

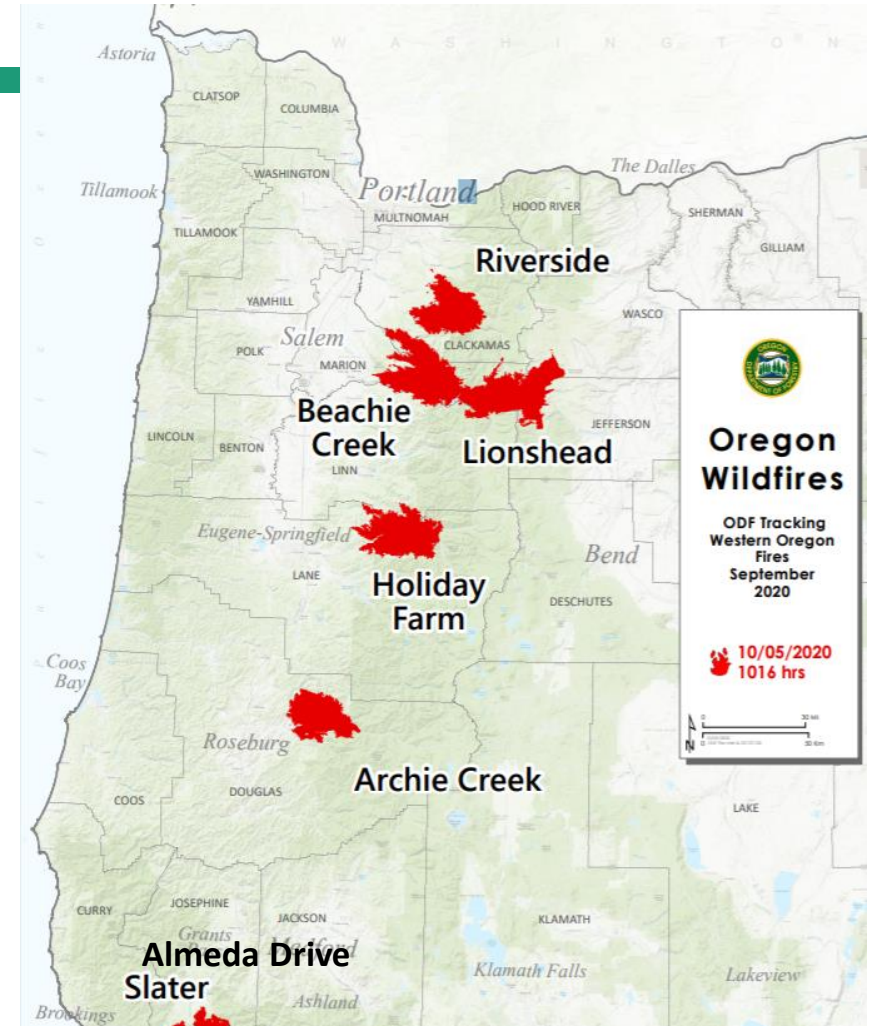
State of the Basin: HABs monitoring and other post wildfire concerns

Aaron Borisenko, Oregon DEQ Water Quality Monitoring Manager
Alison Minerovic Frohn, Oregon DEQ HAB Monitoring Coordinator

Protecting Drinking Water Sources from Cyano-HAB Impacts in the Willamette Basin
April 28, 2021

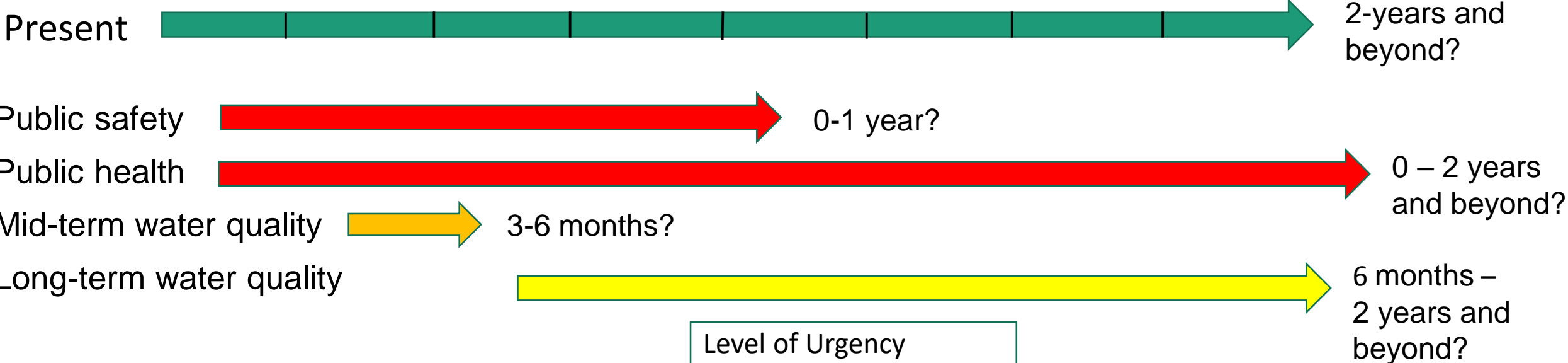
Post fire monitoring questions

- What is the extent, severity and type of wildfire damage in the area?
- What are immediate public safety and public health concerns?
- What do we know about water quality impacts from previous studies?
- What do initial water quality data collection results show?
- What are the potential long-term impacts to beneficial uses of water?
- What data collection and analytical resource do we have at our disposal?
- What are the information needs and who needs it?
- What other factors should be considered like weather effects?
- We can't forget about potential impacts to groundwater.
-and ???






<https://www.oregon.gov/odf/fire/documents/odf-siege-map.pdf>

Monitoring timelines post fire



Level of Urgency

- Critical 
- High 
- Medium 







Governor's Wildfire Science Team

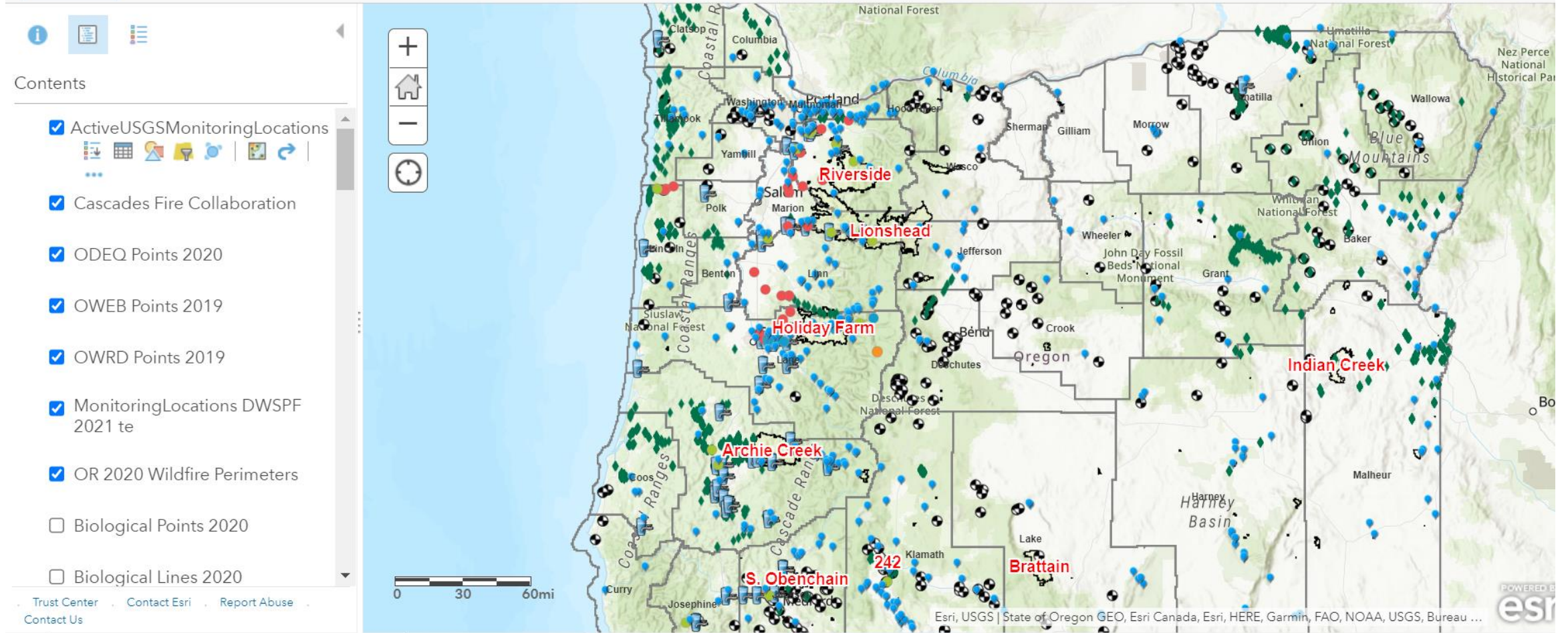
- Develop a catalogue of monitoring activities.
- Develop a monitoring playbook for the future.
- Identify monitoring gaps.
- Bring the monitoring data together.
- Hold a symposium on lessons learned.

2020 Wildfire Monitoring Maps

Home ▾ 2020_Wildfire_Monitoring_Map_February_25_2021 

Open in new Map Viewer New Map ▾ Create Presentation  Aaron

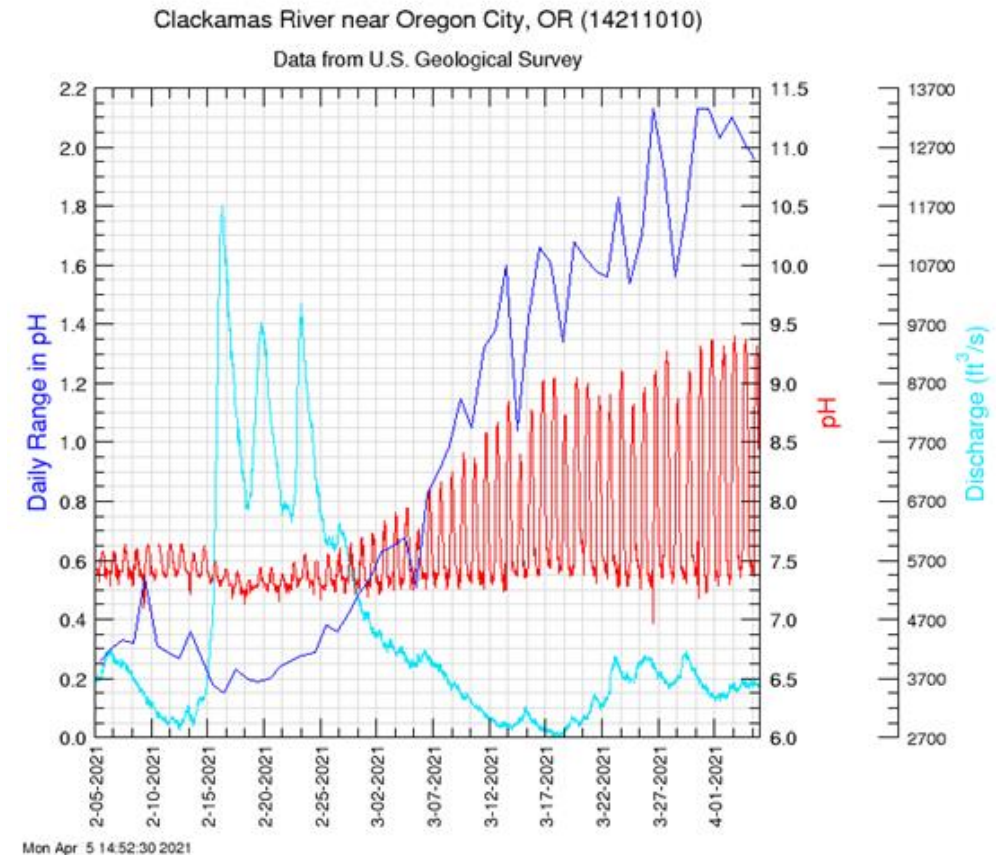
 Details  Add ▾  Edit  Basemap  Analysis  Save ▾  Share  Print ▾  Directions  Measure  Bookmarks 



Early signs of a busy HAB season?

- April was the driest on record.
- Some evidence that 2021 may be a busy HAB season
 - Elevated pH in Clackamas River (diel swings of ~2.5 pH units!)
 - Similar reports in North Umpqua basin

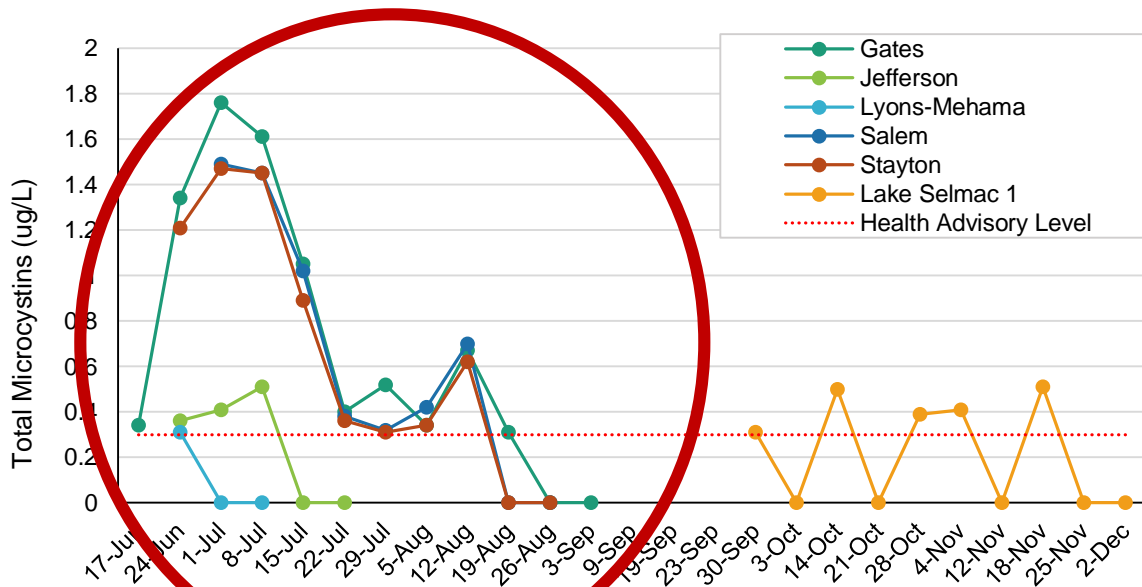
Graph created Monday, 05-Apr-2021, 14:52 EDT



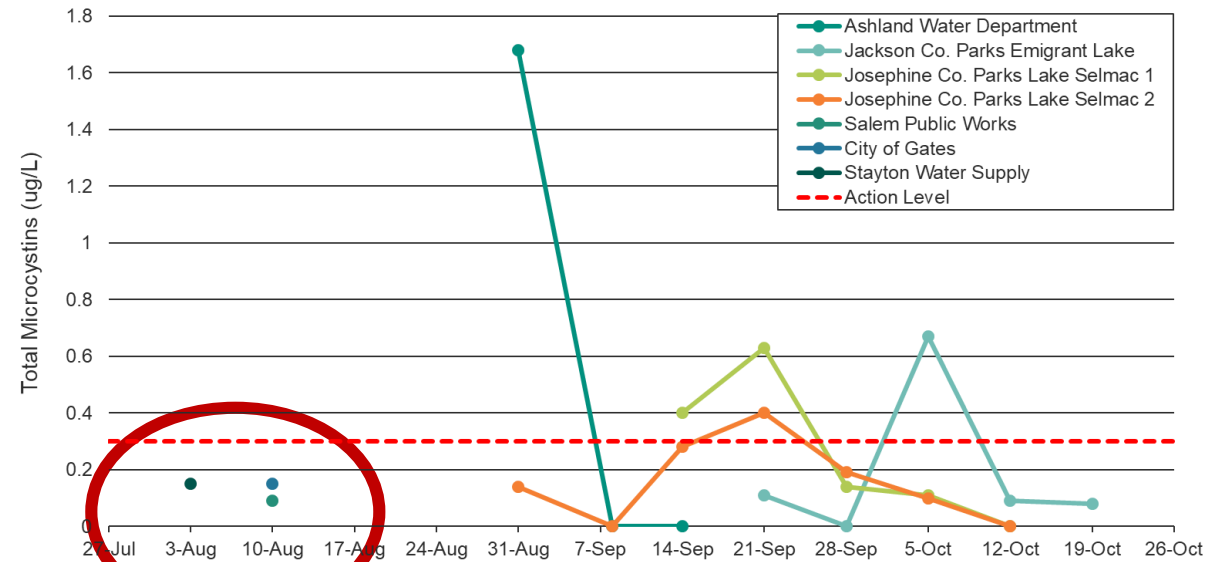
**Provisional data

2019 vs. 2020 vs 2021?

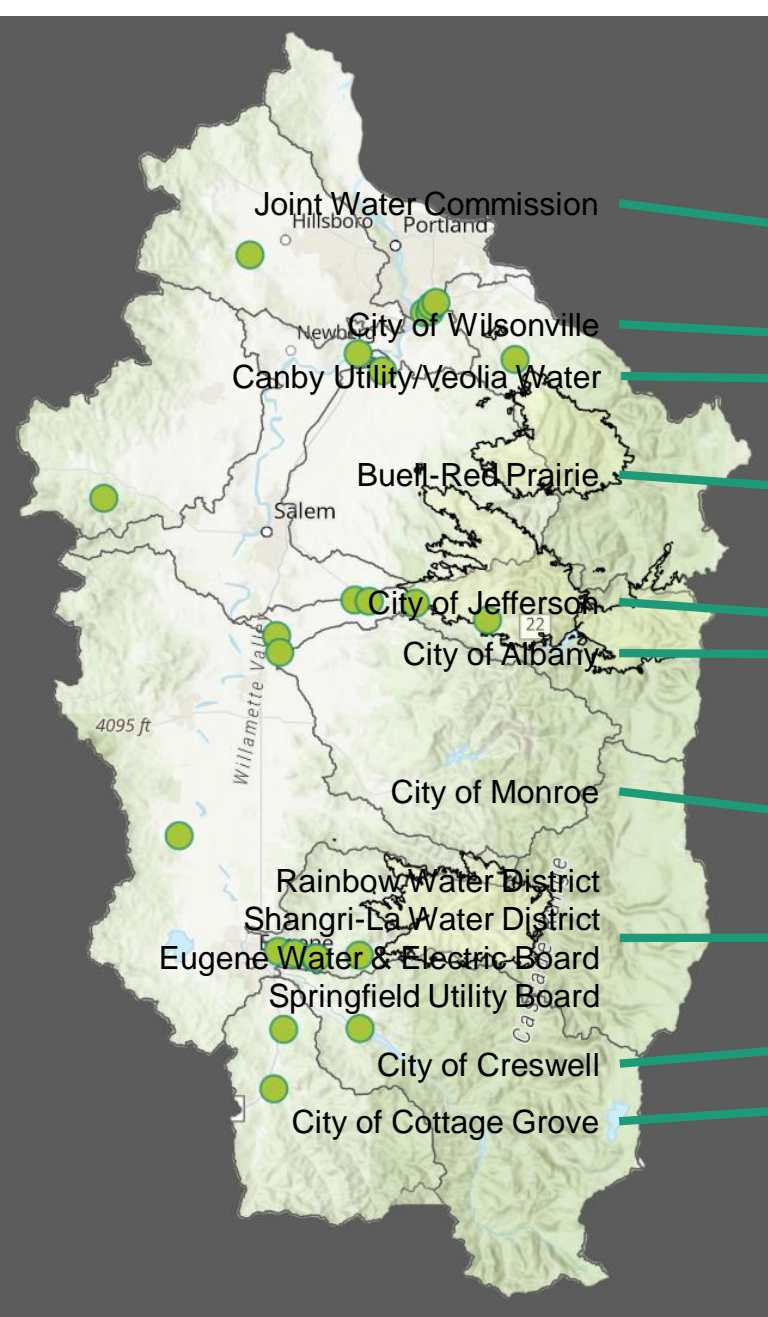
2019 Microcystins Source Water Detections



2020 Microcystins Source Water Detections



North Santiam facilities



North Clackamas County Water Commission
 Lake Oswego-Tigard Water Supply
 South Fork Water Board – Oregon City
 Clackamas River Water

City of Estacada

Facilities in the Willamette River Watershed

Salem Public Works
 Stayton Water Supply
 Lyons Mehama Water District
 City of Gates

Lowell Water Treatment Plant

2020-2021 – qPCR Drinking Water Monitoring

EPA Multipurpose grant

- 56 facilities participated; monitoring early June – mid-August
- Extended monitoring at 31 facilities

Phytoxigene Cyano dTec kits

- mcyA/nodF for MY
- cyrA for CYN
- stxA for STX
- 16S (total cyanobacteria)

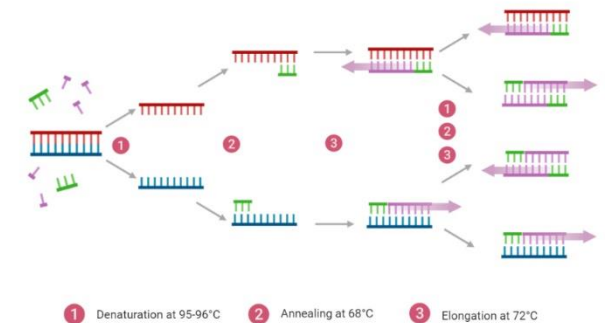
In 2021 –

28 facilities in or near to wildfire impacted are
6 events each
Thank you!!!

Real Time PCR / quantitative PCR (qPCR)



Polymerase chain reaction - PCR

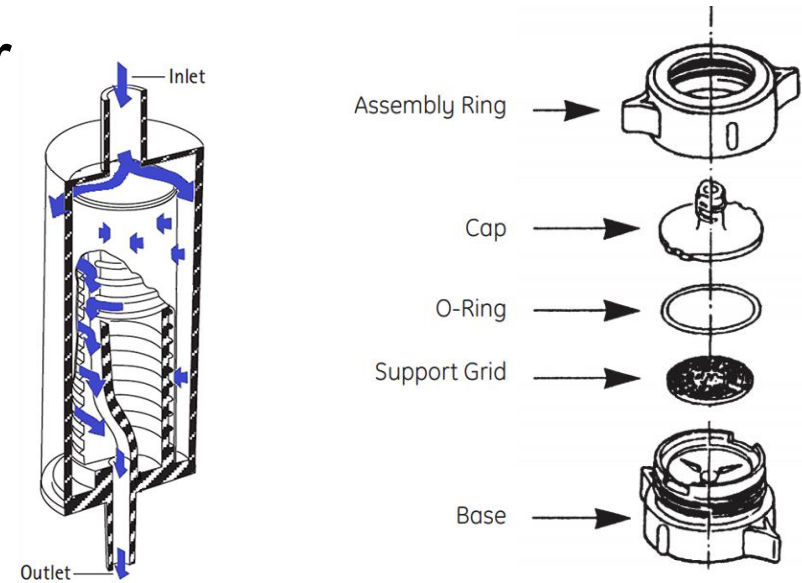


2020 –2021 qPCR Innovation Project

- Two sites: Detroit Lake and North Fork Reservoir
- Focused on method development
 - Field vs. lab filtration
 - Swin-Lok vs. Sterivex filters
- Season shortened due to wildfires
- qPCR analysis in progress

In 2021-

- Working with City of Salem and Clackamas River Water: Thank you!



Sterivex (left) vs. Swin-lok filters (right)

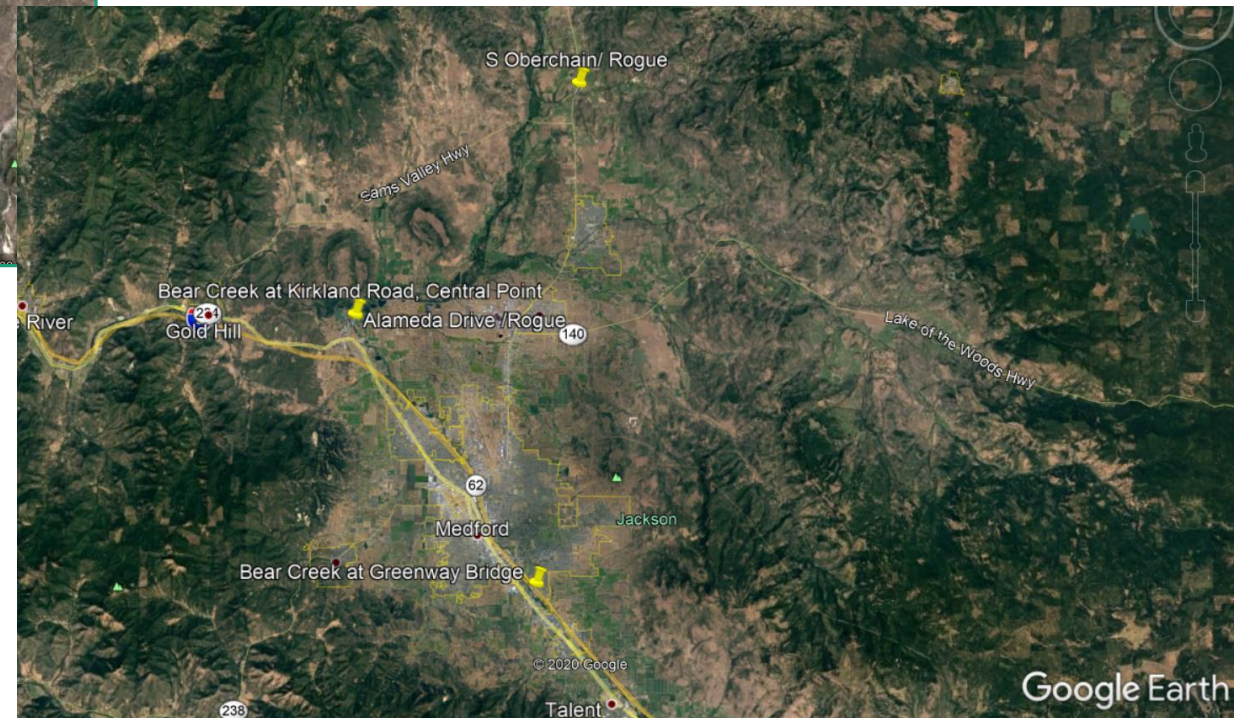
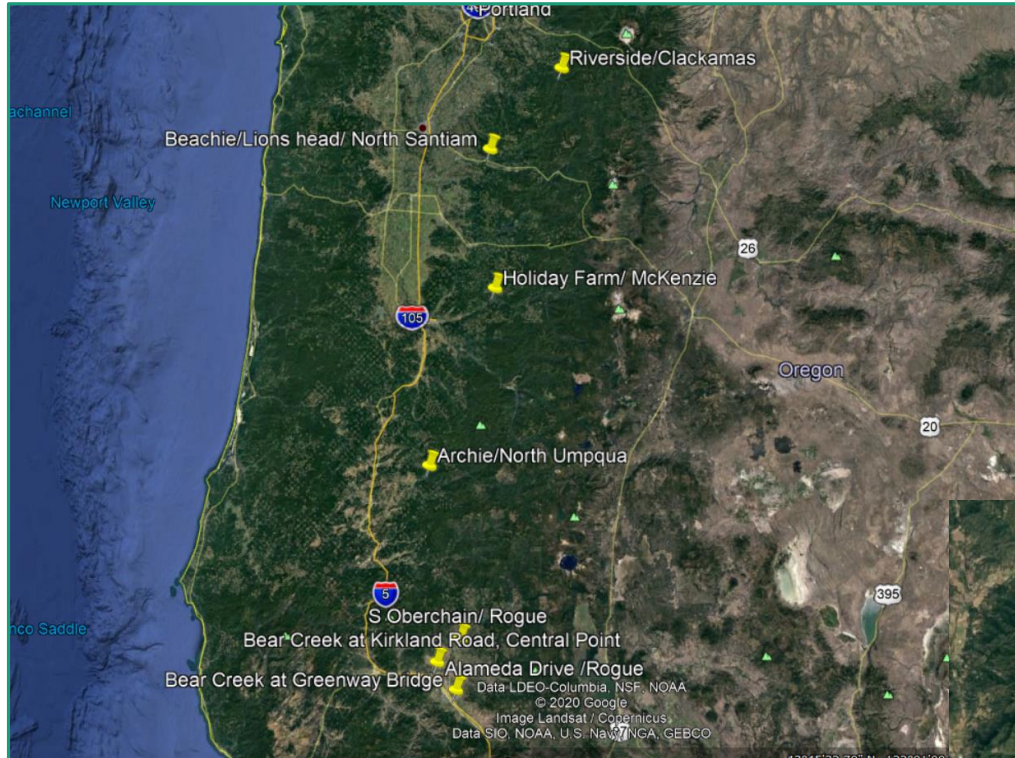
Volatile Organic Compounds testing (VOCs)

Water System Name	Connections	Burned Structures
Blue River Water District	96	70
Hiland WC - Echo Mountain	140	100
Hiland WC - Riverbend	80	2
Panther Creek Water District	355	117
Salmon River Mobile Village	38	36
Lyons Mehama Water District	890	42
City of Gates	240	90
Detroit Water System	400	295
Whispering Pines Mobile Home Village	63	46
Bear Creek Mobile Home Park	70	68

System	Reported Samples
Blue River Water District	7
Breitenbush Hot Springs	4
Cedarhurst Improvement Club	3
City of Gates	30
Detroit Water System	18
Finn Ranch Water District	3
Hiland WC - Echo Mountain	35
Hiland WC - Riverbend	3
Lyons Mehama Water District	4
ODFW Klamath Hatchery	3
Panther Creek Water District	87
Salmon River Mobile Village	3
Taylor's Grove Water Works	3
Whispering Pines MH Village	23
Wyatt Water Works - McKenzie Palisades	3
Total	229

DEQ Toxics Monitoring Program:

DEQ toxics monitoring locations added to help inform the 2020 wildfire impacts.

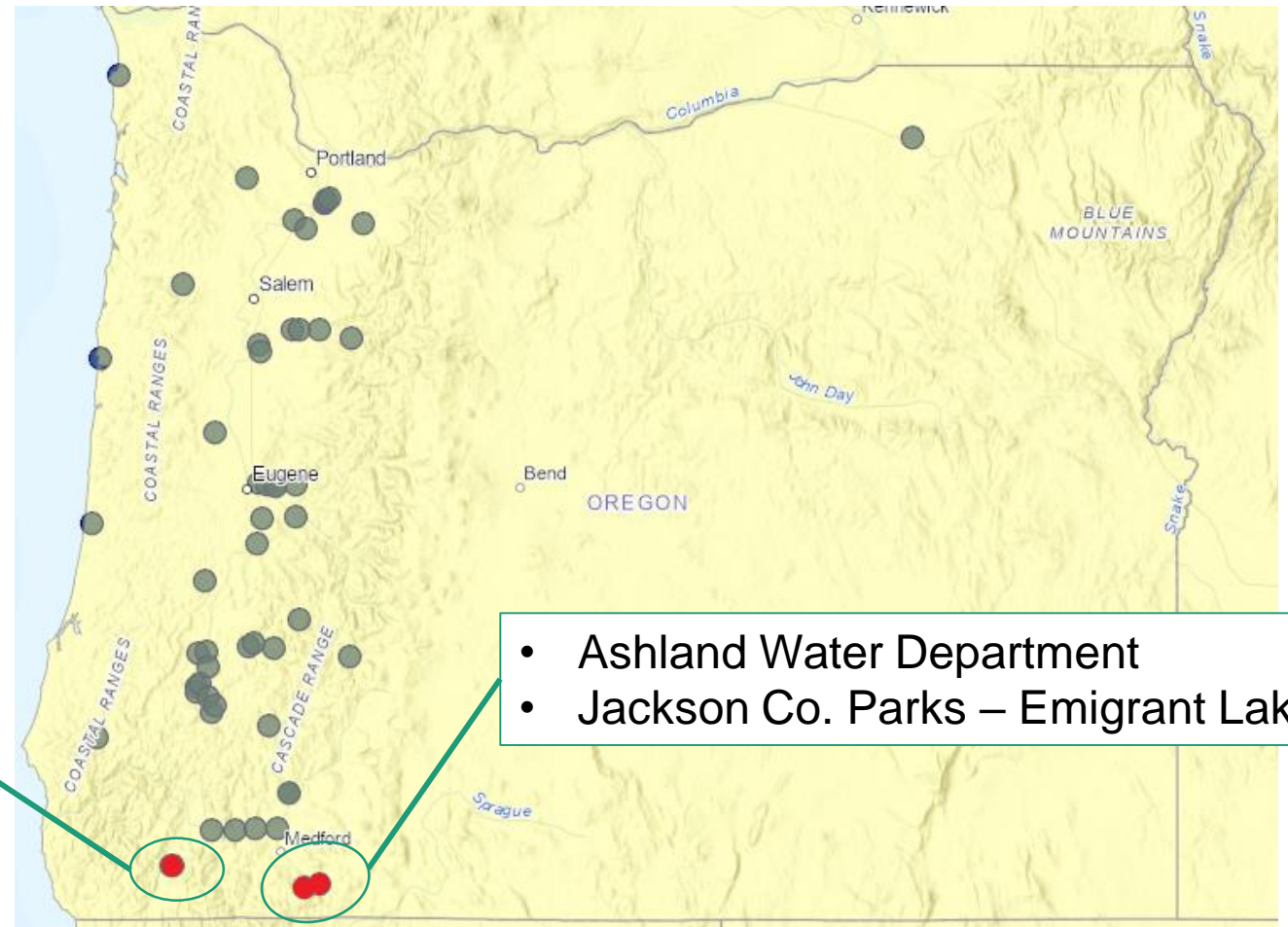


- Bear Creek at Bear Creek Greenway Bridge, Medford
- Bear Creek at Kirtland Road (Central Point)
- North Umpqua River at S Swiftwater Access Rd, Idleyld Park
- Reese Creek at Hwy 62 bridge
- McKenzie River at Goodpasture Boat Ramp near Vida
- North Santiam at Mehama Bridge
- Clackamas River at Hwy 224, Carter Bridge

2020 – Drinking Water Monitoring

- 56 facilities participated
 - 1 new site added
 - 2 sites did not participate
 - 2 sites closed due to COVID
 - 2 sites closed early (seasonal)
- 1 site inactivated due to fires
- Cyanotoxin detections >HAL at four facilities:

- Josephine Co. Parks – Lake Selmac 1
- Josephine Co. Parks – Lake Selmac 2



2020 – Recreational HABs response



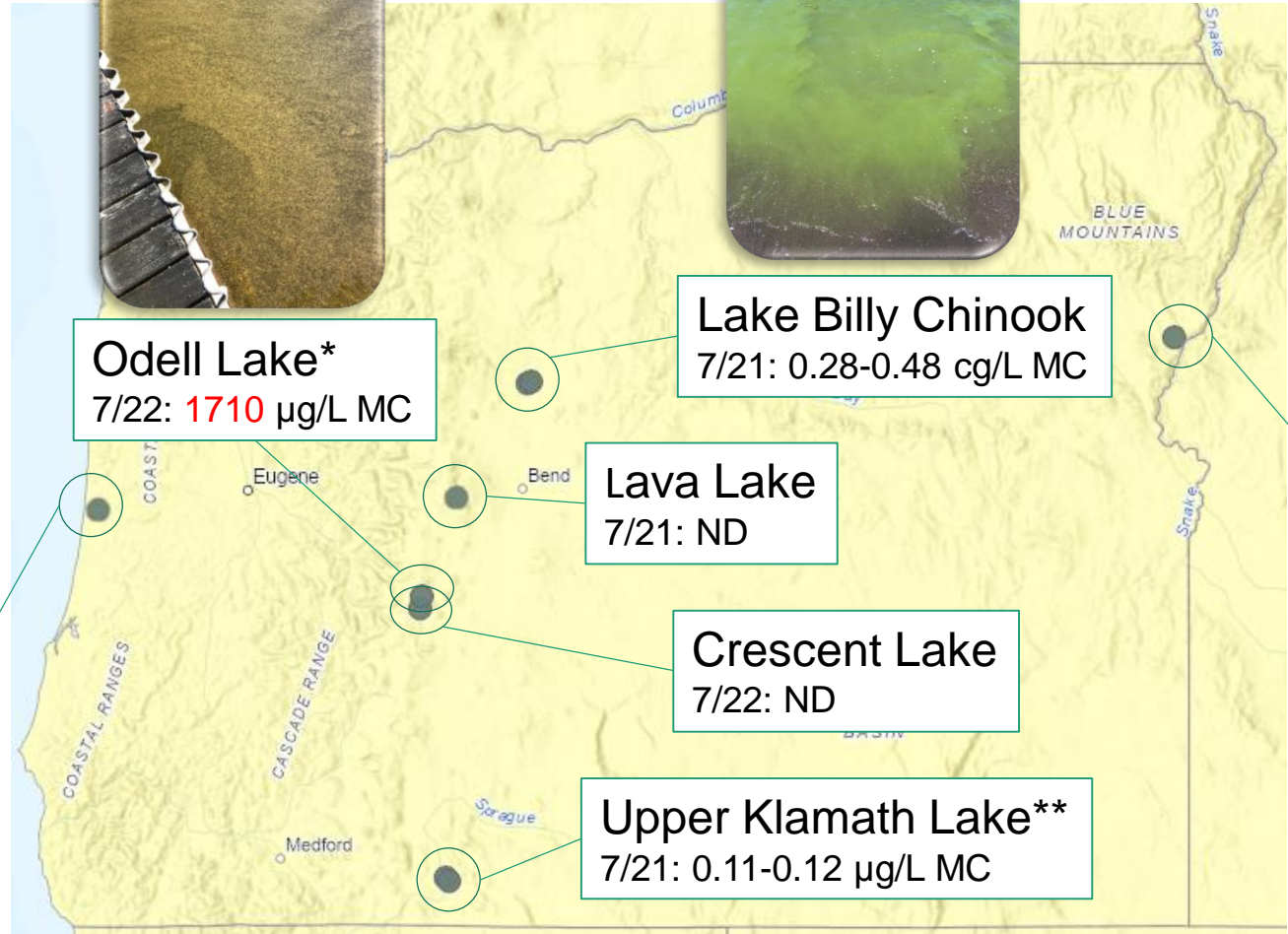
Siltcoos Lake
10/6: 0.33 µg/L MC
12/16: 0.14-0.17 µg/L MC



Odell Lake*
7/22: 1710 µg/L MC



Lake Billy Chinook
7/21: 0.28-0.48 cg/L MC



Lava Lake
7/21: ND

Crescent Lake
7/22: ND

Upper Klamath Lake**
7/21: 0.11-0.12 µg/L MC



Brownlee Reservoir
7/1: 1.73-9.42 µg/L MC
7/8: 0.53-2.81 µg/L MC
7/23: 1.35-2.59 µg/L MC

*advisory issued

**advisory issued (non-DEQ samples)

Ross Island Lagoon – Lower Willamette



- One report of suspected HAB in/near Ross Island Lagoon (8/21/2020)
- No advisories issued

2021 – Future outlook

- Drinking water monitoring –
 - limited qPCR monitoring,
 - no other changes planned yet
- qPCR Innovation project –
 - continuing work from 2020
- Upper Deschutes TMDL –
 - proposal for 2021 approved
 - monitoring begins next month
- Recreational response –
 - CyAN web version beta testing
 - DEQ's R Shiny app
 - Legislative updates: potential for more monitoring

Questions?

Aaron Borisenko

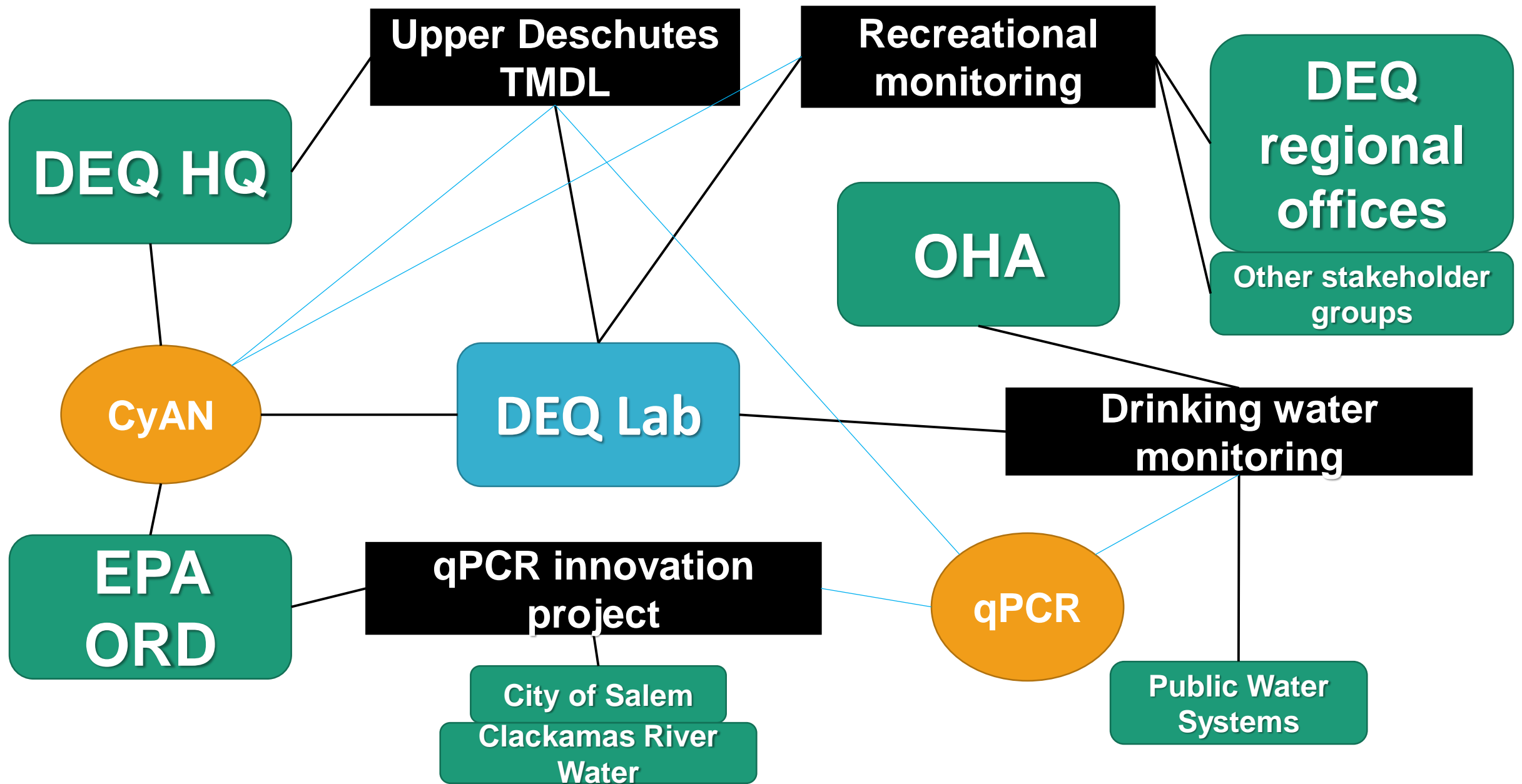
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Alison Frohn

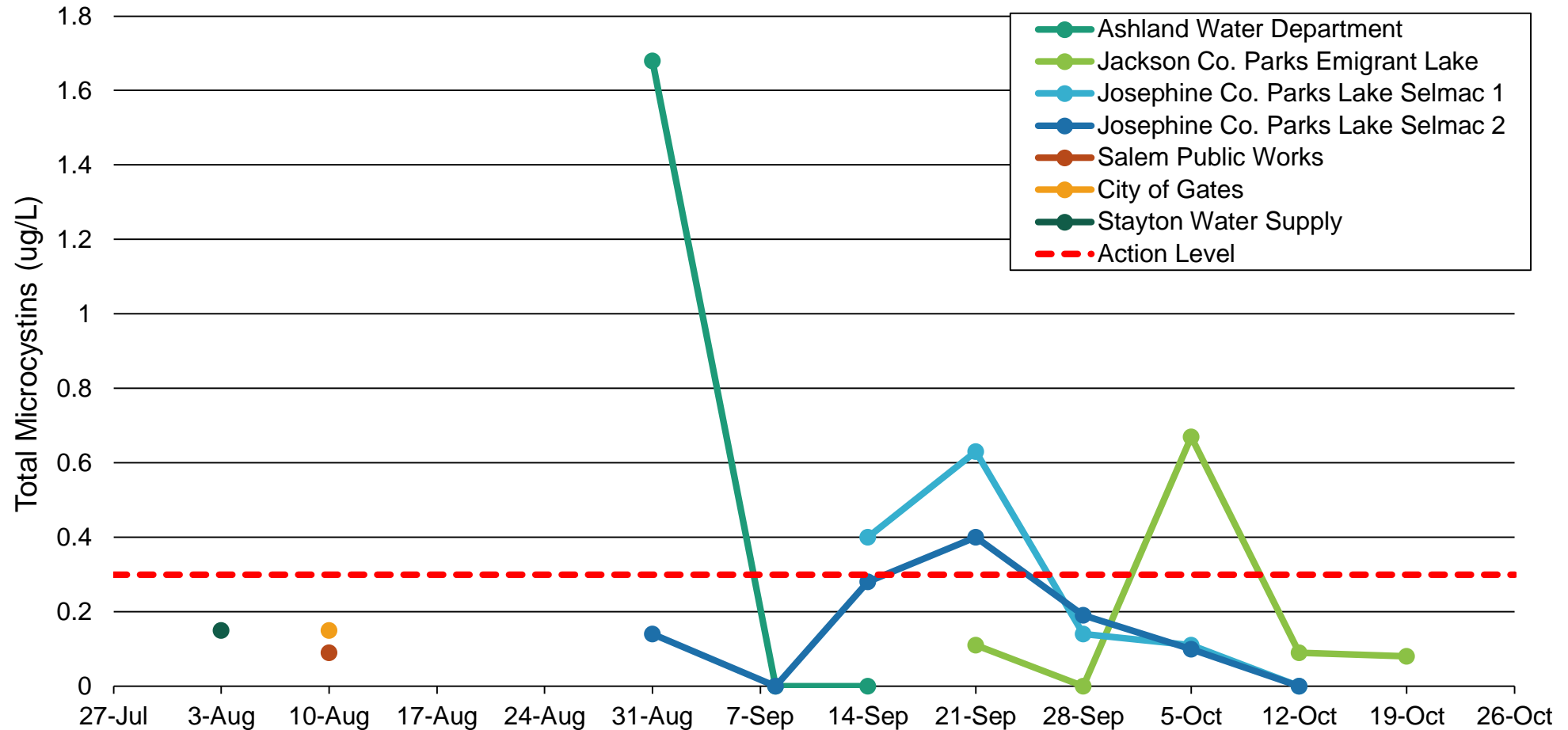
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2020 – Drinking Water Monitoring

2020 Microcystins Source Water Detections



Identifying information gaps and trying to fill them

- Once we have clearly defined our long-term questions and are coordinated we can plan how to fill data gaps.
- We need to keep in touch with our monitoring partners and look for ways to work together.
- We need how to bring data and information together, from various monitoring partners, in a timely fashion, so we can make adjustments to protect public health and other benefits of our waterways.