Risk Communication

Terri Mavencamp, PhD

Montana, DEQ

Speaker Information

- Bureau Chief, Montana DEQ
- BA Chemistry, PhD Neuroscience
- Academia, Industry, Government
- Taught Communicating Scientific Information & Risk Communication at UW and MSU

Montana's Regulatory Framework

- Multiple regulatory frameworks
- State is involved in investigation and cleanup (ex. 75-10-701 through 752, MCA and ARM 17.55.101-115)
- State requirements at each phase
- State driven, with a few exceptions.

Roles

- **DEQ**
  - Set timelines, review & comment on workplans
  - Oversee work
  - Ensure state requirements are met
  - Communicate w/ Stakeholders (public participation requirements)
  - Determine when phases are complete
- **Responsible Party**
  - Prepare and Submit workplans in required times
  - Carry out work
  - Funding
  - Communication w/ DEQ

Communication w/ Public

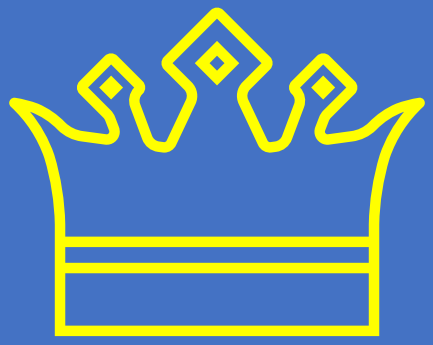
- Largely State-led
- Strong DEQ Public Information Officer Team
- Risk Communication training (Dr. Covello, Center for Risk Communication)

Risk Communication Strategies

- Build Relationships
- Proactive Communication
- Clear Message

Build Relationships

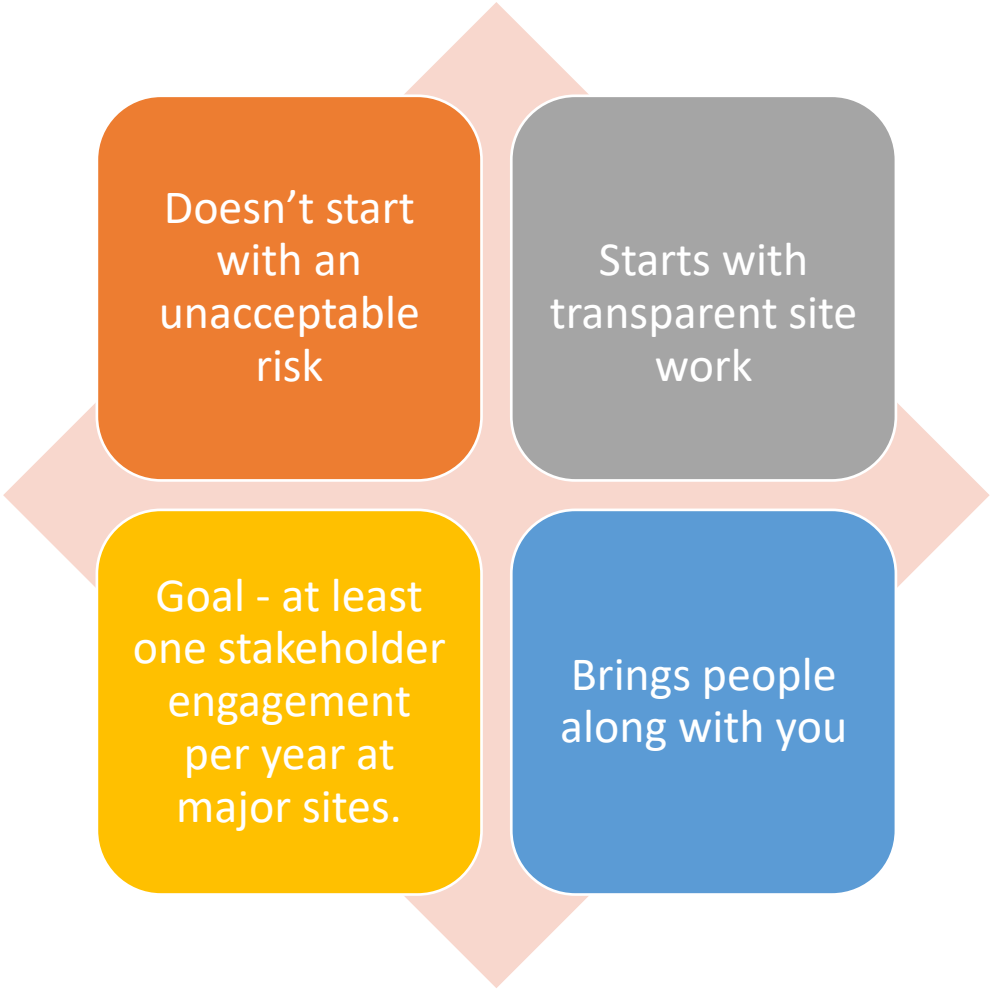
- Trust
- Openness/Transparency
- Clarity
- Timeliness
- Honesty
- Empathy
- Active Listening



Build Relationships

- Public information officer relationships with media
- Project officer relationships with stakeholders
- Management relationships with representatives/legislators/commissioners

Proactive Communication



Clear Message

- Clear goals of risk communication
- Know your audience
- Preparation
- Message map

Toolbox

- Dr Covello's Message map – organized way to display layers of information

Stakeholder: Question or Concern:		
Key Message 1	**Key Message 2**	**Key Message 3**
Supporting Fact 1-1	**Supporting Fact 2-1**	**Supporting Fact 3-1**
L		
Supporting Fact 1-2	**Supporting Fact 2-2**	**Supporting Fact 3-2**
Supporting Fact 1-3	**Supporting Fact 2-3**	**Supporting Fact 3-3**

From: Microsoft Word - Covello_message_mapping.doc (orau.gov)

Montana Examples

Photo from the Missoulian

Butte PCE

Butte, Montana

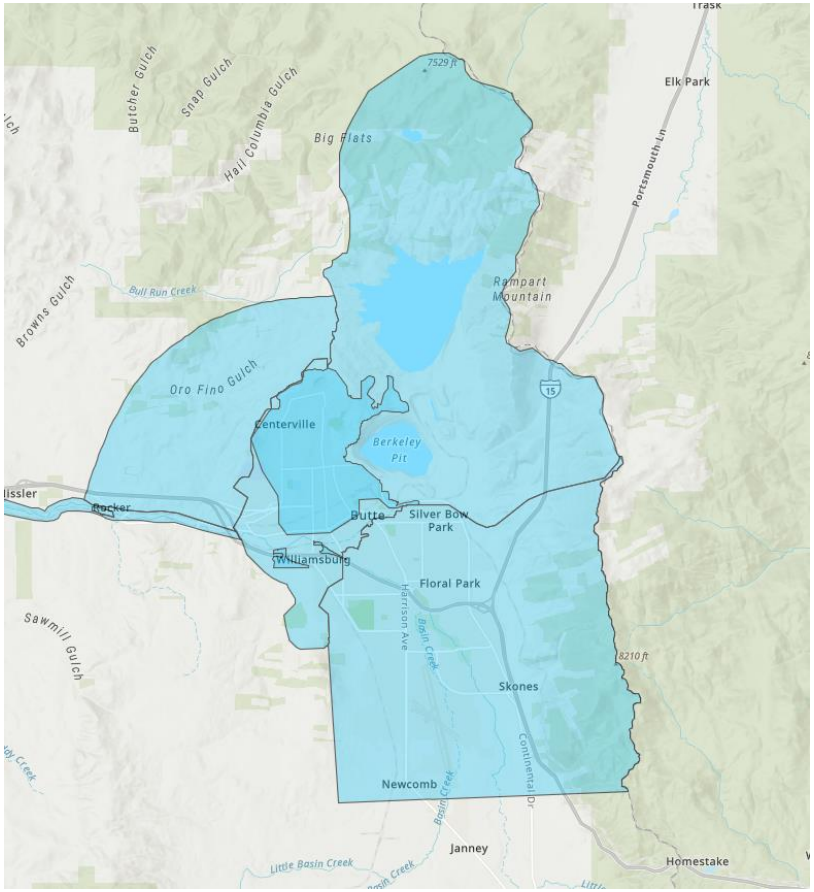


Image from Great Falls Tribune

- 1864 mining camp
- “The richest hill on earth”
- Clark Fork River headwaters in Butte, largest superfund site in US.

Pubmed Search

1 Cite Share
Assessing human metal accumulations in an urban superfund site.
Hailer MK, Peck CP, Calhoun MW, West RF, James KJ, Siciliano SD.
Environ Toxicol Pharmacol. 2017 Sep;54:112-119. doi: 10.1016/j.etap.2017.06.001. Epub 2017 Jun 27.
PMID: 28704752 Free PMC article.
Butte, **Montana** is part of the largest superfund site in the continental United States. ...Soil samples from the yards of **Butte** volunteers were quantified by ICP-MS. Hair analysis revealed concentrations of Al, As, Cd, Cu, Mn, Mo, and U to be statistically ele ...

2 Cite Share
Assessment of blood lead level declines in an area of historical mining with a holistic remediation and abatement program.
Schoof RA, Johnson DL, Handziuk ER, Landingham CV, Feldpausch AM, Gallagher AE, Dell LD, Kephart A.
Environ Res. 2016 Oct;150:582-591. doi: 10.1016/j.envres.2015.12.028. Epub 2015 Dec 30.
PMID: 26746018 Free article.
Large scale mining and mineral processing represents an additional localized source of potential lead exposure in many historical mining communities, such as **Butte**, **Montana**. After 25 years of ongoing remediation efforts and a residential metals abatement program tha ...

3 Cite Share
Sustainable Living Filtration Membranes.
Eggensperger CG, Giagnorio M, Holland MC, Dobosz KM, Schiffman JD, Tiraferri A, Zodrow KR.
Environ Sci Technol Lett. 2020 Mar 10;7(3):213-218. doi: 10.1021/acs.estlett.0c00019. Epub 2020 Feb 13.
PMID: 32175443 Free PMC article.

4 Cite Share
Factors controlling lead bioavailability in the **Butte** mining district, **Montana**, USA.
Davis A, Ruby MV, Bergstrom PD.
Environ Geochem Health. 1994 Dec;16(3-4):147-57. doi: 10.1007/BF01747911.
PMID: 24197209
Microprobe analyses of 38 soil and 5 mine-waste samples from **Butte**, **Montana**, demonstrated that the samples contain predominantly sulphide/sulphate and oxide/phosphates of lead (Pb)-bearing phases associated with mine waste. ...The low solubility of the Pb-bearing mi ...

5 Cite
Effects of Flow Regime on Metal Concentrations and the Attainment of Water Quality Standards in a Remediated Stream Reach, **Butte**, **Montana**.
Runkel RL, Kimball BA, Nimick DA, Walton-Day K.
Environ Sci Technol. 2016 Dec 6;50(23):12641-12649. doi: 10.1021/acs.est.6b03190. Epub 2016 Nov 22.

5 Cite hare
Meconium identifies high levels of metals in newborns from a mining community in the U.**S**.
McDermott S, Hailer MK, Lead JR.
Sci Total Environ. 2020 Mar 10;707:135528. doi: 10.1016/j.scitotenv.2019.135528. Epub 2019 Nov 14.
PMID: 31780146
We set out to quantify the exposure to selected metals that are currently being mined and also are found in the Superfund site in **Butte**, **Montana**, and to compare it to that of Columbia, South Carolina, US, where mining is not occurring. ...RESULTS: We collected mecon ...

6 Cite hare
A pilot study that provides evidence of epigenetic changes among mother-**child** pairs living proximal to mining in the US.
Cai G, Yu X, Hutchins D, McDermott S.
Environ Geochem Health. 2022 Feb 8. doi: 10.1007/s10653-022-01217-9. Online ahead of print.
PMID: 35137284
This investigation focused on methylation of genes associated with exposure to metals. Mother-**child** pairs from three locations in **Montana** were recruited, and buccal cells were collected for genome-wide methylation assay. Four pairs were from **Butte**, where ther ...

7 Cite hare
Correction to: A pilot study that provides evidence of epigenetic changes among mother-**child** pairs living proximal to mining in the US.
Cai G, Yu X, Hutchins D, McDermott S.
Environ Geochem Health. 2022 Mar 17. doi: 10.1007/s10653-022-01248-2. Online ahead of print.
PMID: 35298729 No abstract available.

Timeline

2008, GW encountered during excavation at Butte High, PCE, TCE and VOCs found.

2009, DEQ enforcement investigated & identified a suspected source, referred to Water Quality Act Program

2010- DEQ discuss site with EPA

2012

WQA site visit. Program couldn't identify a RP, PCE levels relatively low 12 ug/L

2017

EPA updated the Superfund Hazard Ranking System to include a Subsurface Intrusion Component.

2019, DEQ officially referred to EPA for PA

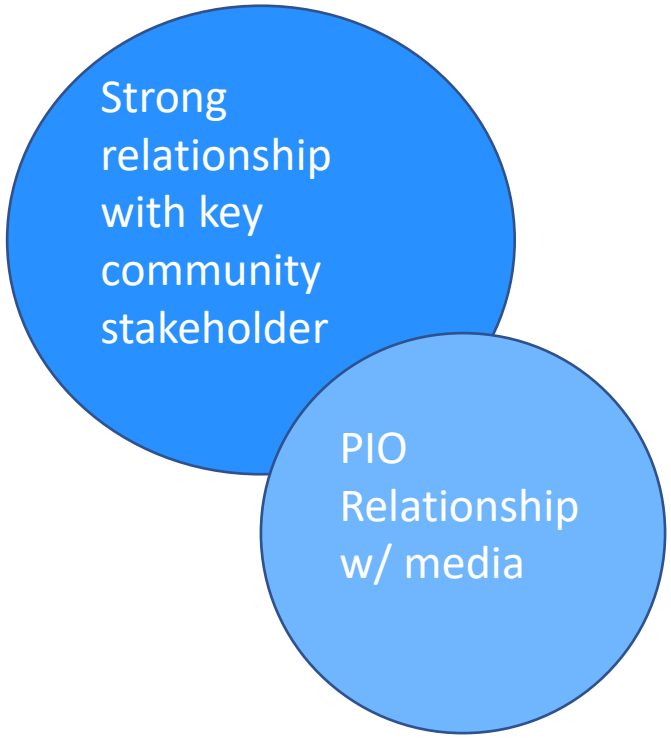
2021, EPA Preliminary Assessment in 2021 determined potential NPL site (GW pathway alone)

Goal

- Bring public up to speed on the site
- Risks
- Next steps

Building Relationships

- What went right



- What went wrong

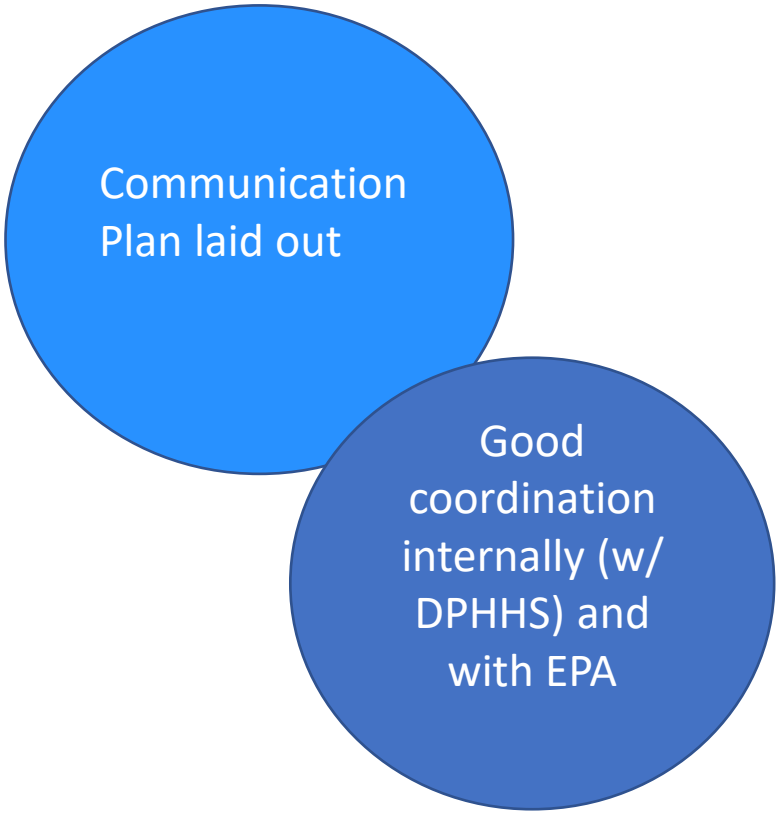
New EPA PM, no established relationship w/ DEQ

Relationship between EPA/community mistrustful

DEQ program had not build 1:1 relationships with commissioners, mayor, superfund coordinator

Proactive Communication

What went right

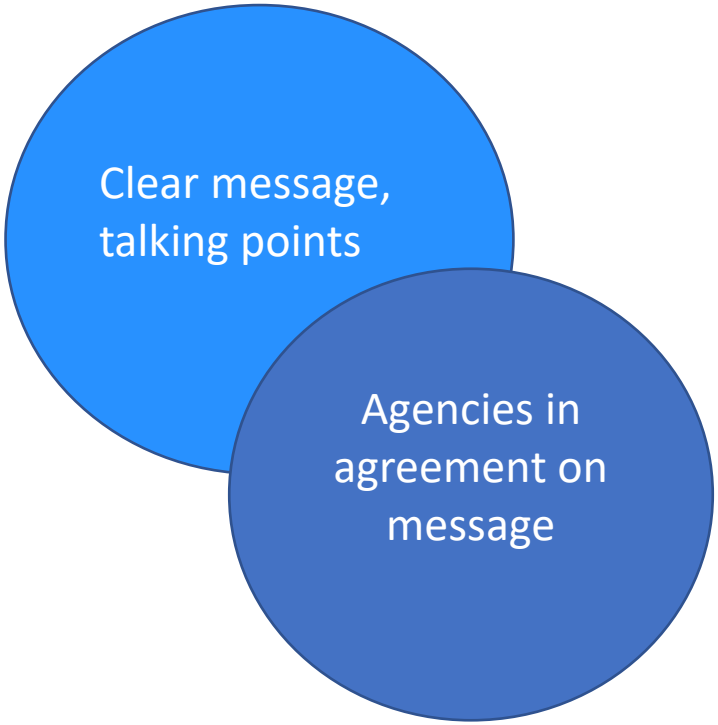


What went wrong

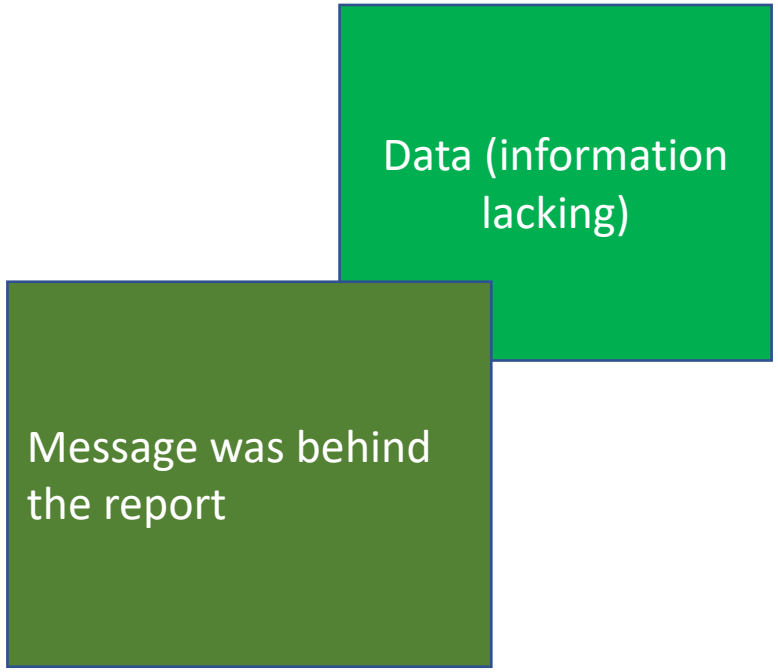
- reactive
- Why weren't we told about this before?
- Timing of initial message- press before commissioners/school board/Mayor were informed.
- Early communication not well documented

Clarity of Message

- What went right



- What went wrong



Takeaways

- Open relationships between agencies are critical and must be fostered.
  - Clearly outline how agency wants to be communicated with (worth it)
- Local outreach needs to occur in a timely manner and documented.
- Don’t blame anyone for communication break down or dropping the ball
- Don’t compare site risk levels to risks from self-imposed activities.

PFAS in Montana

- PFAS found at all federal facilities investigated
- PFAS emerging topic
- Varied interest across DEQ and state
- Need for a unified working group

PFAS Working Group

- Started in 2019
- Interagency
- Regular Meetings

DEQ Montana Department of Environmental Quality

Montana Fish, Wildlife & Parks

Montana Department of Agriculture

Montana DPHHS Healthy People. Healthy Communities.

Lewis & Clark Public Health

PFAS Working Group Products

- Statewide Action Plan
- Collaboration on Grants
- Collaboration on Monitoring
- Communication Subgroup
- GIS Subgroup
- Regulations Subgroup
- Website

How is this Risk Communication?

Goal of Risk Communication: *giving audience members the information they need to make informed, independent judgements about risks to health, safety, and the environment.* (EPA)

Building Relationships

Proactive Communication

Clear Messages

EPA, Learn about Risk Communication | US EPA

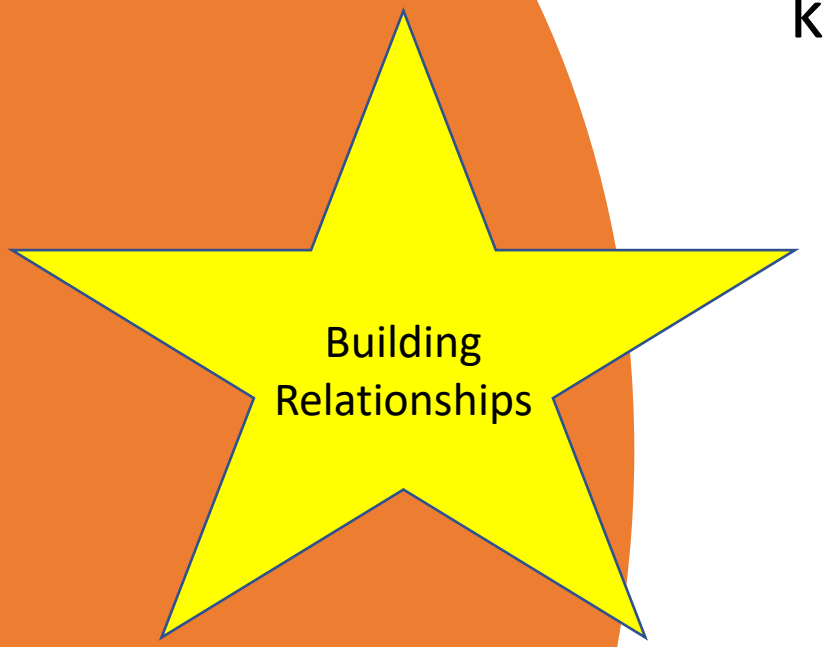
Whitmore Ravine

- Surface water samples, including a fishing pond, came back at high levels.

- (1,188 ng/L; ppt for PFOA/PFOS and 12,920 ng/L ; ppt for all PFAS)

Goal

- Inform public of potential risks from PFAS concentrations
- Over appropriate platforms
- Within two weeks of obtaining validated laboratory data



- Due to PFAS working group, contacts were already known/made
  - Fish Wildlife Parks
  - Dept. Public Health and Human Services
  - DEQ Remediation
  - DEQ Public Information Officers
  - DEQ Public Water Supply
  - Air Force Base
  - County

Internal Coordination (DEQ)

Initial meeting to coordinate response went well

Multiple sections w/in DEQ with vested interest.

Public information officer with final say on message

= one point of contact for a remediation site, all communication out needs to be reviewed by that point of contact

DEQ PFAS working group website already in place with FAQs, site information, contacts, etc

Proactive Communication

DEQ Montana Department of Environmental Quality

MONTANA DPHHS

Whitmore Ravine PFAS

What are PFAS?

Per- and polyfluoroalkyl substances (PFAS) are a group of thousands of human-made chemicals. They have been used in many consumer and household products since the 1940s, including cookware, food packaging, and stain repellants, as well as some firefighting foams used at airports, fire training areas, emergency response locations and military installations. PFAS are sometimes called "forever chemicals" because they do not easily break down and can stay in the environment for long periods of time.

What has DEQ done at Whitmore Ravine?

DEQ is proactively working to assess the prevalence of PFAS in Montana's water bodies. This is one part of implementing the Montana PFAS Action Plan that was adopted in June of 2020. In late summer and early fall of 2021 DEQ's Monitoring and Assessment Section conducted a water quality monitoring project to screen for PFAS around the state.

During preliminary review of results, DEQ found high PFAS concentrations in samples taken at Whitmore Ravine in Great Falls. Definitive sources of all the PFAS compounds found at Whitmore Ravine have not been identified at this time.

The nearby Malmstrom Air Force Base (MAFB) is already investigating whether it could be a contributor to the PFAS concentrations at Whitmore Ravine. In 2016/2017, MAFB contractors performed an investigation that identified areas of potential PFAS contamination on base. As a result, MAFB is developing a work plan to determine the extent and magnitude of PFAS contamination on- and off-base. DEQ is consulting with its federal partners and will review the draft work plan.

What do we mean by high concentrations of PFAS?

In 2019, DEQ adopted a Human Health Standard standard for the two most studied PFAS compounds, PFOA and PFOS, (individually of combined) for groundwater at 70 parts per trillion (ppt). This standard is based on a lifetime Health Advisory Level for drinking water set by the EPA. There currently is no standard for PFAS in surface water so this monitoring project used the groundwater standard as a screening level for surface water samples. The combined concentration of PFOS and PFOA in Whitmore Ravine surface water was 1,188 ppt. A total of 28 PFAS compounds were analyzed by the lab and the total PFAS concentration was 12,920 ppt.

Is there any immediate threat to health or safety?

There is currently no immediate threat to human health, however DEQ recommends the water in Whitmore Ravine not be consumed by people or animals without proper water treatment.

DEQ has worked with state and local stakeholders to notify nearby landowners and trail users of the situation.

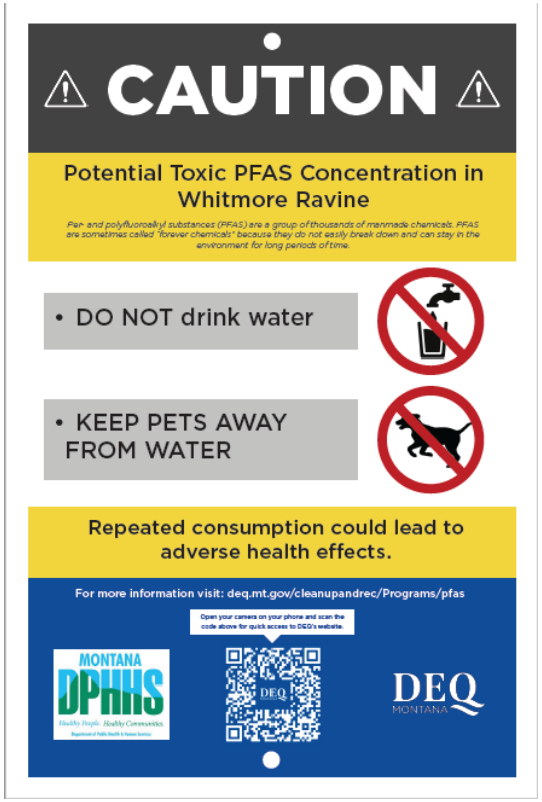
What are the potential health risks associated with PFAS?

Only a few of the thousands of PFAS have been studied for their potential to affect people's health. Research is ongoing and we will learn more over time. Studies that have occurred suggest that exposure to certain PFAS may lead to health problems including changes in the liver, cardiovascular effects, reproductive effects in women, immunological and developmental effects in infants and children, and an increased risk of kidney or testicular cancer.

Where can I find additional information on PFAS?

Montana Department of Environmental Quality:
deq.mt.gov/cleanupandrec/programs/pfas

Press releases and signs posted; landowner letters sent



Talking points in place, risk message ready to go.

Clarity of Message

DEQ Montana Department of Environmental Quality

MONTANA DPHHS Healthy People. Healthy Communities.

Name
Address
City, MT, Zip

Dear Landowner Name,

You are receiving this letter from the Montana Department of Environmental Quality (DEQ) regarding a sample taken from Whitmore Ravine surface water. The Monitoring and Assessment Section completed a water quality monitoring project to screen for per- and polyfluoroalkyl substances (PFAS) around the state. PFAS is a group of thousands of man-made organic compounds that have been used in many industrial, consumer, and household products since the 1940s and are sometimes called "forever chemicals" because they do not easily break down in the environment.

DEQ collected surface water and sediment samples in the Great Falls area on October 12th and 13th 2021 which were analyzed for 28 PFAS compounds. Only 28 PFAS compounds were analyzed due to laboratory analysis capability. After reviewing our results, we found high PFAS concentrations in Whitmore Ravine surface water. The Whitmore Ravine surface water sample was obtained approximately 500 feet upstream from where it discharges into the Missouri River. In 2019, DEQ adopted the EPA's drinking water health advisory for two of the most common and studied PFAS compounds, perfluorooctanic acid (PFOA) and perfluorooctane sulfonic acid (PFOS), (individually or combined) as the Montana groundwater standard at 70 parts per trillion (ppt). Our monitoring project used this groundwater standard as a screening level for surface water samples. The combined concentration of PFOS and PFOA in Whitmore Ravine surface water was 1,188 ppt. A total of 16 PFAS compounds were detected with a total PFAS concentration of 12,920 ppt.

DEQ is providing landowners adjacent to Whitmore Ravine with a notice of these results. There is currently no immediate threat to human or animal health. However, water from Whitmore Ravine should not be consumed without proper water treatment as repeated consumption could lead to adverse health effects. These effects could include liver, immunological, developmental, endocrine, reproductive, cardiovascular, and carcinogenic effects. We recommend finding an alternative water source if livestock or pets are drinking from untreated water sources within or immediately downstream from Whitmore Ravine.

Photo credit, Scott Gestring

Risk Communication Strategies

- Build Relationships
- Proactive Communication
- Clarity of Message

Thank you for your attention

Contact:

Terri Mavencamp
tmavencamp2@mt.gov

406-444-5595

http://deq.mt.gov

References

- Dr. Covello's blog: Crisis and Risk Communication Articles - Pathway to Risk Communications (pathwaycommunication.com)

- Learn about Risk Communication | US EPA

- The SALT Framework | US EPA