

Community Update: Rapid Response to the Chemical Spill and Chemical Fires in East Palestine, Ohio

Andrew Whelton, Ph.D.
Purdue University
West Lafayette, Indiana
awhelton@purdue.edu

Prof. Nusrat Jung, Prof. Brandon
Boor, Prof. Caitlin Proctor, Paula
Coelho, Rasul Diop, Stephanie
Shaffner, Aliya Ehde, Jinglin
Jiang, Xiaosu Ding





Rapid public health scientific support in response to disasters

2014 Chemical Spill (WV)

2017 Tubbs Fire (CA)

2018 Camp Fire (CA)

2020 Oregon Fires (OR)

2021 Chemical Spill (HI)

2021 Marshall Fire (CO)

and others...

Key Questions:

1. What chemicals should be looked for?
2. Where did/do the chemicals go?
3. How do you return infrastructure/homes to safe use?
4. What were/are the chemical exposures?

At the request of community members, our volunteer team visited in February and March

20 people at Purdue involved

Site visits

February 25-27

March 3-4

Creek water sampling

Creek soil sampling

Well water sampling

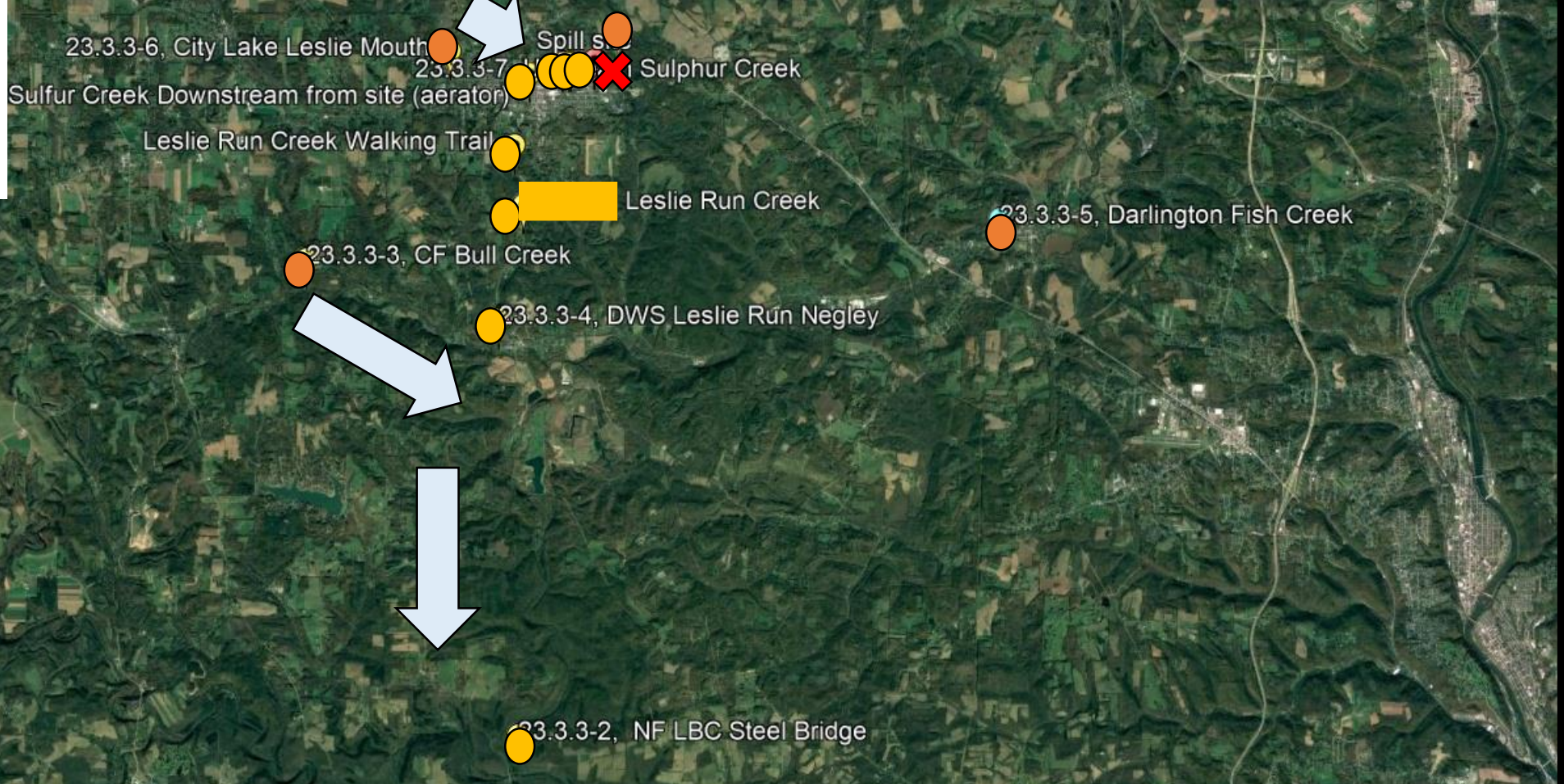
Interviews with homeowners







We Conducted

Sampling:

13 Creek Locations
13 Wells (not shown)

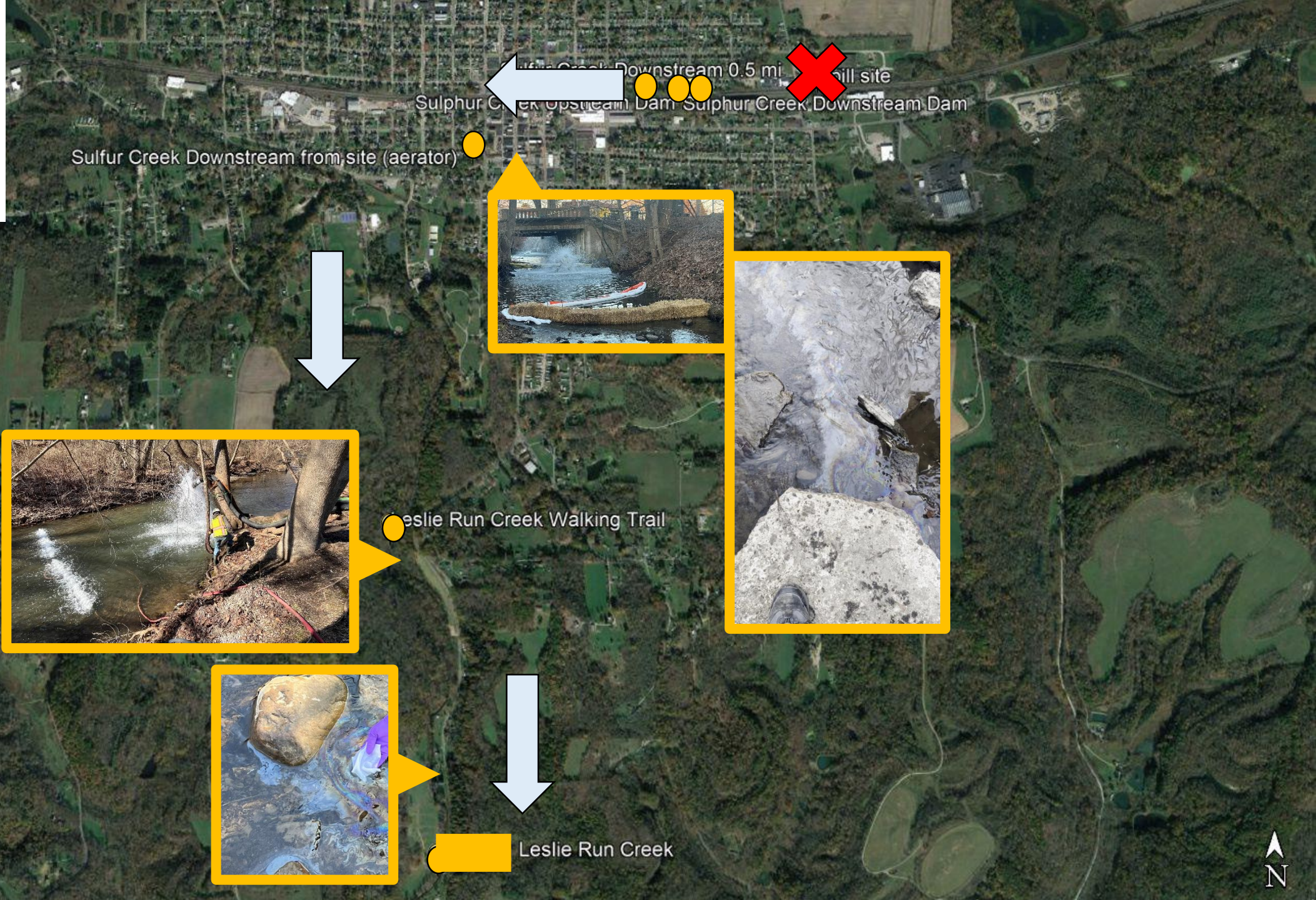


Legend

-  Spill site
-  Contaminated location
-  Background location
-  Water flow direction

Water Quality

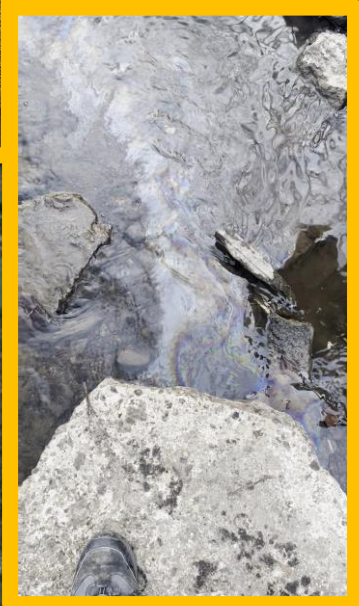
- pH, temperature
- VOCs – MAH, PAH
- SVOCs – PAH, (PFAS)
- Cations, Anions
- Metals



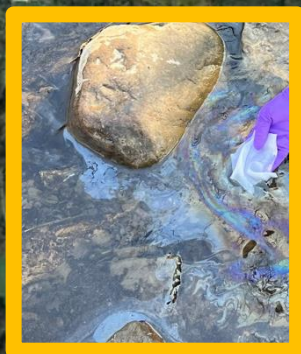
Sulphur Creek Downstream 0.5 mi

Sulphur Creek Upstream Dam Sulphur Creek Downstream Dam

Sulfur Creek Downstream from site (aerator)

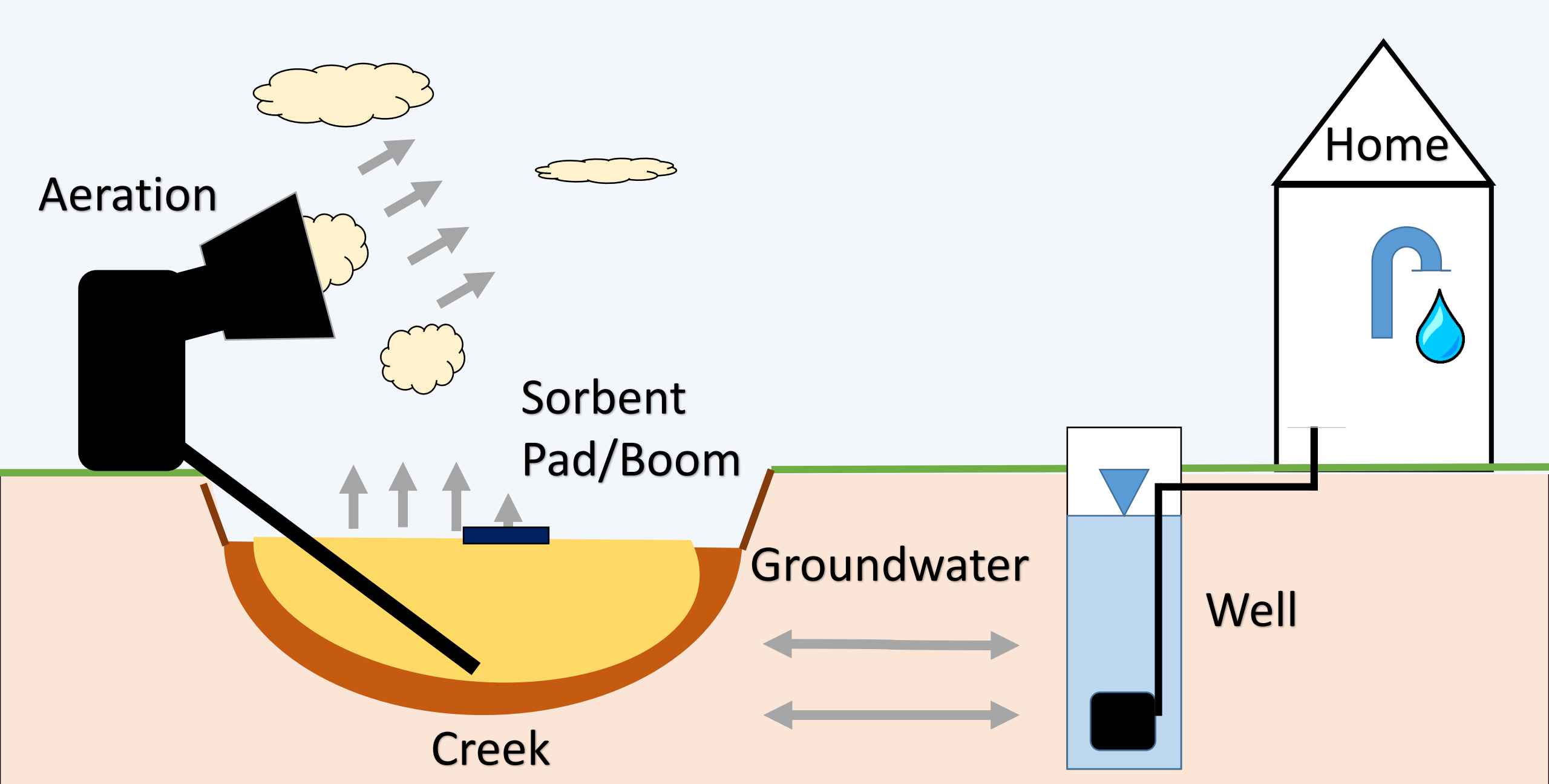


Leslie Run Creek Walking Trail



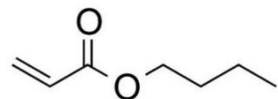
Leslie Run Creek



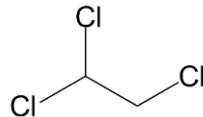


Aliphatic

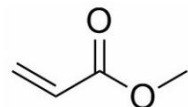
Butyl acrylate



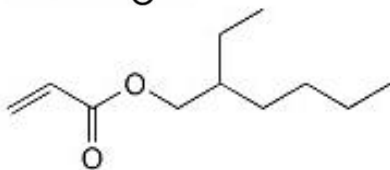
1,1,2-Trichlorethane



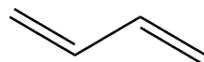
Methyl acrylate



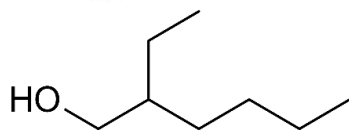
2-Ethylhexyl acrylate



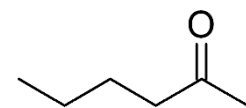
1,3-Butadiene



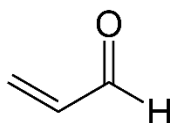
2-Ethylhexanol



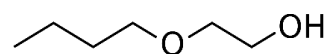
2-Hexanone



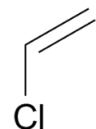
Acrolein



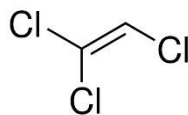
2-Butoxyethanol



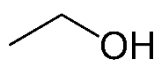
Vinyl chloride



Trichlorethylene



Ethanol

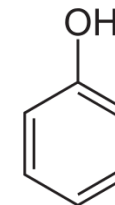


Aromatic

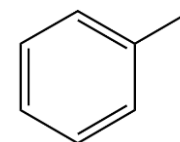
Benzene



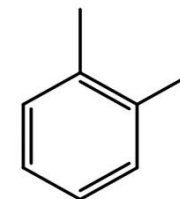
Phenol



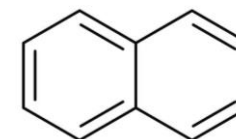
Toluene



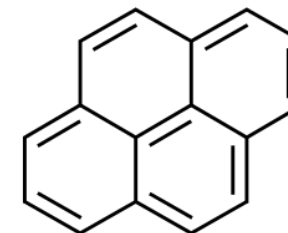
Xylenes



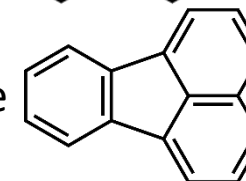
Naphthalene



Pyrene



Fluoranthene



Many chemicals have been detected by officials in air, water, and soil, some at low levels. Officials have primarily focused on talking about a few

Analysis by TAMU/CMU of USEPA's Outdoor Air Testing Results (Feb 24)

EPA Reported Concentrations

Calculated Hazard Quotient (HQ) for East Palestine (OH)

HQ due to "Normal" Levels in Counties Across USA, Counties in Ohio, and in Columbiana County (OH)

Chemicals (CAS#)	EPA Reported Concentrations		Calculated Hazard Quotient (HQ) for East Palestine (OH)		HQ due to "Normal" Levels in Counties Across USA, Counties in Ohio, and in Columbiana County (OH)				
	Median (mg/m3) in East Palestine (OH) Feb 2023	Highest (mg/m3) in East Palestine (OH) Feb 2023	HQ for median in East Palestine (OH) Feb 2023	HQ for highest in East Palestine (OH) Feb 2023	HQ for median county in USA (EPA NATA 2014)	HQ for highest county in USA (EPA NATA 2014)	HQ for median county in Ohio (EPA NATA 2014)	HQ for highest county in Ohio (EPA NATA 2014)	HQ for Columbiana County, Ohio (EPA NATA 2014)
1,1,2-Trichloroethane (79-00-5)	0.00007	0.00145	0.35	0.73	0.00	0.02	0.00	0.00	0.00
1,3-Butadiene (106-99-0)	0.000084	0.00053	0.04	0.27	0.01	0.08	0.01	0.02	0.01
Acrolein (107-02-8)	0.00014	0.0008	7.0	40	0.89	6.1	0.88	1.56	0.83
Benzene (71-43-2)	0.00084	0.012	0.03	0.40	0.01	0.03	0.01	0.02	0.01
m,p-Xylenes (179601-23-1)	0.00078	0.0098	0.01	0.10	0.00	0.01	0.00	0.01	0.00
Naphthalene (91-20-3)	0.00007	0.0014	0.02	0.47	0.01	0.04	0.01	0.02	0.01
o-Xylene (95-47-6)	0.00029	0.021	0.00	0.21	0.00	0.01	0.00	0.01	0.00
Trichloroethylene (79-01-6)	0.000018	0.00053	0.01	0.27	0.00	0.17	0.01	0.03	0.01
Vinyl Chloride (75-01-4)	0.00026	0.016	0.00	0.20	0.00	0.00	0.00	0.00	0.00

Background Information:

- Hazard Quotient (HQ) = Concentration ÷ RfC
- HQ < 1: little concern for single chemical
- HQ < 0.1: little concern for multiple chemicals
- RfC = level likely to be without appreciable risk over a lifetime

Interpretation:

- ***Concentrations for nine of the ~50 chemicals EPA reported are higher than "normal" average levels***
- ***If they continue at these levels, they may be of health concern (especially acrolein)***

Our review of available data has found inconsistent testing by government agencies for chemicals of concern

Outdoor Air	Surface Water	Municipal Water	Private Well Water
Acrolein	Not tested	Not tested	Not tested
Not tested	Butyl acrylate	Butyl acrylate	Butyl acrylate (not confirmed)
Not tested	2-Ethylhexanol	Not tested	Not tested
Not tested	2-Ethylhexyl acrylate	2-Ethylhexyl acrylate	2-Ethylhexyl acrylate (not confirmed)
Not tested	2-Butoxyethanol	Not tested	Not tested
Vinyl chloride	Vinyl chloride	Vinyl chloride	Vinyl chloride
Benzene	Benzene	Benzene	Benzene
Xylenes	Xylenes	Xylenes	Xylenes
Naphthalene	Naphthalene	Naphthalene	Naphthalene
1,3-Butadiene	Not tested	1,3-Butadiene	1,3-Butadiene
1,1,2-Trichloroethane	1,1,2-Trichloroethane	1,1,2-Trichloroethane	1,1,2-Trichloroethane
Trichloroethylene	Not tested	Trichloroethylene	Not tested
Phosgene	Not tested	Not tested	Not tested
Ethylene glycol (Not tested)	Not tested	Not tested	Not tested
n-Butyl ether (Not tested)	Not tested	Not tested	Not tested
Purdue Surface Water Detections (Mar 7 Letter to US Senate): Acrolein, n-Butyl ether , Butyl acrylate, 2-Butoxyethanol, 1,3-Butadiene, 2-Ethylhexyl acrylate, Ethylene glycol			

What's Next?

1. Stay away from the creeks. They are hazardous and not access controlled.
2. Stay away from aeration equipment. They are hazardous, not access controlled.
 - *We asked OH, USEPA, OSHA to warn workers and the public.*
3. Cleanup worker safety has been jeopardized.
 - *We asked OSHA to investigate.*
4. Agencies need to start consistent testing. Failure to test correctly hinders making decisions that protect the public from harm and understanding health and environmental impacts.
 - *We asked OH, USEPA, the US Senate E&PW Committee to correct this mistake.*
5. Where are test results by Norfolk Southern “split” samples for private wells? (NS and Health Department issued joint logo letter)
6. To date, we found no data showing that private wells were contaminated by the spill or the fires, and agency testing approaches have been inconsistent.
7. We continue to review agency results, and will have our test results soon.

We'll post this file and results at www.PlumbingSafety.org

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News

- [Independent experts point to gaps in water testing in East Palestine \(WFMJ.com\)](#)
- [Independent testers report health risks in East Palestine \(MSN.com\)](#)
- [How the Ohio train derailment will affect the local ecosystem in the coming years \(ABC News\)](#)
- [Independent testers report health risks in East Palestine \(NewsNation\)](#)
- [One month later, fallout from toxic train accident continues \(voanews.com\)](#)
- [Outside experts say citizens should stay away from East Palestine creeks as clean-up continues \(WFMJ\)](#)

[Ohio Chemical Spill Public Health Response](#)

[Enroll in the self-paced, online 10-hour Building Water Essentials course for CEUs](#)

[NEW: Free and Online Water Quality Risk Tools Available](#)

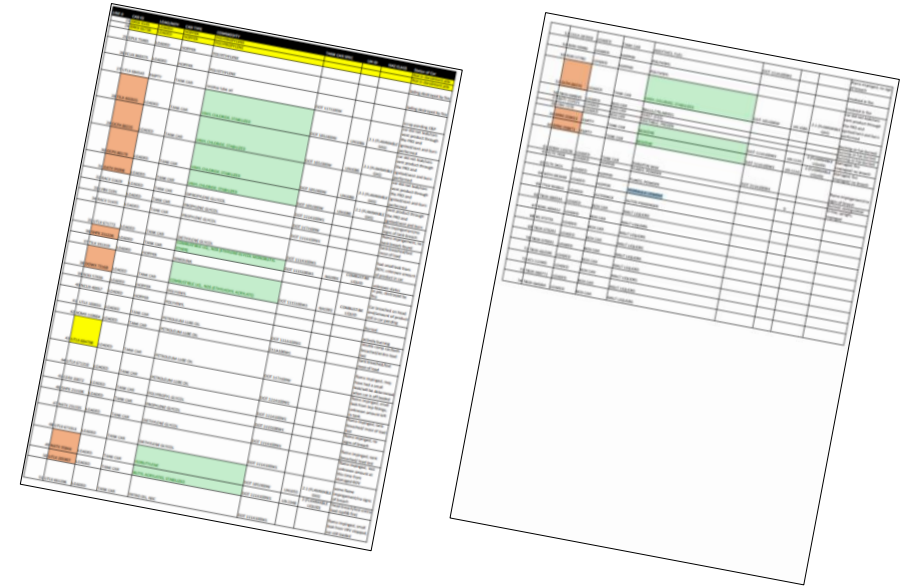
[Wildfire Response](#)

[Missed the Journalism, Science, and Policy Conversation? Watch it here](#)

Andrew Whelton, Ph.D.
Purdue University
West Lafayette, Indiana
awhelton@purdue.edu

Additional Slides

It's still unclear what was on the train, set fire, and was created. Per USEPA the train carried the following:



Ethylhexyl acrylate
Vinyl chloride
Butyl acrylate
PVC resin
PE resin
Frozen vegetables
Powder flakes
Paraffin wax

Propyl glycol
Diethylene glycol
Petro oil, NEC
Petroleum lube oil
Semolina
Balls
Fuel additives
Malt liquors

Benzene
Residue lube oil
Isobutylene
Sheet steel
Hydraulic cement
Passenger autos
Ethylene glycol
methyl butyl ether

Government posted air, water, soil test results

1. USEPA (Outdoor air, soil) [Indoor air results not shown]
https://response.epa.gov/site/site_profile.aspx?site_id=15933
2. Columbiana Health Dept (Private wells) <https://www.columbiana-health.org/resources/>
3. Ohio EPA (Surface water, municipal drinking water wells)
<https://epa.ohio.gov/monitor-pollution/pollution-issues/east-palestine>
4. ORSANCO (Ohio River) <https://www.orsanco.org/east-palestine-train-derailment-spill-response/>
5. PA DEP (Outdoor air, private wells, soil)
<https://www.pema.pa.gov/derailment/Pages/default.aspx>
6. CDC/ATSDR <https://www.atsdr.cdc.gov/sites/east-palestine-train-derailment/index.html>

To anticipate drinking water safety concerns, ORSANCO conducted Ohio River water sampling 700 miles downstream, ATSDR created 3 screening levels

ATSDR Screening Levels (Feb 11)

n-Butyl acrylate = 560 ppb

2-Ethylhexyl acrylate = 500 ppb

2-Ethyl hexanol = 200 ppb

(Unclear: Ingestion only?

Inhalation? Dermal absorption?)

Ohio River Valley Water Sanitation Commission (ORSANCO), MAX detects over 700 miles

n-Butyl acrylate = 12.5 ppb

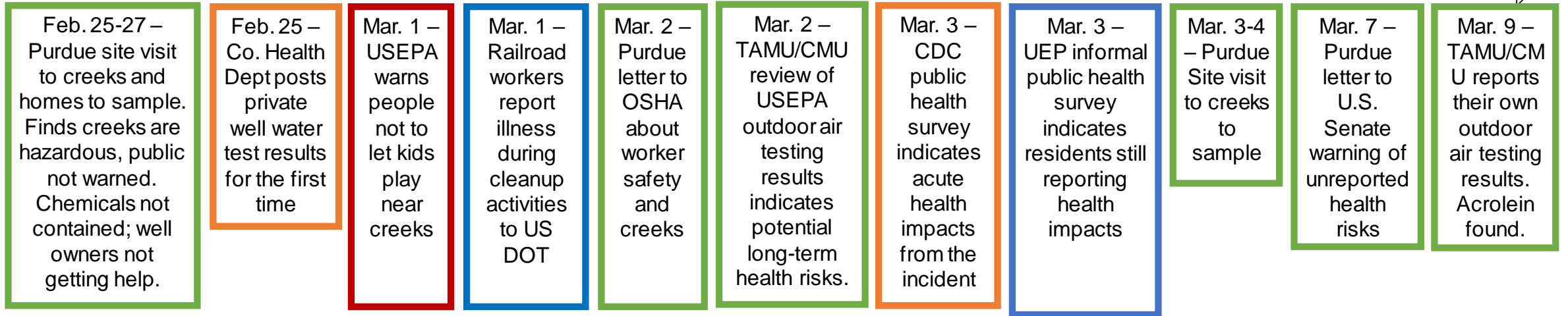
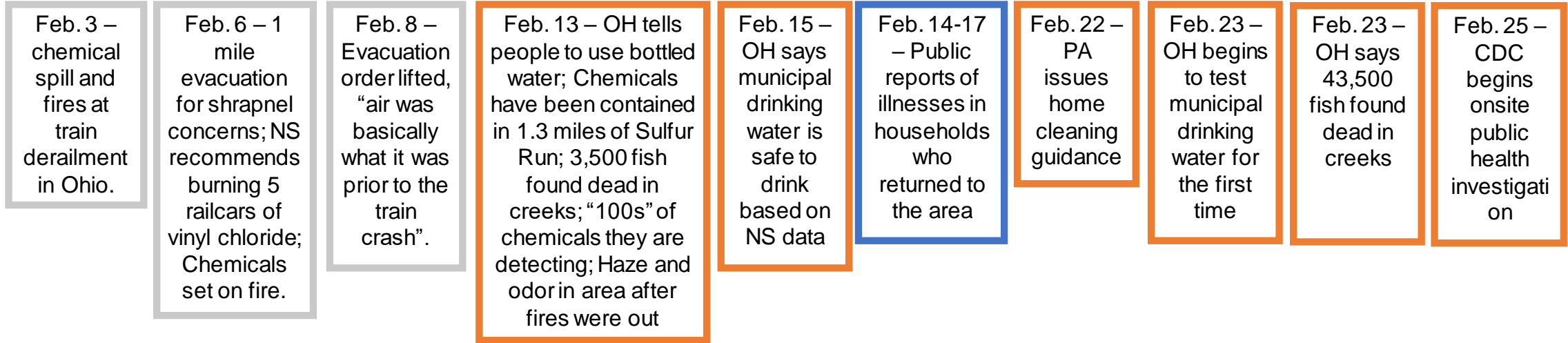
2-Ethylhexyl acrylate = 17.1 ppb

2-Ethyl hexanol = 27.6 ppb

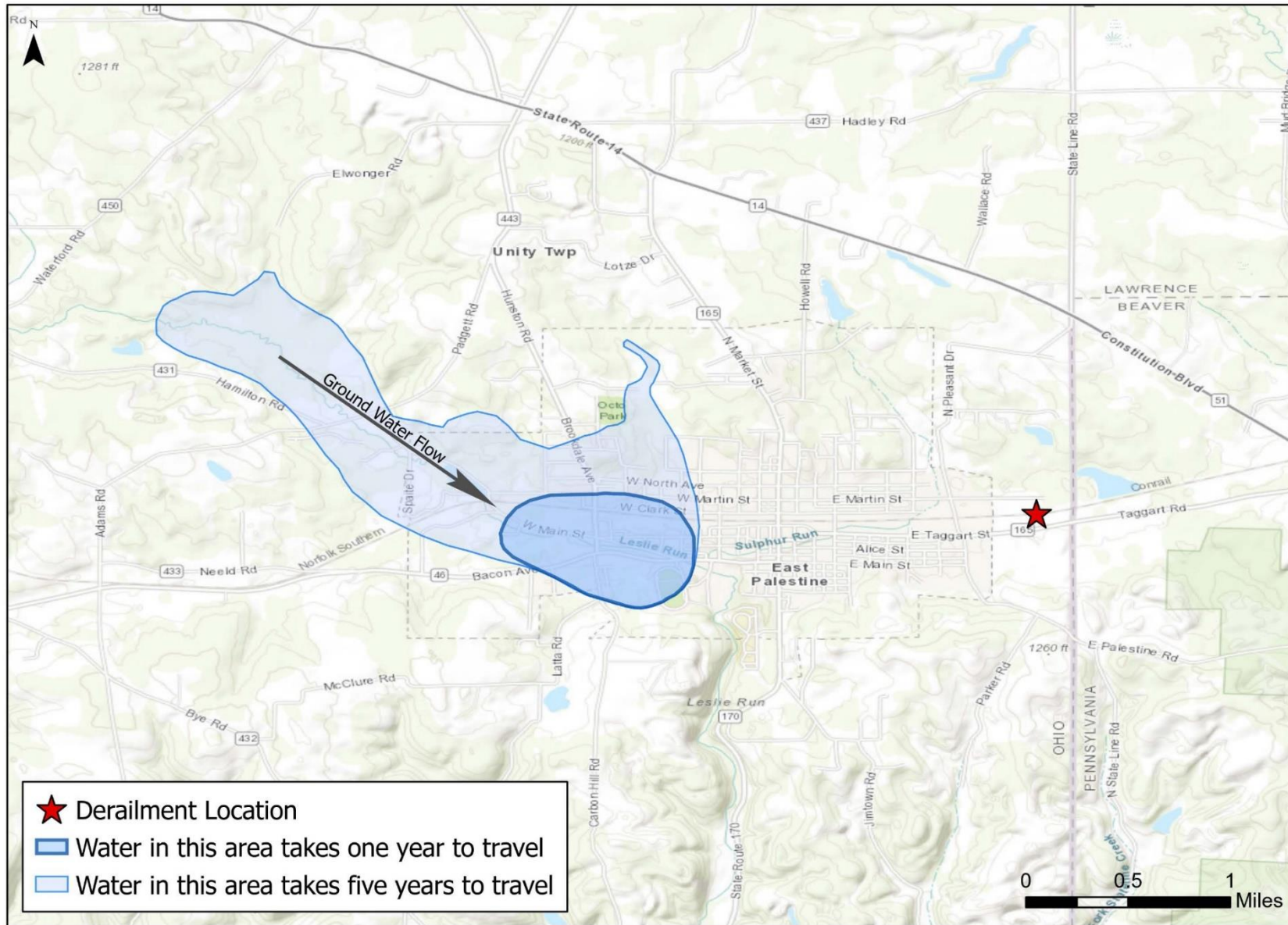
Vinyl chloride = < 0.5 ppb

Other VOCs = < 0.5 ppb

Twenty days after the spill, contamination was still entering the Ohio River

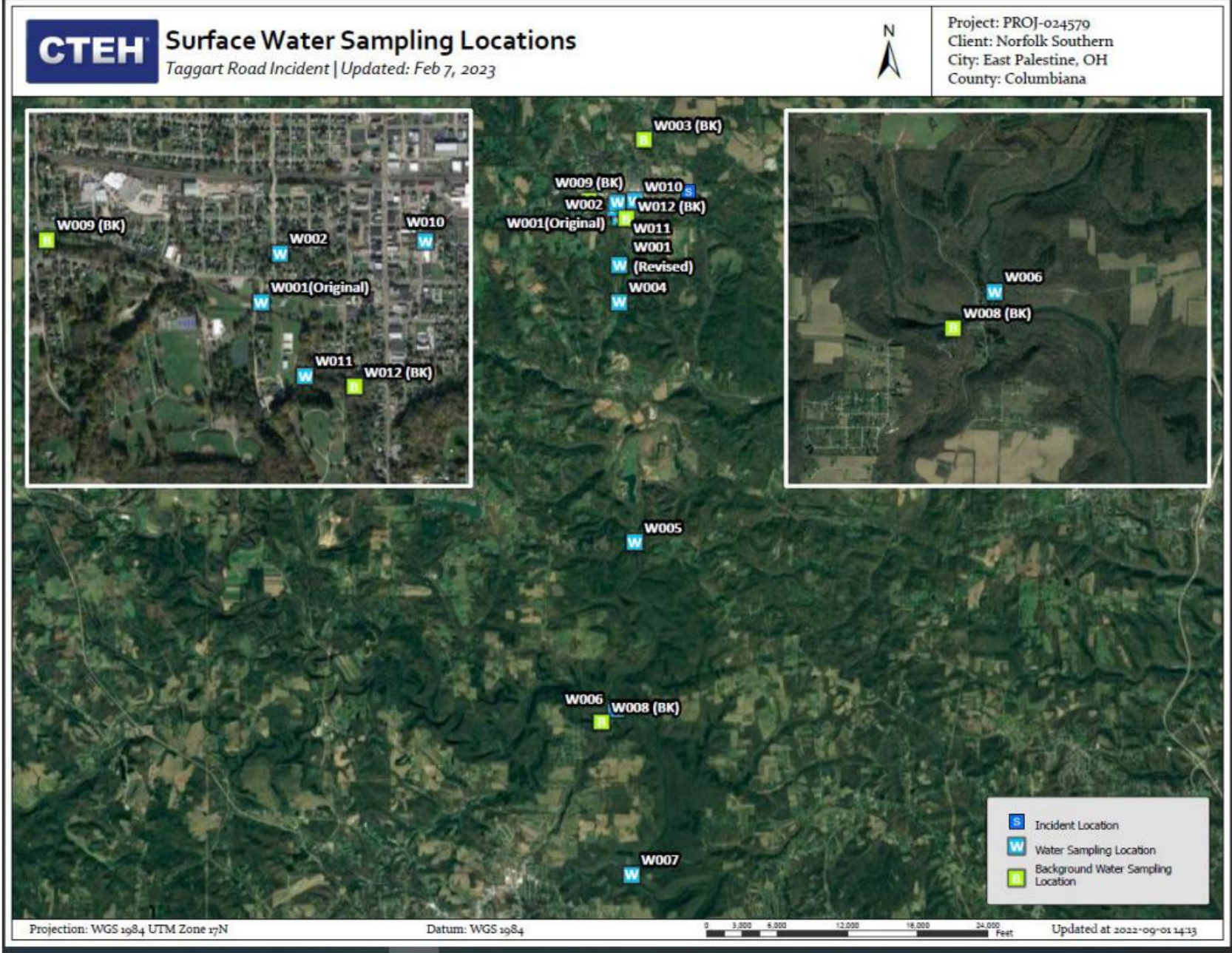


East Palestine Ground Water Source

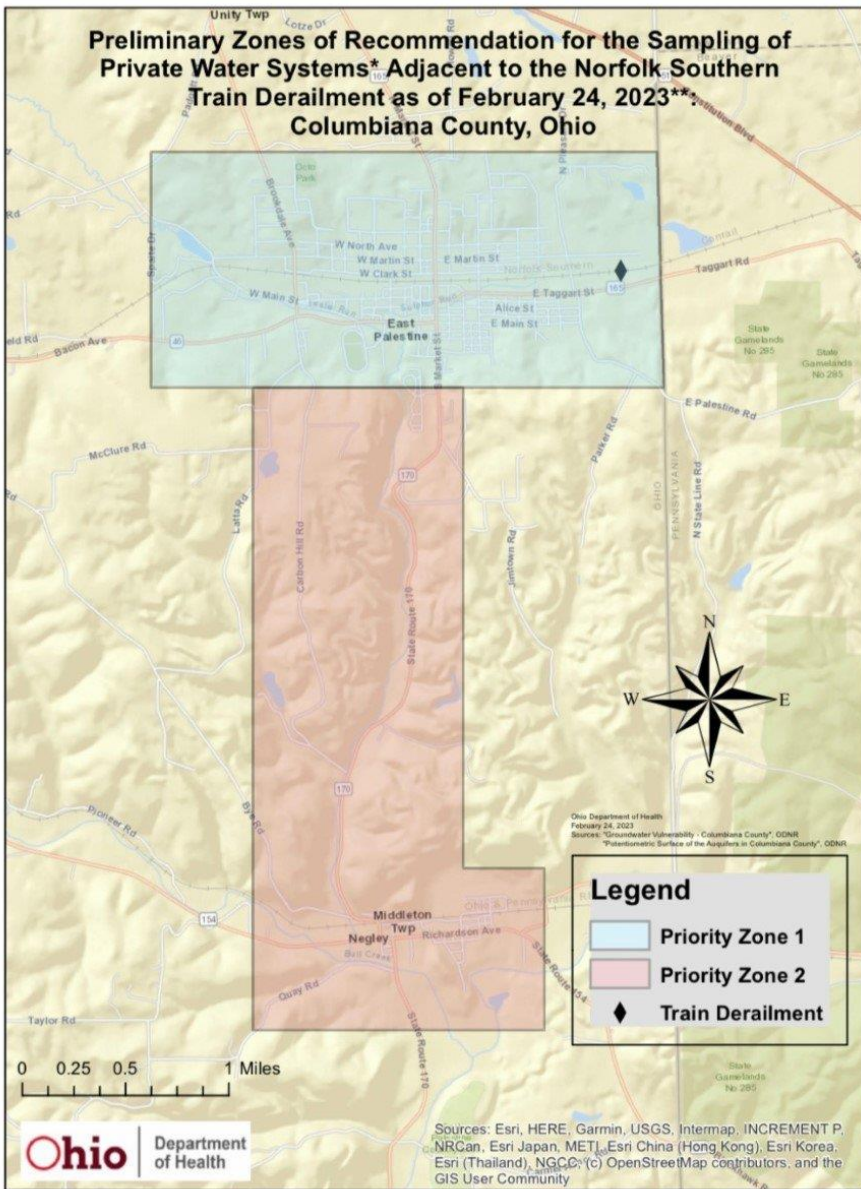


From
Ohio EPA

Chemical	Method Detection Limit
Vinyl chloride	0.29
Butyl acrylate	1.0
2-Ethylhexyl acrylate	1.0
Benzene	0.34



From
Ohio EPA



From Ohio ODH

*For those on private water systems, ODH is recommending drinking bottled water until you have the results of your private water system test. Call 330-849-3919 to schedule a free private water system test.

**Map as of February 24, 2023. Recommended sampling zones are subject to change.