

The background of the slide is a light gray gradient with several realistic water droplets of various sizes scattered across it. The droplets have highlights and shadows, giving them a three-dimensional appearance.

LEWIS & CLARK COUNTY WATER QUALITY
PROTECTION DISTRICT

**PUBLIC MEETING: PRIVATE WELL
TESTING, CONTAMINANTS, AND
TREATMENT OPTIONS**

BIRDSEYE VOLUNTEER FIRE DEPT. HALL

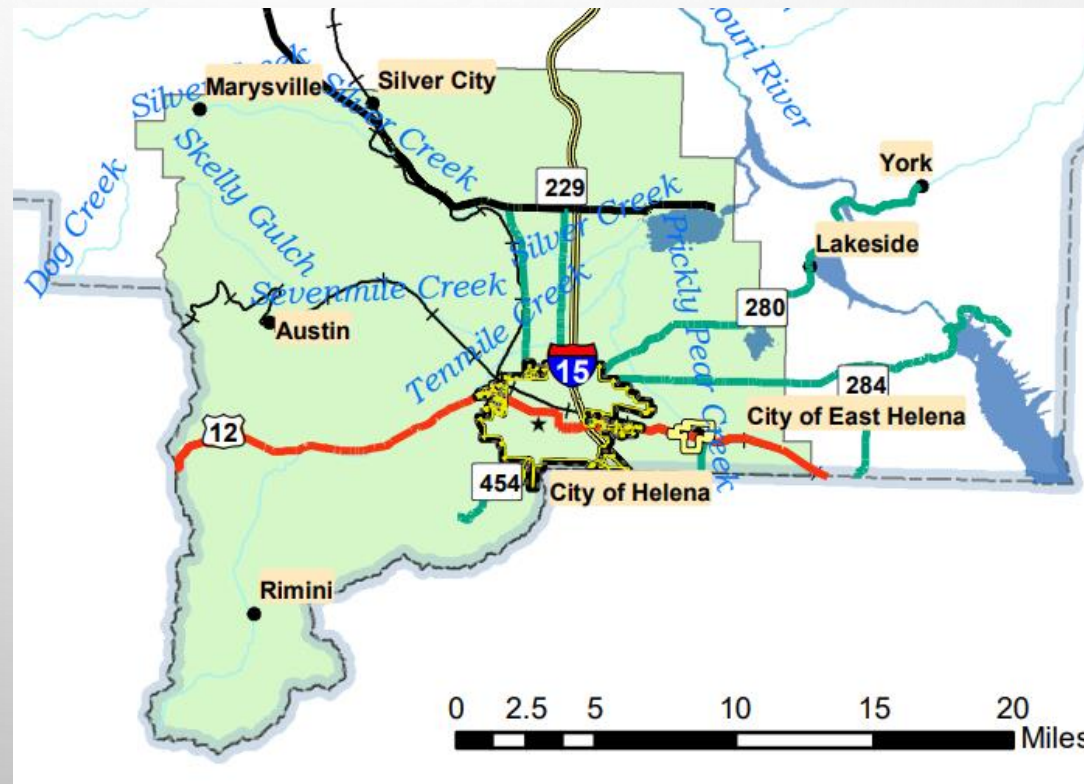
APRIL 21, 2022

OUTLINE

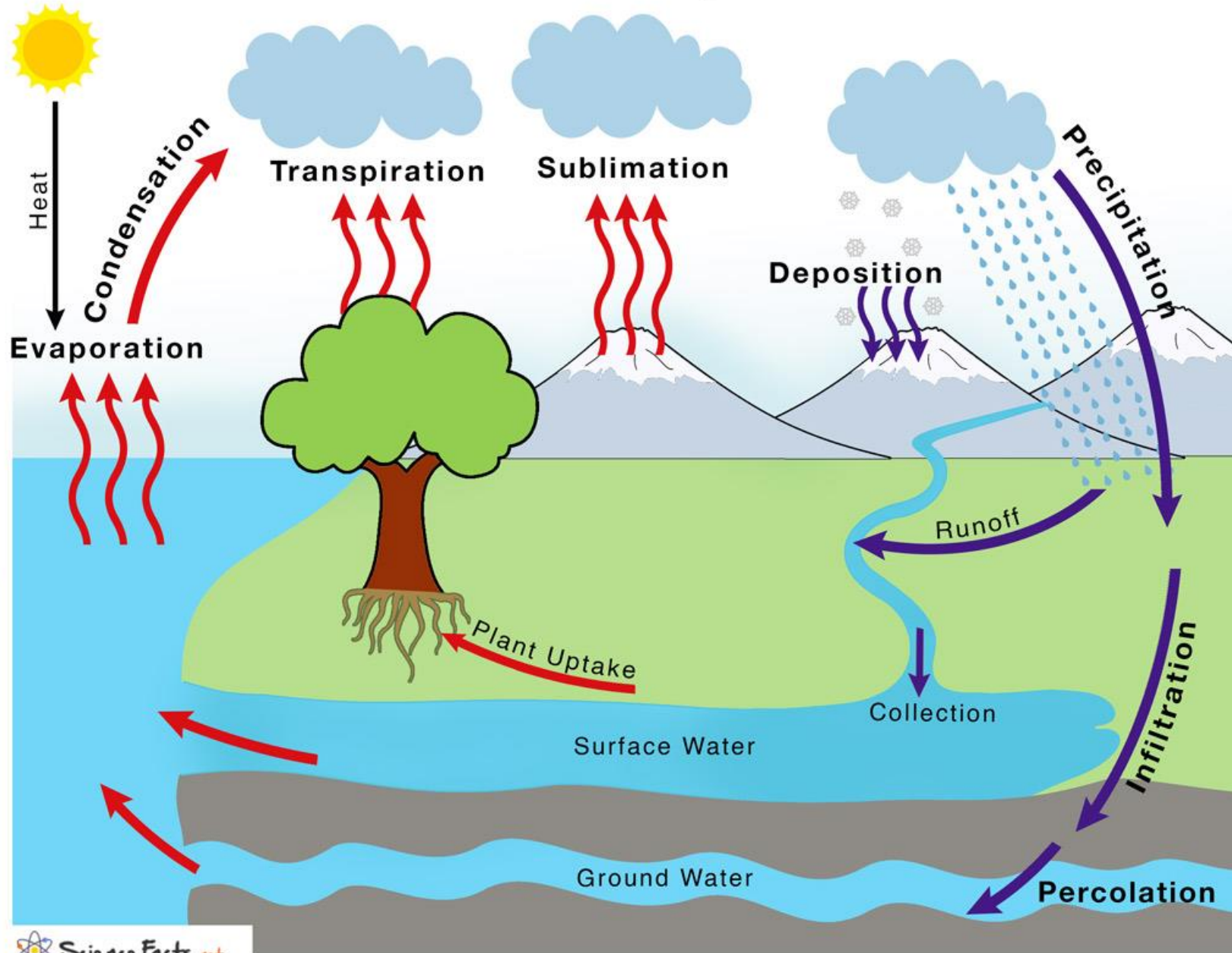
- WATER QUALITY PROTECTION DISTRICT
- PRIVATE RESIDENTIAL WELL TESTING
- RECENT RESEARCH
 - WQPD
 - MBMG
- CONTAMINANTS OF CONCERN
 - NUTRIENTS
 - METALS
- TREATMENT OPTIONS

WHAT IS THE WQPD?

- PRESERVE, PROTECT, AND IMPROVE WATER QUALITY AND QUANTITY WITHIN DISTRICT BOUNDARIES.



Water Cycle



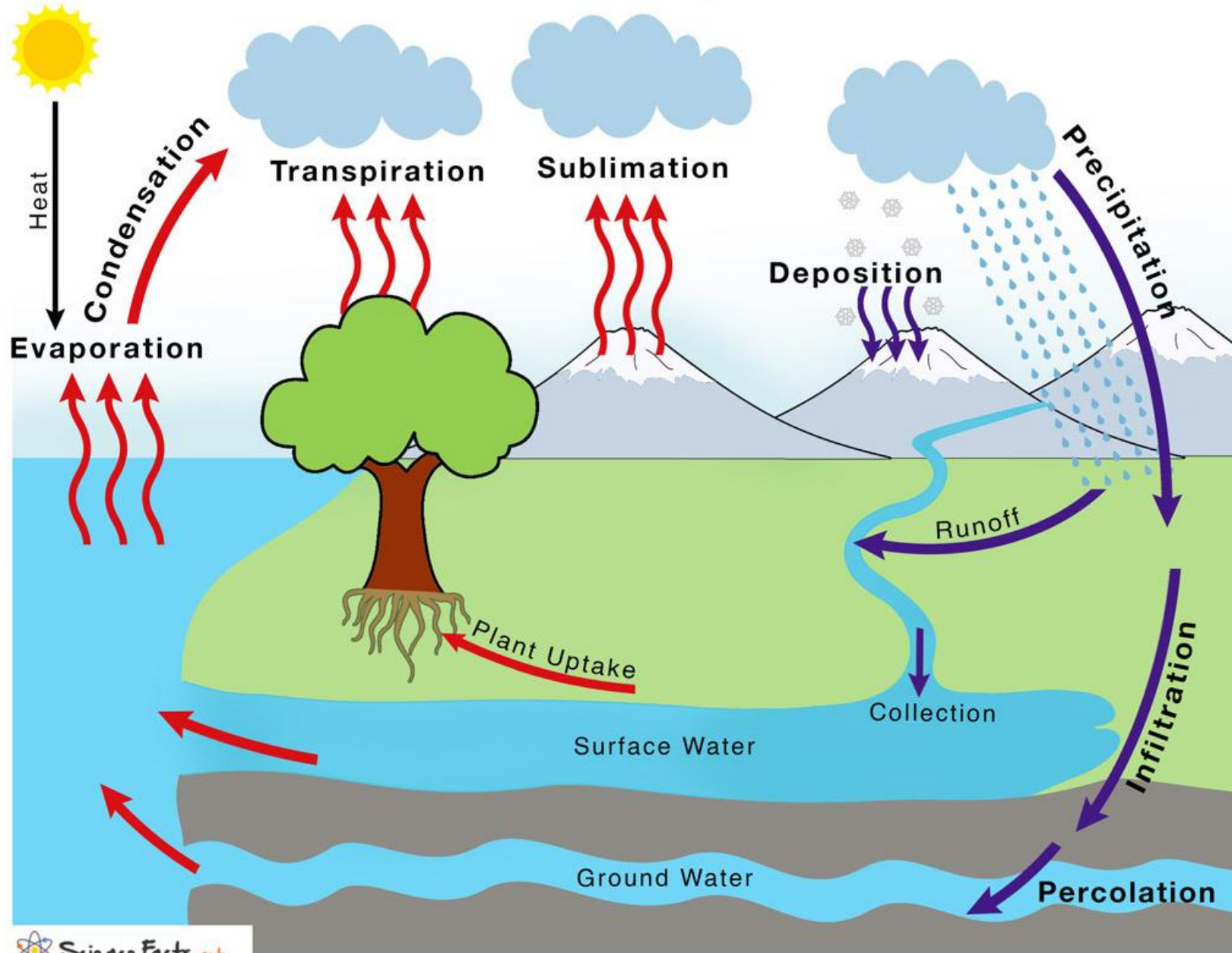
The background of the image is a light, neutral gray with a subtle gradient. It is decorated with numerous water droplets of various sizes and shapes, scattered across the frame. Some droplets are large and prominent, while others are small and delicate. The droplets have a realistic appearance with highlights and shadows, giving them a three-dimensional look. The text is centered horizontally and vertically on the page.

SAMPLE AND TEST YOUR WATER!

DRINKING WATER QUALITY TESTING

- PUBLIC WATER SUPPLY (PWS): ALREADY DONE FOR YOU
 - CITY OF HELENA, CITY OF EAST HELENA
 - NON-MUNICIPAL PUBLIC WATER
- PRIVATE RESIDENTIAL WELLS
 - IT'S UP TO YOU AS HOMEOWNER OR RESIDENT TO SEE WHAT'S IN YOUR WATER
 - NOT REGULATED OR MANDATED

Water Cycle

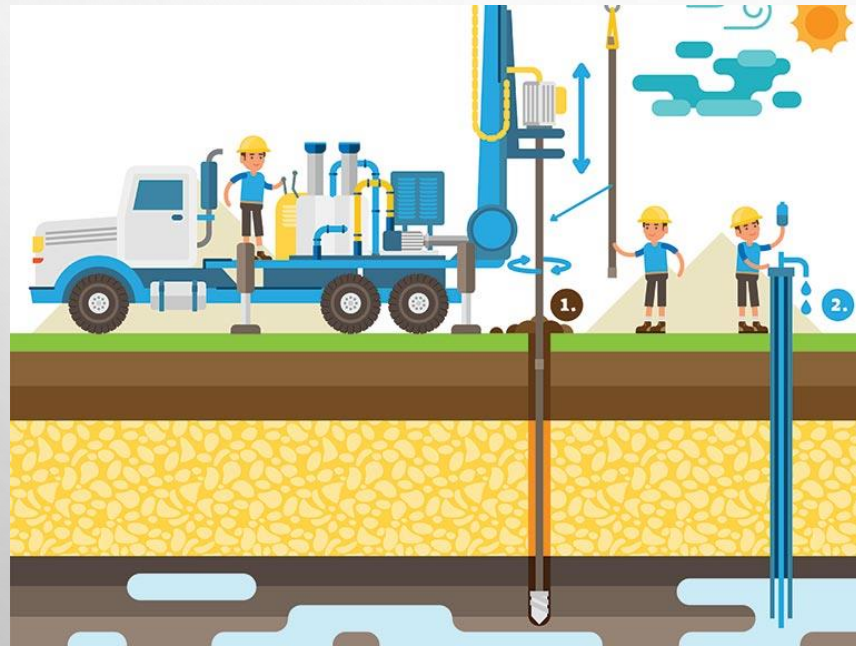


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**HOW OFTEN SHOULD WATER
QUALITY BE TESTED?**

TESTING FREQUENCY

- NEW HOUSE OR NEW WELL
- ANNUALLY



hogdonwells.com



realtor.com

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**HOW DO
HOMEOWNERS/RESIDENTS GET
WELL WATER TESTED?**

WATER QUALITY TESTING OPTIONS

- WELL EDUCATED KITS FROM WQPD
 - LOW-COST OPTION
- ENERGY LABORATORIES, HELENA
 - 406-442-0711
- ENVIRONMENTAL LAB, MT DPHHS
 - 406-444-3444
- ALPINE ANALYTICAL, INC., HELENA
 - 406-449-6282



Log in: _____
 Client: _____
 Sample ID: _____
 Collection Date: _____ Time: _____
 Collected by: _____ Preservation: None

BRAUN Log in: _____
INTERTEC Client: _____
 Sample ID: _____
 Collection Date: _____ Time: _____
 Collected by: _____ Preservation: H₂O

BRAUN Log in: _____
INTERTEC Client: _____
 Sample ID: _____
 Collection Date: _____ Time: _____
 Collected by: _____ Preservation: None

BRAUN™ Log in: _____
INTERTEC Client: _____
 Sample ID: _____
 Collection Date: _____ Time: _____
 Collected by: _____ Preservation: None

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**WHAT SHOULD
HOMEOWNERS/RESIDENTS TEST
FOR?**

Analyte	Analytical Method	Reporting Limit	Units	Preservative
Non-Metals				
Alkalinity (total as CaCO ₃)	A2320-B	1	mg/L	cool ≤ 6°C
Bicarbonate as HCO ₃	A2320-B	1	mg/L	cool ≤ 6°C
Bromide	EPA 300.0	0.05	mg/L	cool ≤ 6°C
Carbonate as CO ₃	A2320-B	1	mg/L	cool ≤ 6°C
Chloride	EPA 300.0	1	mg/L	cool ≤ 6°C
Conductance, Specific @ 25C	EPA 120.1	1	uS/cm	cool ≤ 6°C
Fluoride	EPA 300.0	0.1	mg/L	cool ≤ 6°C
Hardness (total as CaCO ₃)	A2340-B	1	mg/L	cool ≤ 6°C
Nitrogen: Nitrate plus Nitrite as N	E353.2	0.01	mg/L	cool ≤ 6°C, H ₂ SO ₄ to pH<2
pH (lab)	EPA 150.2	0.1	s.u.	NA
Sulfate	EPA 300.0	1	mg/L	cool ≤ 6°C
Total Dissolved Solids	A 2540 C	10	mg/L	cool ≤ 6°C
Metals (Total Dissolved)				
Arsenic	E200.8	0.001	mg/L	cool ≤ 6°C, HNO ₃ to pH<2
Calcium	E200.8	1	mg/L	cool ≤ 6°C, HNO ₃ to pH<2
Iron	E200.8	0.02	mg/L	cool ≤ 6°C, HNO ₃ to pH<2
Magnesium	E200.8	1	mg/L	cool ≤ 6°C, HNO ₃ to pH<2
Potassium	E200.8	1	mg/L	cool ≤ 6°C, HNO ₃ to pH<2
Sodium	E200.8	1	mg/L	cool ≤ 6°C, HNO ₃ to pH<2
Uranium	E200.8	0.0003	mg/L	cool ≤ 6°C, HNO ₃ to pH<2

MAXIMUM CONTAMINANT LEVEL (MCL)

- ENFORCEABLE STANDARD SET BY EPA
 - DETERMINED BY HEALTH EFFECTS DATA
- ONLY APPLY TO PWS
 - USE AS A REFERENCE FOR PRIVATE RESIDENTIAL WELL WATER

Nitrate: 10 mg/L or 10 ppm

Arsenic: 0.01 mg/L or 0.01 ppm, 10 µg/L or 10 ppb

Uranium: 0.03 mg/L or 0.01 ppm, 30 µg/L or 30 ppb

9.98 → 10.02

The image features a light gray background with several realistic water droplets of various sizes scattered in the corners. The droplets have highlights and shadows, giving them a three-dimensional appearance. The text is centered in the middle of the page.

AND TOTAL COLIFORM BACTERIA!

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WHY TEST FOR THOSE CONTAMINANTS?

RAVEN ROAD STUDY

- 3 SAMPLING EVENTS
 - MARCH 2015, SEPTEMBER 2015, OCTOBER 2021
- LOOKING FOR NITRATE ISSUES
 - ARSENIC AND URANIUM PART OF SAMPLING SUITE
- RESULTS
 - 3 OF 17 WELLS HAD NO₃ EXCEEDING THE MCL*
 - 10 OF 17 WELLS HAD AS EXCEEDING THE MCL*
 - 2 OF 17 WELLS HAD U EXCEEDING THE MCL*

**in at least one of three sampling events*

MBMG SCRATCHGRAVEL HILLS STUDY

- HYDROGEOLOGIC INVESTIGATION
 - GROUNDWATER SUPPLY
 - SEPTIC EFFLUENT IMPACTS TO GROUNDWATER QUALITY
- RESULTS
 - 3 OF 25 SITES HAD NO₃ EXCEEDING THE MCL
 - 1 OF 25 SITES HAD AS EXCEEDING THE MCL
 - 1 OF 25 SITES HAD U EXCEEDING THE MCL

Montana Bureau of Mines and Geology Open-File Report 636

NITRATE

- ANTHROPOGENIC SOURCES
 - FERTILIZER
 - SEPTIC SYSTEMS
 - MANURE
- HEALTH CONCERNS
 - BLUE BABY SYNDROME
 - THYROID CONDITIONS
 - CANCER

NITRATE

- BEST MANAGEMENT PRACTICES
 - PROTECTED WELLHEAD
 - SEPTIC MAINTENANCE
 - FERTILIZER/MANURE MANAGEMENT
- TREATMENT
 - ION EXCHANGE, DISTILLATION, REVERSE OSMOSIS

The background of the slide is a light gray gradient with several realistic water droplets and bubbles of various sizes scattered across it. The droplets have highlights and shadows, giving them a three-dimensional appearance.

ARSENIC INFORMATION

PUBLIC MEETING @ BIRDSEYE FIRE STATION

04/21/2022

MADLINE MCKEEFRY

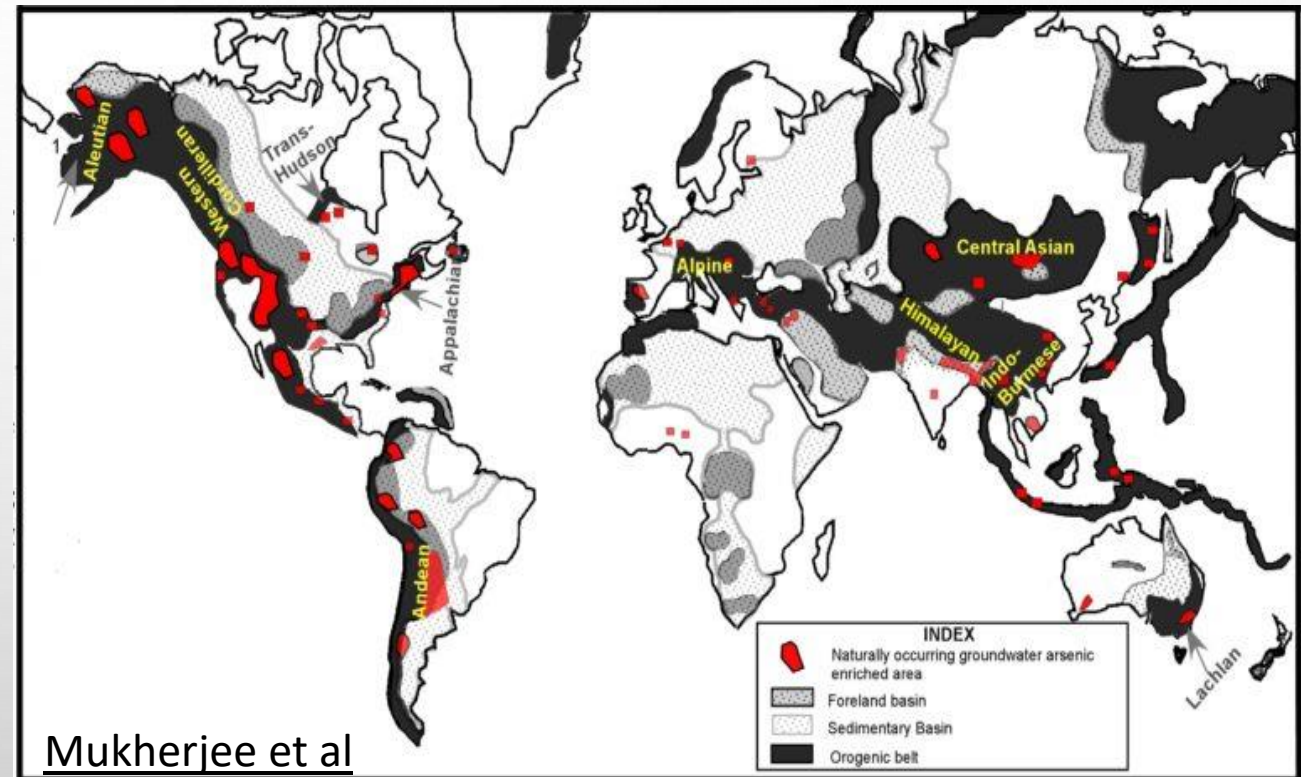
LEWIS AND CLARK PUBLIC HEALTH

WHO AM I?

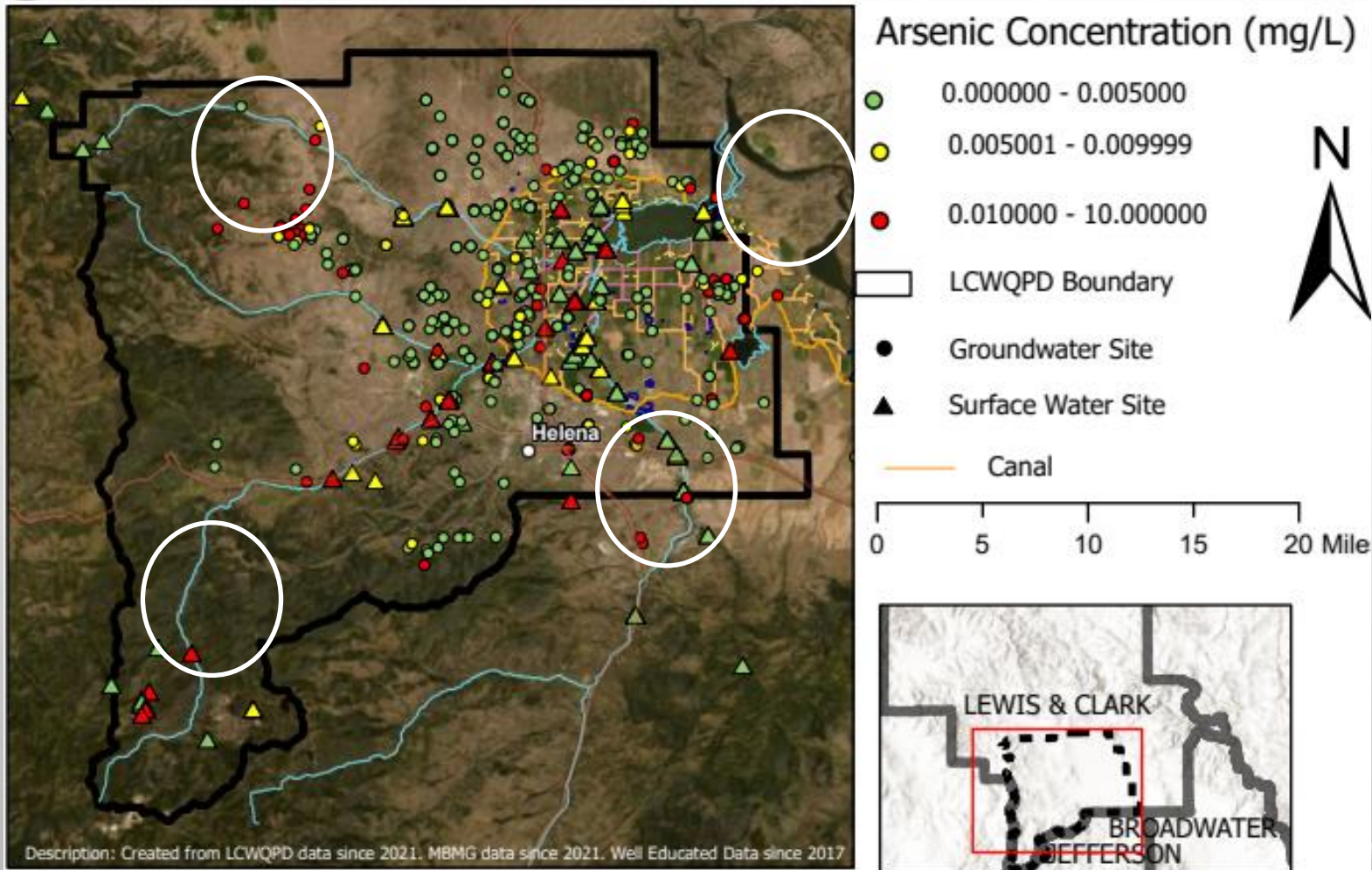
- MADDIE MCKEEFRY – LEWIS AND CLARK WATER QUALITY PROTECTION DISTRICT
 - MONITOR WATER QUANTITY AND QUALITY THROUGHOUT THE HELENA VALLEY
 - DISCUSS ARSENIC, WATER TREATMENT OPTIONS, AND LOCAL RESOURCES
- WHAT I AM NOT
 - A DOCTOR
 - WATER TREATMENT EXPERT
 - ARSENIC EXPERT

ARSENIC BACKGROUND

- ARSENIC IS NATURALLY OCCURRING
 - 20 MOST ABUNDANT ELEMENT IN THE EARTH'S CRUST
- HUMAN ENHANCEMENT: MINING OPERATIONS
- ARSENIC CAN AFFECT ANY WELL DEPTH SINCE IT IS LOCATED WITHIN THE ROCK UNIT
 - DIFFERENT FACTORS CONTRIBUTE



WHY DO WE CARE



- HIGH CONCENTRATIONS THROUGHOUT THE VALLEY
 - 19 % ABOVE DRINKING WATER STANDARD (MCL)
(56 OUT OF 297 HOMES)
 - 21% ARE ELEVATED
(62 OUT OF 297 HOMES)
 - 60% LOW CONCERN
(178 OUT OF 297 HOMES)

* Any amount of arsenic is not good

HEALTH EFFECTS

- FACTORS
 - DOSE - AMOUNT IN YOUR BODY
 - DURATION - HOW LONG/OFTEN YOU ARE EXPOSED
 - GENERAL HEALTH
- SHORT-TERM SYMPTOMS INCLUDE:
 - NAUSEA, VOMITING, DIARRHEA, DEHYDRATION (CDC)
- LONG-TERM SYMPTOMS INCLUDE:
 - SKIN DISORDERS, HIGHER RISK OF DIABETES, LIVER AND CARDIOVASCULAR DISEASES THAT CAN LEAD TO FORMS OF CANCER (CDC)
- FORMS OF ARSENIC
 - REDUCED: HARDER TO TREAT
 - OXIDIZED



TREATMENT SYSTEMS

REGARDLESS OF ARSENIC TYPE

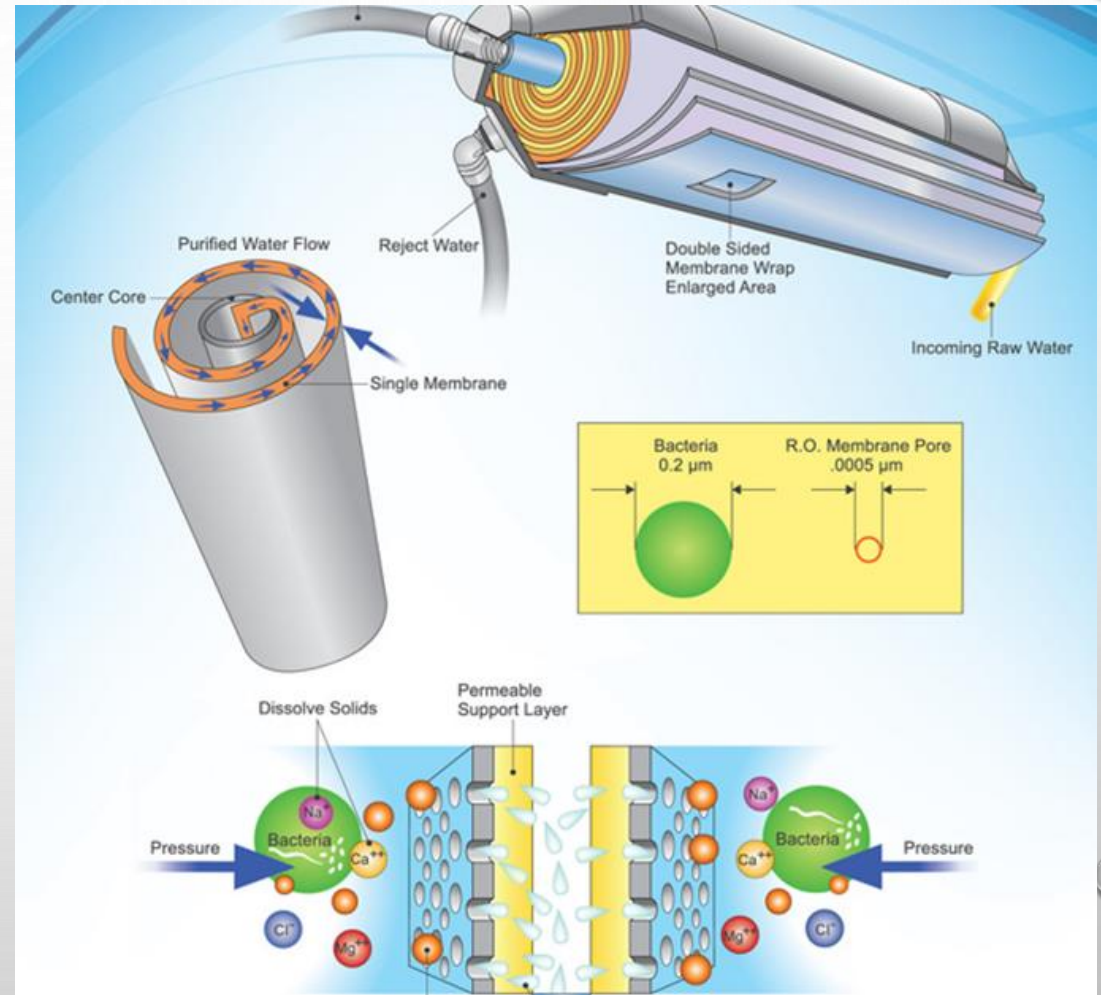
- POINT OF ENTRY: TREATMENT IS THROUGHOUT THE ENTIRE HOUSE
 - NOT NEEDED FOR ARSENIC
- **POINT OF USE:** TREATMENT IS PLACED ON A SINGLE TAP AND WATER IS TREATED FOR CONSUMPTIVE PURPOSES
 - USED FOR DRINKING WATER
- INSTALLATION CAN GO THROUGH A THIRD PARTY OR DIY
 - CONFIRM THEY ARE CERTIFIED BEFORE INSTALLING THE SYSTEM
 - NSF (NATIONAL SANITATION FOUNDATION) OR ANSI (AMERICAN NATIONAL STANDARDS INSTITUTE)

POU TREATMENT OPTIONS

- MOST COMMON POINT OF USE
 - OPTION 1: REVERSE OSMOSIS (RO SYSTEM) - \$300-1,500
 - OPTION 2: ADSORPTION MEDIA SYSTEM - \$300-700
- LEAST COMMON POINT OF USE
 - OPTION 3: DISTILLATION SYSTEM - \$300-1,200

OPTION 1 (RO SYSTEM)

- PRO: REMOVES NEARLY ALL CONTAMINATES EXCEPT FOR A SELECT FEW
- CON: WASTE PRODUCED, CAN BE INEFFICIENT, AND MAY NEED PRE (OXIDATION) AND POST TREATMENT (MINERALS)
- COST: \$300-1,500 WITH \$50-100 EVERY YEAR FOR REPLACEMENT OF FILTER
- MEMBRANES SHOULD LAST FOR A FEW YEARS





IMPORTANT COMPONENTS OF A RO SYSTEM

(DIY CAN BE DIFFICULT)

- NEED MEMBRANE STAGE (PREVIOUS SLIDE)
- NEED STAGES PRIOR TO MEMBRANE TO INCREASE LIFESPAN
- SYSTEM CERTIFICATION
- REPLACE FILTERS
 - DISPOSE IN TRASH
- WASTE RATIO (CONSIDER WASTE DRAINAGE)
- SYSTEM SIZE





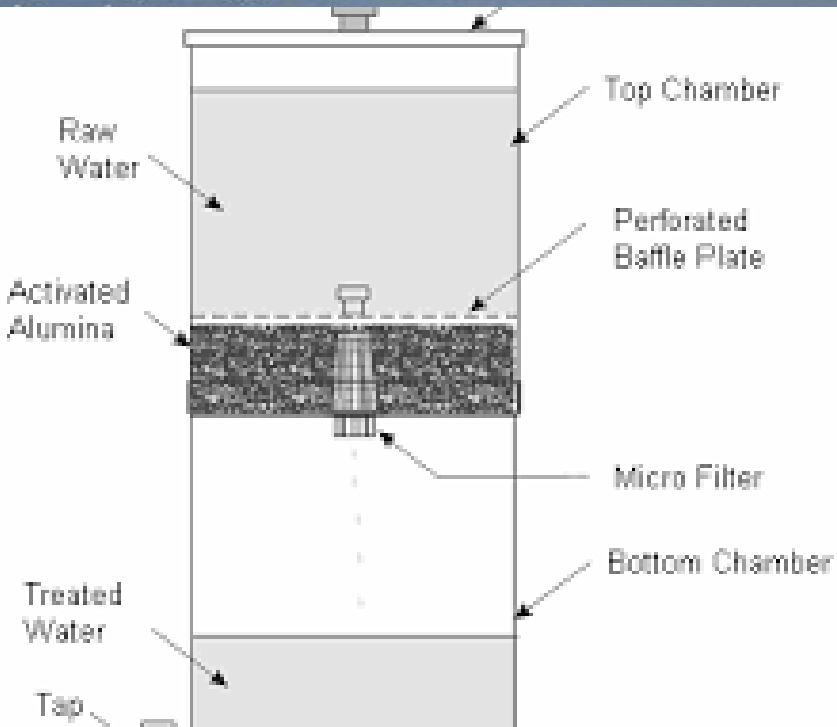
OPTION 2 (ADSORPTION SYSTEM)

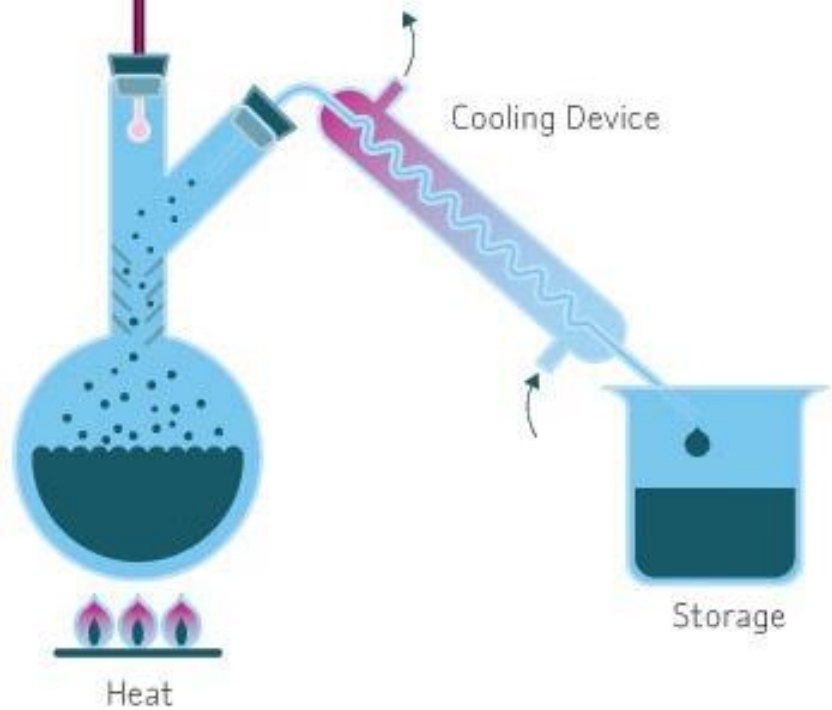
PROBABLY NOT A DIY

- PRO: CREATES LITTLE WASTEWATER AND NO ADDED CHEMICALS

- CON: REMOVE SELECT CONTAMINANTS AND COULD REQUIRE PRETREATMENT DEPENDING ON RAW WATER QUALITY

- COST: \$300-700 WITH \$50-500 EVERY 6 TO 12 MONTHS DEPENDING ON **TANK SIZE** AND **MEDIA** (IN PICTURE)





OPTION 3 (DISTILLATION)

- PRO: REMOVES MOST CONTAMINANTS, MAINTENANCE IS LOW CONSISTING OF CLEANING THE BOILING POT AND HEAT COILS
- CON: ELECTRICITY COST TO OPERATE, DOES NOT PRODUCE A HIGH YIELD OF WATER, MAY NEED POST TREATMENT (MINERALS)
- COST: \$300-1,200 PLUS ENERGY COST TO BOIL WATER
- PURCHASE ONLINE, NO LOCAL SOURCES



WATER TREATMENTS IN THE AREA

Capital City Water Conditioning: Helena, MT @ (406)-594-6054

- Specialized RO systems
- Adsorption system

Big Sky Water Conditioning: Helena, MT @ (406)-442-5630

- RO system

Pure Water Technologies: Bozeman, MT @ (406)-582-4411

- RO system
- Anion exchange

Lowes / Home Depot: Helena, MT

- DIY RO system

* We are not promoting any system or company, just providing you resources

LABORATORIES FOR WELL TESTING

Alpine Analytical

- (406)-449-6282
- Location: 315 Cherry Ave Helena, MT 59601

Energy Labs

- (406)-442-0711
- Location: 3161 East Lyndale Ave Helena, MT 59604
- Can pick up kits at the county building

Department of Public Health and Human Services

- (406)-444-2642
- Location: 1400 E Broadway St
Cogswell Room B206
Helena, MT 59601

- **If you come back to the Water District, we can give you a \$25 discount if lab cost is over \$25 by sending results to the Lewis and Clark Conservation District**
 - Email: mmckee@lccountymt.gov
 - Mail or Visit: 316 N Park Ave Room 224 Helena, MT 59601

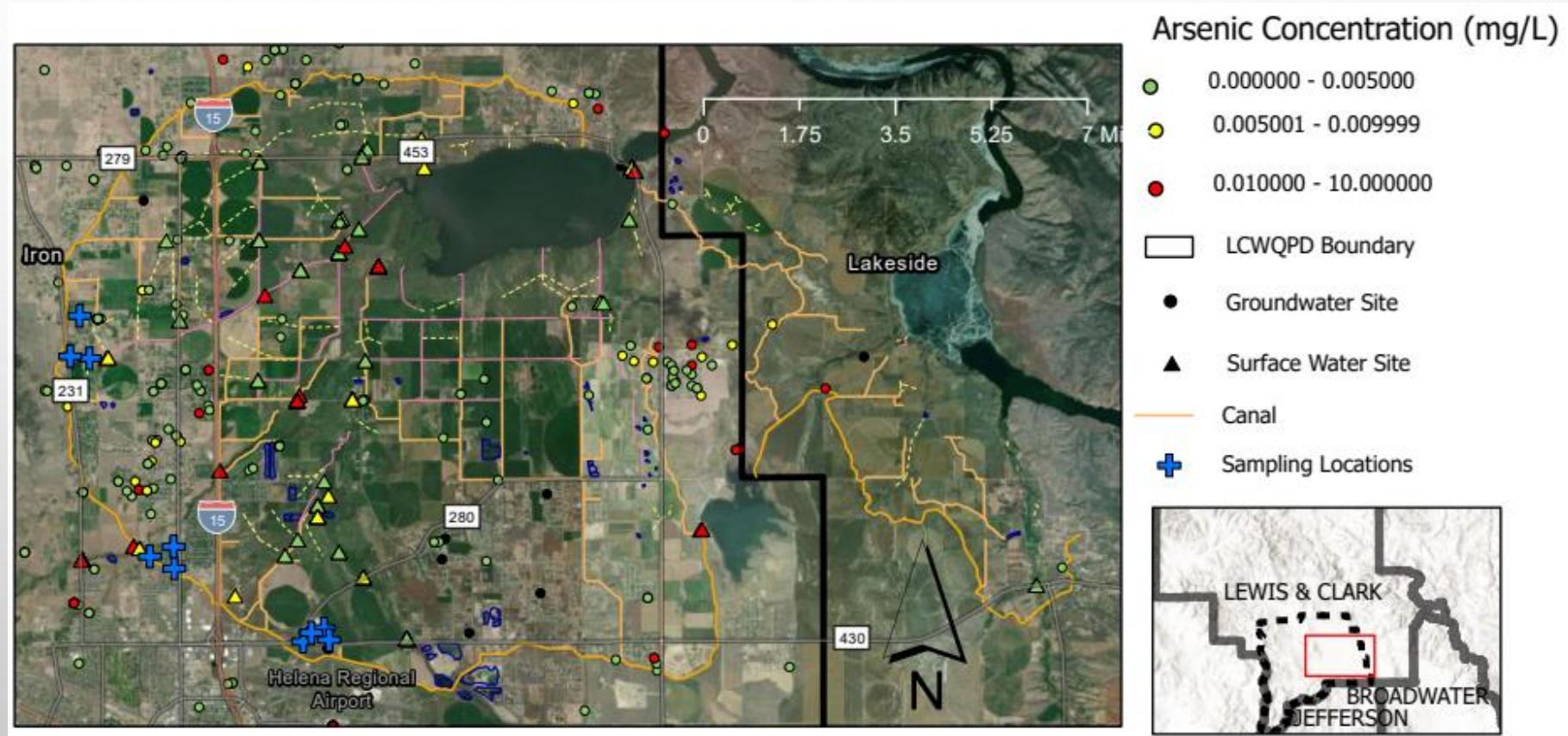
DO I NEED A TREATMENT SYSTEM?

- **DID YOU GET YOUR WELL TESTED?**
 - WAS THERE CONTAMINANTS OF CONCERN?
 - IF YES, THEN FIND BEST OPTION FOR TREATMENT
 - **MUST BE MAINTAINED**
 - TREATMENT IS AT HOMEOWNER'S DISCRETION
- * DUE TO MANY FACTORS, THERE IS NO DEFINED MINIMAL LEVEL OF ARSENIC REQUIRING A TREATMENT SYSTEM**



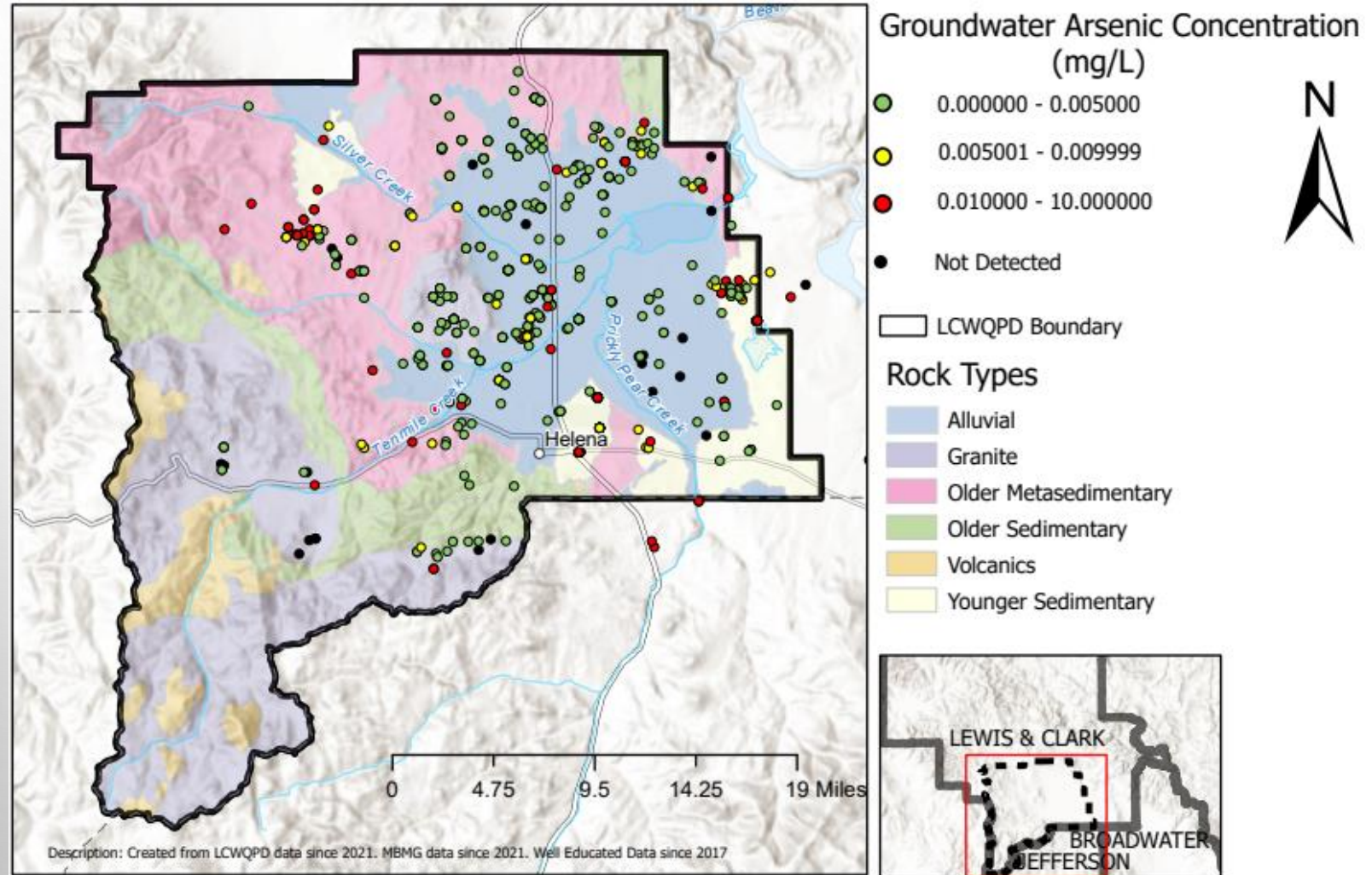
WHAT WE ARE DOING

- STUDYING THE WATER QUALITY OF SHALLOW AND DEEP WELLS IN PROXIMITY TO OR DOWNSTREAM OF THE IRRIGATION CANAL



FUTURE ARSENIC STUDY

- IN 2023 THE DISTRICT WOULD LIKE TO LOOK AT THE DIFFERENT ROCK UNITS AND TOTAL WELL DEPTHS SURROUNDING THE VALLEY TO ANALYZE ARSENIC CONCENTRATIONS



CONCLUSION

- **TEST YOUR WELL**
- **EVALUATE THE RESULTS AND SHARE WITH THE DISTRICT**
 - **WE CAN PROVIDE ADDITIONAL RESOURCES**
- **SELECT APPROPRIATE WATER TREATMENT SYSTEM IF DESIRED**

ADDITIONAL RESOURCES

- LEWIS AND CLARK WATER QUALITY PROTECTION DISTRICT
 - [HTTPS://WWW.LCCOUNTYMT.GOV/HEALTH/WATER/WATER-QUALITY-RESOURCES.HTML](https://www.lccountymt.gov/health/water/water-quality-resources.html)
- WATER TREATMENT
 - [HTTPS://INFO.NSF.ORG/CERTIFIED/DWTU/](https://info.nsf.org/certified/dwtu/)
 - [HTTPS://WWW.NSF.ORG/CONSUMER-RESOURCES/ARTICLES/HOME-WATER-TREATMENT](https://www.nsf.org/consumer-resources/articles/home-water-treatment)
 - [HTTPS://DRINKING-WATER.EXTENSION.ORG/TAG/DRINKING-WATER-TREATMENT/](https://drinking-water.extension.org/tag/drinking-water-treatment/)
 - [HTTPS://WWW.NSF.ORG/CONSUMER-RESOURCES/ARTICLES/STANDARDS-WATER-TREATMENT-SYSTEMS](https://www.nsf.org/consumer-resources/articles/standards-water-treatment-systems)
 - [HTTPS://WELLOWNER.ORG/RESOURCES/WATER-QUALITY/CONTAMINANTS/ARSENIC/#REMOVE-ARSENIC](https://wellowner.org/resources/water-quality/contaminants/arsenic/#remove-arsenic)
- WATER TESTING LABS IN HELENA
 - [HTTP://WWW.ALPINEANALYTICAL.COM/JANDA/FILES/HOME/1553616743_PRICE%20MARCH%202019%20VER.%202.PDF](http://www.alpineanalytical.com/janda/files/home/1553616743_PRICE%20MARCH%202019%20VER.%202.PDF)
 - [HTTPS://DPHHS.MT.GOV/ASSETS/PUBLICHEALTH/LAB/ENVIRONMENTALLABTESTING/PINKSHEETADACOMPLIANT.PDF?VER=2019-04-23-091219-930](https://dphhs.mt.gov/assets/publichealth/lab/environmentallabtesting/pinksheetadacompliant.pdf?ver=2019-04-23-091219-930)
 - [HTTPS://WWW.ENERGYLAB.COM/WP-CONTENT/UPLOADS/SERVICES/WATER.PDF](https://www.energylab.com/wp-content/uploads/services/water.pdf)

CONTACT INFORMATION

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