfu)
1	2275	Dykes Creek	at Fowl River Rd	23-Mar-17	13:50	26.0	22.0	1.0	767	
2	2275	Dykes Creek	at Fowl River Rd	25-Apr-17	12:15	27.5	22.0	1.0	33	2067
3	2275	Dykes Creek	at Fowl River Rd	26-May-17	10:40	29.0	21.0	1.0	33	1733
4	2275	Dykes Creek	at Fowl River Rd	28-Jun-17	10:20	29.0	24.5	1.0	33	1667
5	2275	Dykes Creek	at Fowl River Rd	23-Aug-17	11:20	31.5	25.0	1.0	200	5467
6	2275	Dykes Creek	at Fowl River Rd	29-Aug-17	10:15	24.5	22.0	1.0	33	1833
7	2275	Dykes Creek	at Fowl River Rd	21-Sep-17	10:00	29.5	23.5	1.0	67	3900
8	2275	Dykes Creek	at Fowl River Rd	20-Nov-17	11:05	13.0	15.0	1.0	0	333
9	2275	Dykes Creek	at Fowl River Rd	24-Dec-17	10:20	17.0	17.0	1.0	33	633
10	2275	Dykes Creek	at Fowl River Rd	26-Jan-18	10:20	16.0	14.5	1.0	0	1033
11	2275	Dykes Creek	at Fowl River Rd	26-Feb-18	11:15	21.0	19.0	1.0	33	2267
12	2275	Dykes Creek	at Fowl River Rd	26-Mar-18	11:18	20.0	19.5	1.0	67	1500
13	2275	Dykes Creek	at Fowl River Rd	24-Apr-18	10:15	24.5	19.0	1.0	0	1733
14	2275	Dykes Creek	at Fowl River Rd	20-May-18	10:00	27.5	24.0	1.0	33	733
15	2275	Dykes Creek	at Fowl River Rd	26-Jun-18	10:15	35.0	28.0	1.0	33	1333
16	2275	Dykes Creek	at Fowl River Rd	26-Jul-18	10:05	31.5	27.0	1.0	67	1733

# Water Quality Portal



Operated under an Interagency Cooperative agreement (USGS & EPA)

- Serves data from USGS, EPA, USDA, NPS in a standard WQX format
- # WQP: Data from >1,600 organizations
- # WQP: >425m records from >1m sites
- Serves data of All Water Types
- Includes a Graphical User Interface (GUI) & Web Services
- One of Our Integrated Systems (IOW HUB)
- DATA Services can directly power analytics like those in HMW
- Growing Number of internal/external Tools built on top of this Primary data source



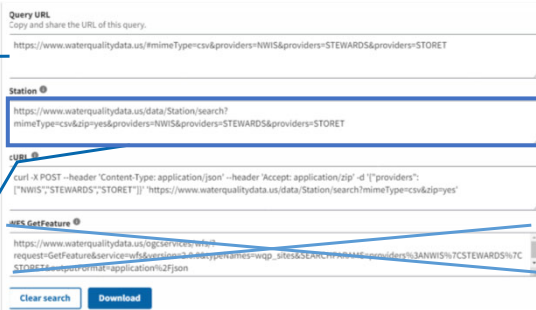
## Using Data from WQP Web Services

Web services provide URLs that can include the instructions from your query and retrieve the requested data automatically

Save the URL to your Query

URL of your data download

Paste this link in your preferred application to link to your data



# How's My Waterway? *Water Information Viewer*

How's My Waterway?  
Explore, Discover and Learn about your water.

Community State & Tribal National

Let's get started!  
WATERSHED: Kinickonic River (04040003001)

3646 S 17th St, Milwaukee, Wisconsin, 53221  
WATERSHED: Kinickonic River (04040003001)  
SIZE: 15,949 acres / 64.54 km<sup>2</sup>

Overview

Your Waters: What We Know  
Waters in your community are connected within a local watershed. The dashed outline on the map shows your watershed.

Water quality is monitored for physical, chemical and biological factors. The monitoring results are assessed against EPA approved water quality standards or thresholds. Water can be impaired, meaning it is not able to be used for certain purposes... [Show more](#)

18 Waterbodies 413 Water Monitoring Locations 48 Permitted Dischargers

Waterbody Conditions:  
● Good ● Impaired ▲ Condition Unknown

Overall condition of 18 waterbodies in the Kinickonic River watershed.

Assembles and Integrates information from dozens of independent systems and datasets

# How's My Waterway? *Includes Discrete Monitoring Data*

How's My Waterway?  
Explore, Discover and Learn about your water.

Community State & Tribal National

Let's get started!  
WATERSHED: Kinickonic River (04040003001)

3646 S 17th St, Milwaukee, Wisconsin, 53221  
WATERSHED: Kinickonic River (04040003001)  
SIZE: 15,949 acres / 64.54 km<sup>2</sup>

Overview

Your Waters: What We Know  
Waters in your community are connected within a local watershed. The dashed outline on the map shows your watershed.

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18 Waterbodies 413 Water Monitoring Locations 48 Permitted Dischargers

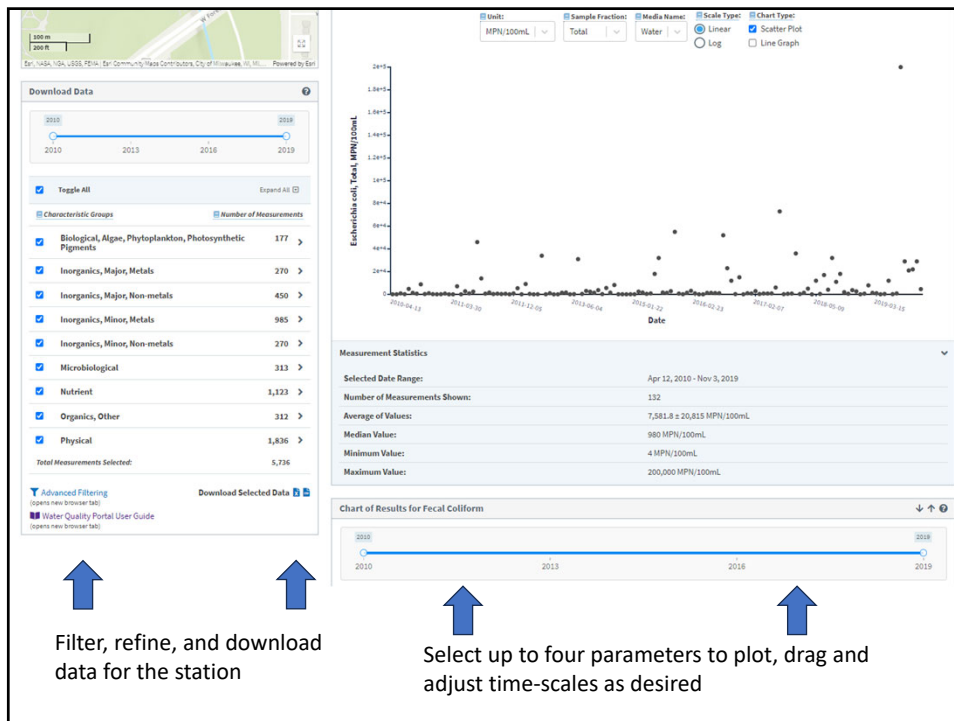
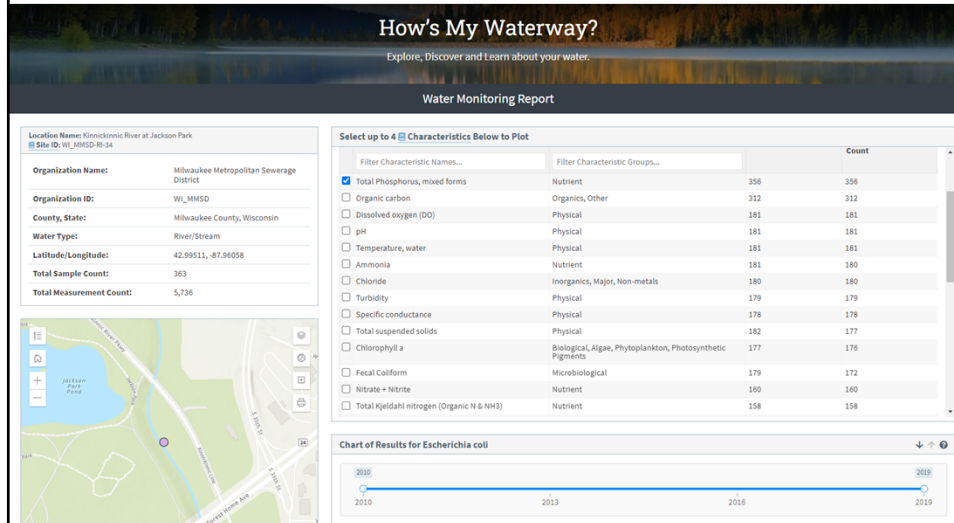
Waterbody Conditions:  
● Good ● Impaired ▲ Condition Unknown

Overall condition of 18 waterbodies in the Kinickonic River watershed.

Includes data from USGS sensors, CYAN satellite estimates, and WQP data > 1.3 m stations

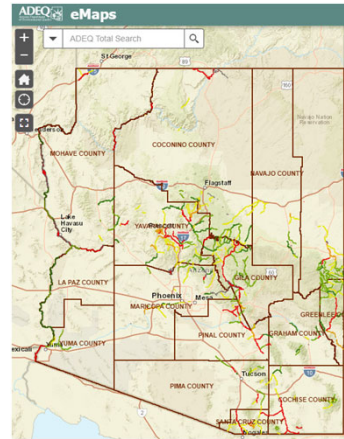
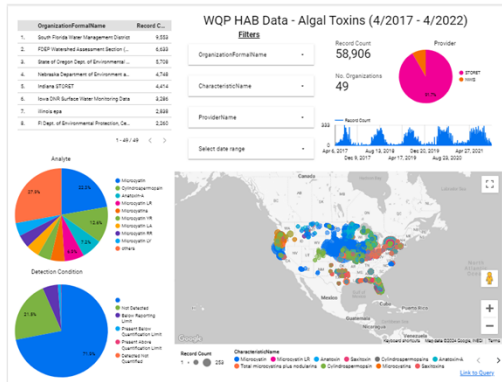
# How's My Waterway?

## Explore charts of sampled parameters





# HMW is just an example...*Share your Data and Build Your Own Water Science Communication Application*



Thank you!

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[WQX@epa.gov](mailto:WQX@epa.gov)

[Water Quality eXchange](#)

[Water Quality Portal](#)

[How's My Waterway](#)

## Participation Certificate

- If you would like to obtain a participation certificate you can access the PDF in the **Handouts** section of your control panel.

Questions?

## Watershed Academy Webcasts

More webcasts coming soon!

The slides from today's presentations are posted on the Watershed Academy webpage.

A recording of the webcast will be posted within the next month.

[www.epa.gov/watershedacademy](http://www.epa.gov/watershedacademy)

## Contact Information

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Thank You!