

Water Treatment

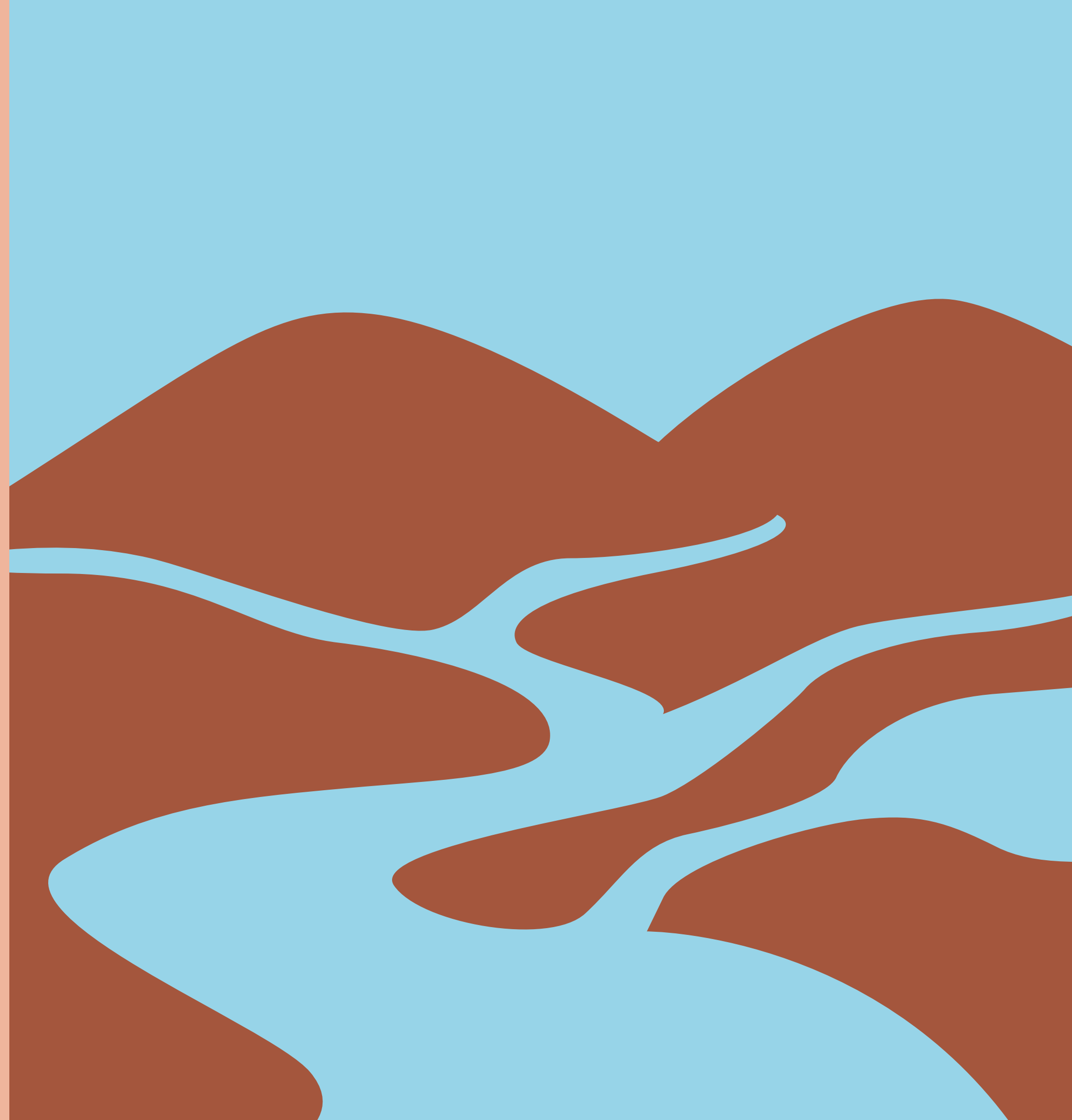
Source Water Characteristics and
the Law direct chemical use

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Surface Water

- Lakes
- Reservoirs
- Rivers
- Creeks

- Low Mineral Content
- Variable Turbidity
- Bacteria
- Viruses
- Carbon
 - Low Alkalinity
- SWTR

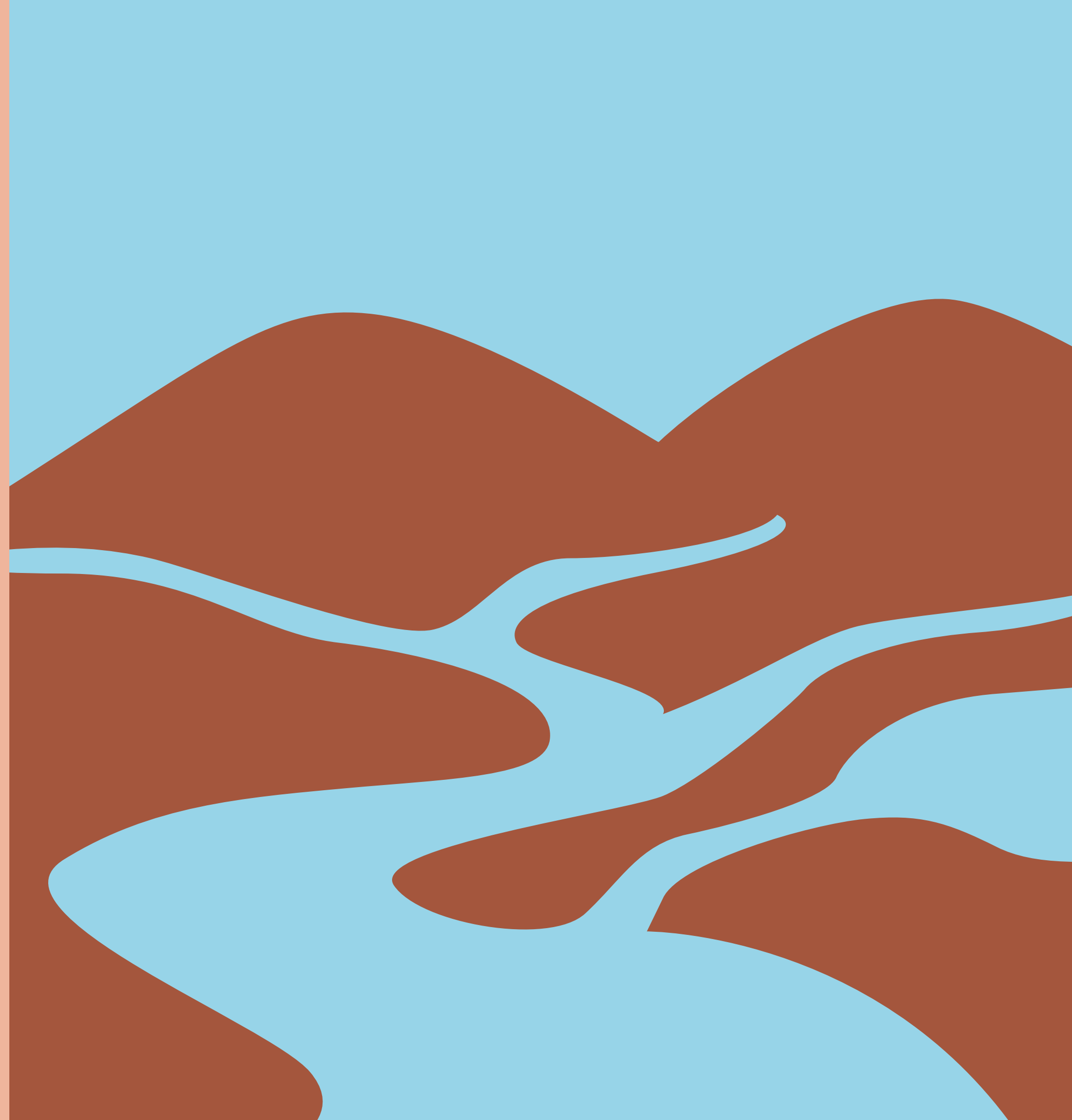


Ground water

WELLS

- Aquifers
- Fractured Rock (no aquifer)

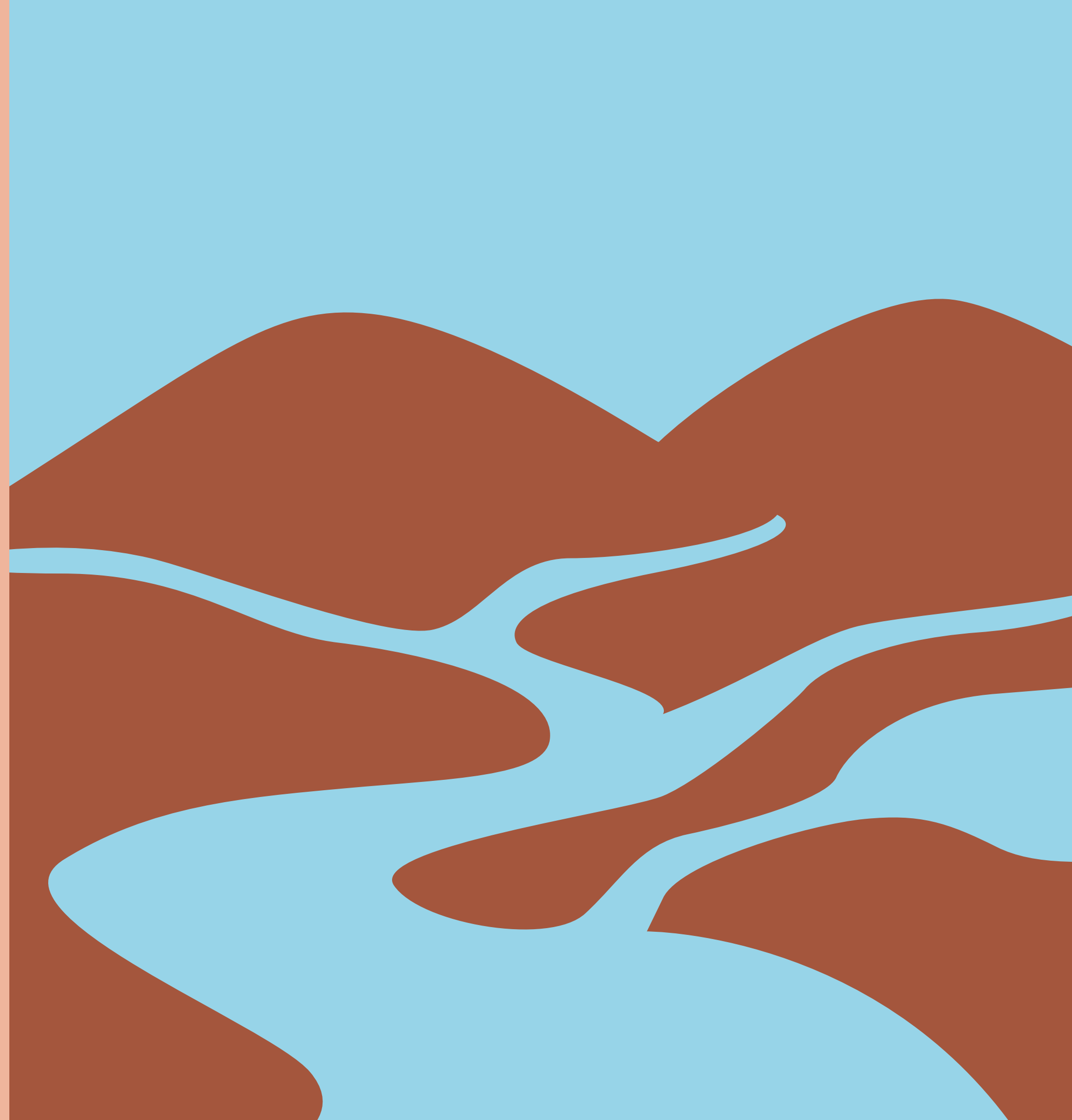
- Mineral Content
 - High Alkalinity/
Hardness
- Little to no bacteria
- SGMA (aquifers)



Water Sources

5 of the 6 CCWD Systems are supplied by Surface Water

Surface Water and Groundwater generally have different characteristics



Surface Water Sources

- **New Hogan Reservoir & White Pines (Calaveras River Watershed)**
- **Bear Creek/Middle Fork (Mokelumne River Watershed)**
- **McKay's/Hunters/North Fork Project (Stanislaus River Watershed)**



Bummerville Reservoir - West Point

Groundwater Source

Wallace Lake Estates

Aquifer - East Jan Joaquin Sub -
Basin (Western portion of the
County)

Sustainable Groundwater
Management Act (SGMA - 2014)



Wallace Well 2



Wallace Well 3

Two CCWD surface water sources are somewhat unique

Iron & Manganese

Both New Hogan Reservoir and Lake Tulloch are characterized by the presence of FE & MN

The Hunters WTP, which serves Ebbetts Pass does not have to contend with FE & MN

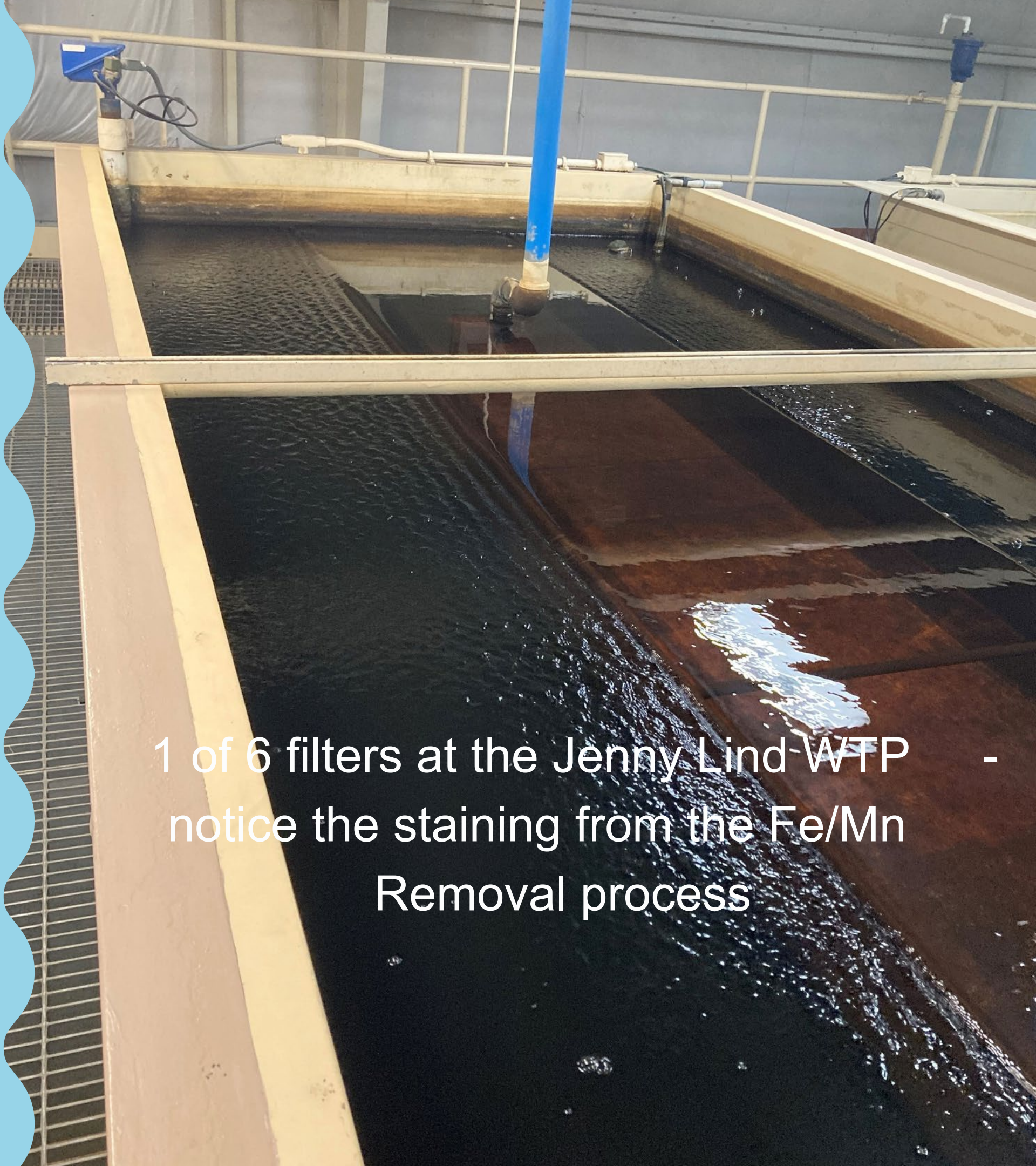


Jenny Lind WTP
Ozone Towers

Permanganate (either sodium or potassium), normally used to remove manganese from Groundwater, is used at the Jenny Lind WTP. Ozone is used at both the Jenny Lind and Copper Cove WTPs

Iron Manganese

The use of Permanganate and ozone provides a powerful 1/2 punch in terms of oxidizing minerals and helping to pull them out of solution



1 of 6 filters at the Jenny Lind WTP - notice the staining from the Fe/Mn Removal process

Operators in Action



MN ANALYSIS

Continual Optimization

Continual analysis allows CCWD's Operators to optimize chemical dosages to ensure the best water quality at the lowest cost

Routine Lab Work

CCWDs Operators continually analyze water quality from all stages of the process - including raw and post treatment - to adjust chem dosages & filter operations



SYSTEM SAMPLES

Operators in Action

The District's Surface Water Treatment Plant's utilize relatively few chemicals in the treatment process

OXIDATION



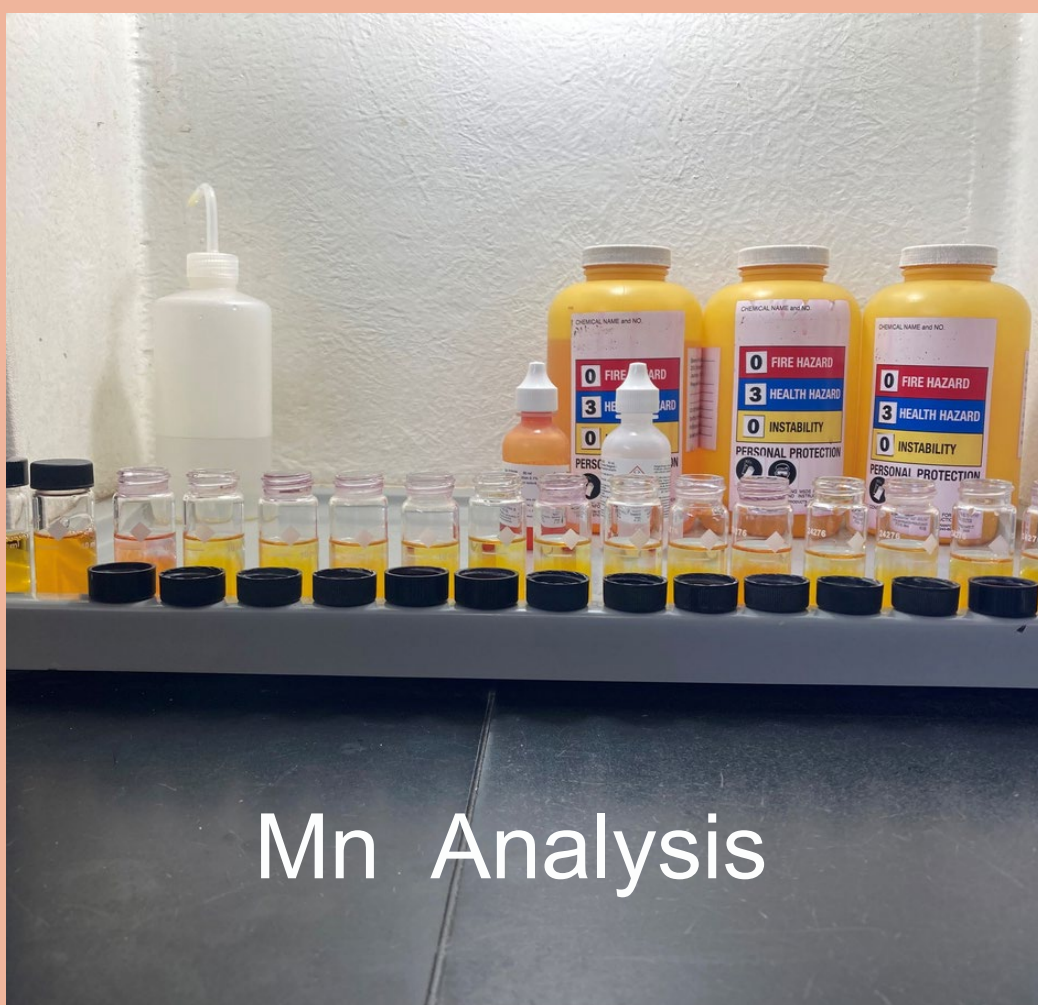
O3
Generator

Ozone & Permanganate oxidize FE & MN and helps to bring the minerals out of solution



In-Plant Air
Monitor

Ozone also is very effective at killing bacteria and viruses. It also dissipates quickly which ensures the safety of staff



Mn Analysis

Raw Water Manganese concentrations are constantly changing - chemical dosages must as well

Operators in Action

The District's Surface Water Treatment Plant's utilize relatively few chemicals in the treatment process

COAGULATION/FLOCCULATION



Streaming Current Detector

The use of coagulants and polymers is critical to the filtration process of water treatment



Copper Cove Filtration Units

Coagulants bind to dirt & debris via charge neutralization & polymers add weight



JL Clarifier in Flush Mode

CCWDs filtration technology combines the coagulation, flocculation, and filtration processes in one package

Operators in Action

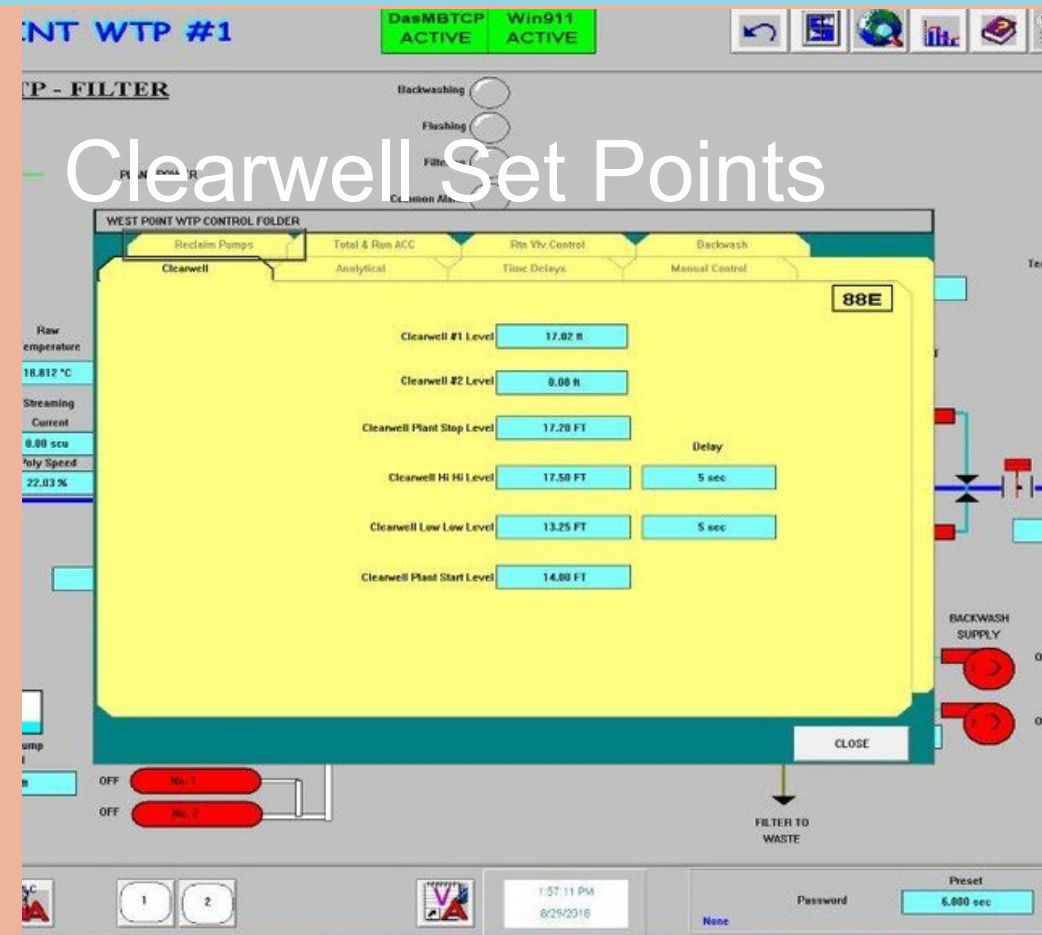
DISINFECTION

The District's Surface Water Treatment Plant's utilize relatively few chemicals in the treatment process

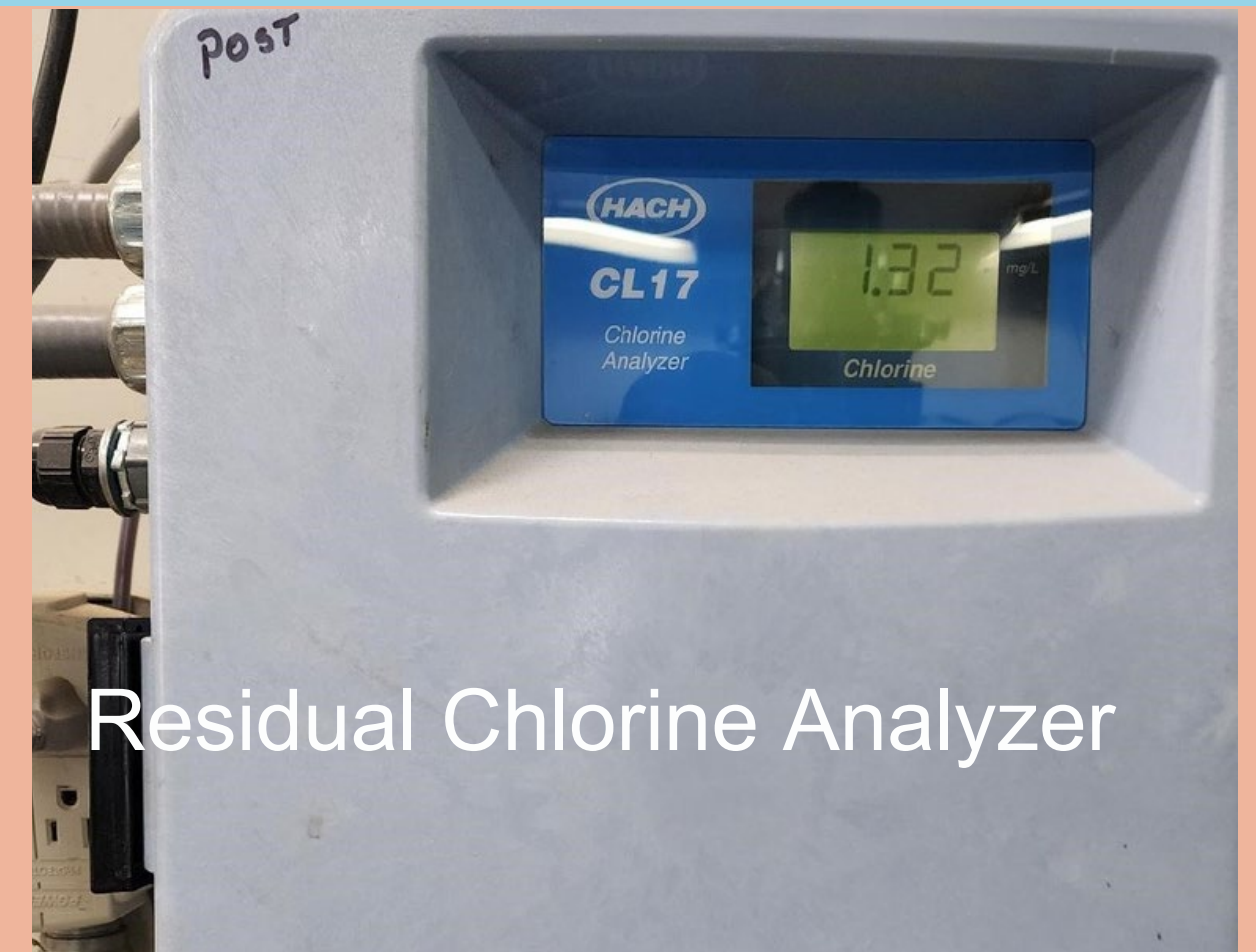


Chem injection Tap

CCWD uses Chlorine - In our case 12.5% Sodium Hypochlorite - AKA Bleach - for disinfection



Chlorine has been used in the USA to disinfect water supplies since 1908



Residual Chlorine Analyzer

Sodium Hypochlorite is cheap, measurable, and effective

Operators in Action

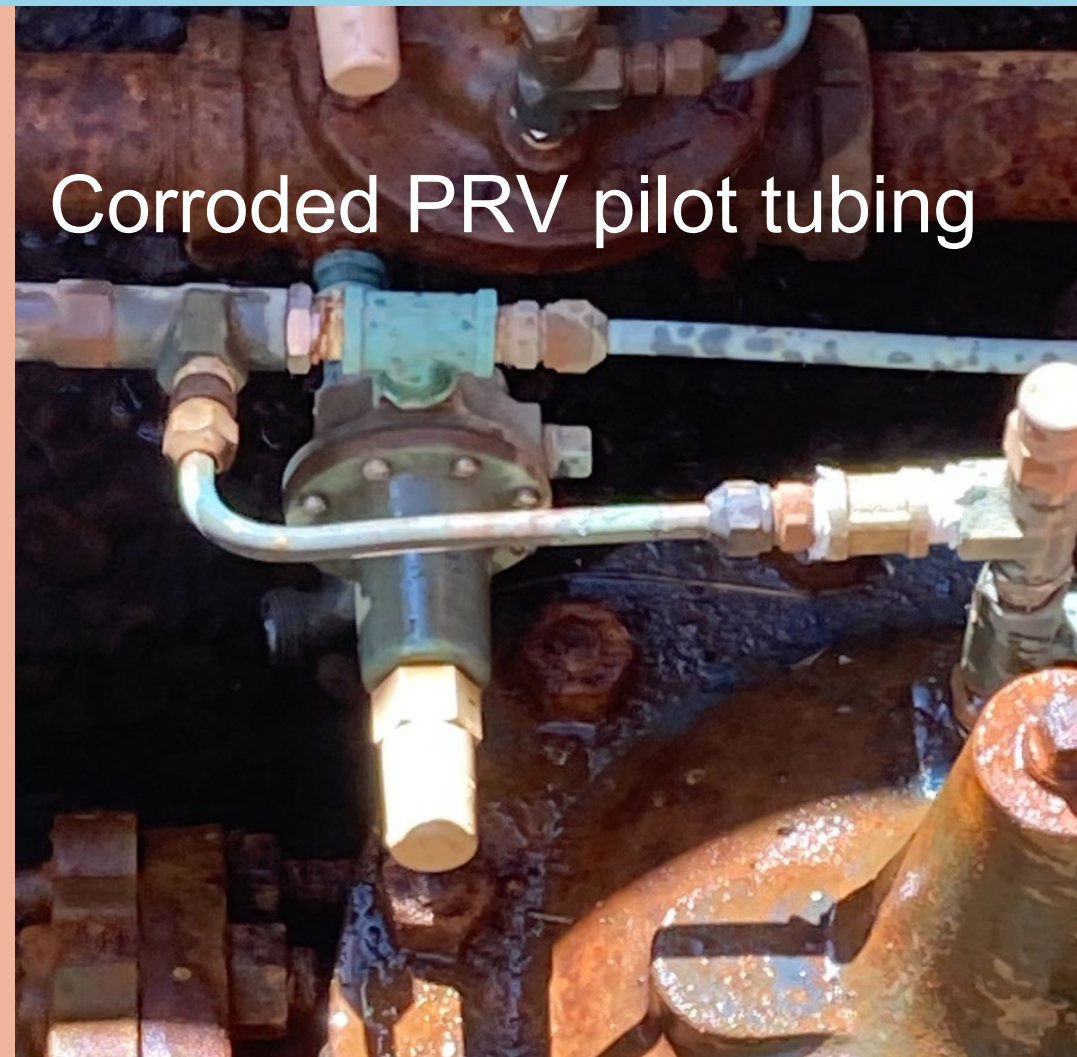
CORROSION CONTROL

The District's Surface Water Treatment Plant's utilize relatively few chemicals in the treatment process



Zinc Ortho Tank and metering pump

Corrosion Control is achieved by dosing zinc orthophosphate



Corroded PRV pilot tubing

Zinc Orthophosphate attaches to metal piping, like copper and steel, to form a protective coating that prevents the leaching of metals into the water supply



Corroded Corp Stop

Corrosion Control also helps protect Customer's plumbing and is an effective tool used to comply with the lead and copper rule

Let's Recap

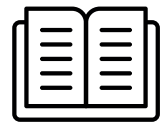
- CCWD Treats both Surface and Groundwater
- The District uses chemicals for 4 processes
- Oxidation
- Coagulation/Flocculation
- Disinfection
- Corrosion Control

Did You Know?

- Hunters WTP, West Point WTP, and Sheep Ranch only use chemicals for 3 processes
- Wallace uses chlorine for disinfection



Did you Know?



- All Chemicals used are NSF Approved for use in water treatment
- There are max allowable dosage requirements
- Coagulants and polymers are captured in the filtration process

Did You Also Know?

- Each Chemical the District uses has a measurable residual Operators use to gauge its effectiveness - for coagulants and polymers it's turbidity



Essentially the Same Processes

Copper, Hunter's, West Point and Jenny Lind operate essentially the same, with the difference being the use of ozone and permanganate at Copper and Jenny Lind

JENNY LIND FILTER



Significant Iron and Manganese staining

HUNTERS FILTER



Do not have issues with Iron & Manganese

COPPER FILTER

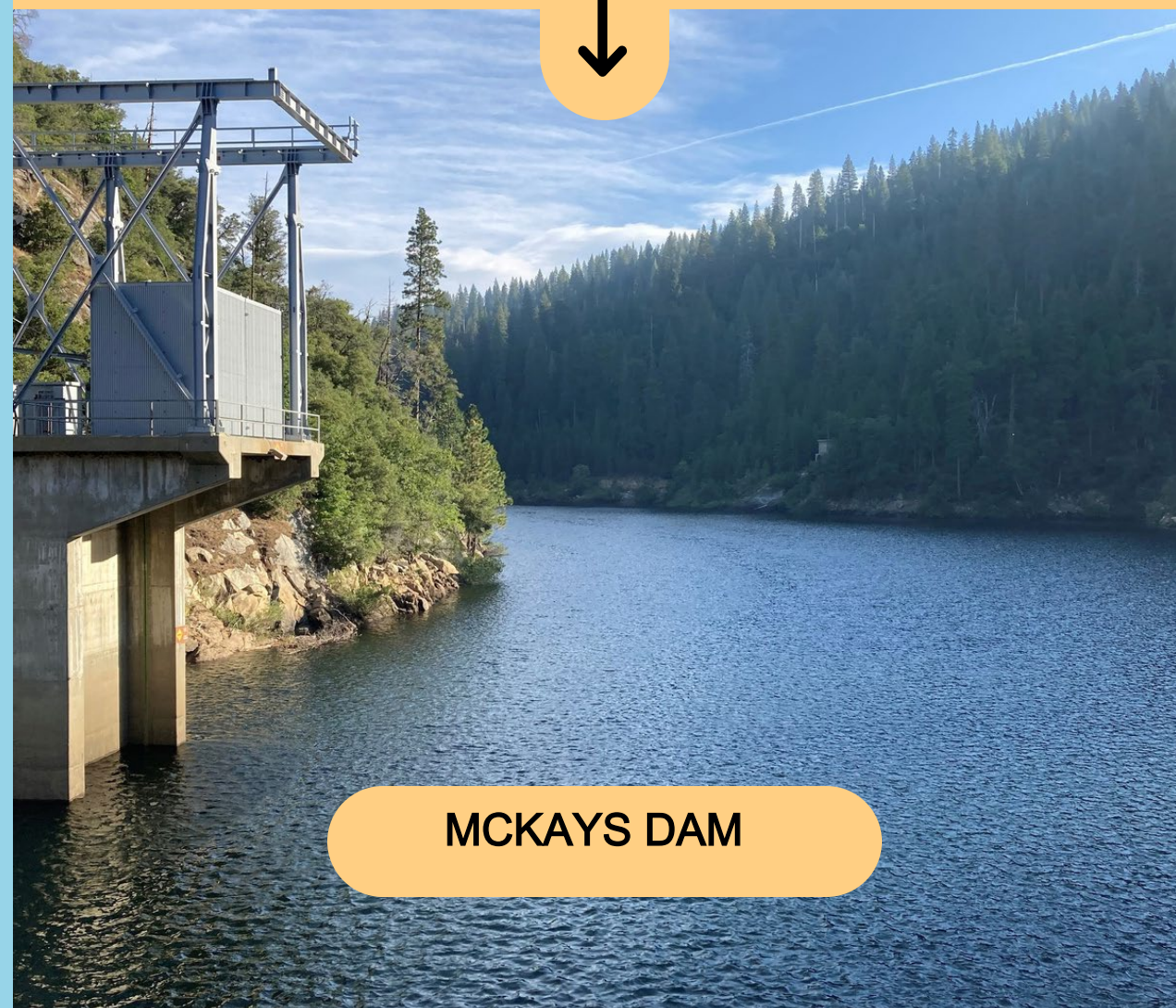


Have to contend with Manganese, but do not dose permanganate

Disinfection By-Products AKA - DBPs

Organics

Carbon left over from decomposed plant matter remains in surface water as Total Organic Carbon (TOC)



MCKAYS DAM



BT 8 TANK



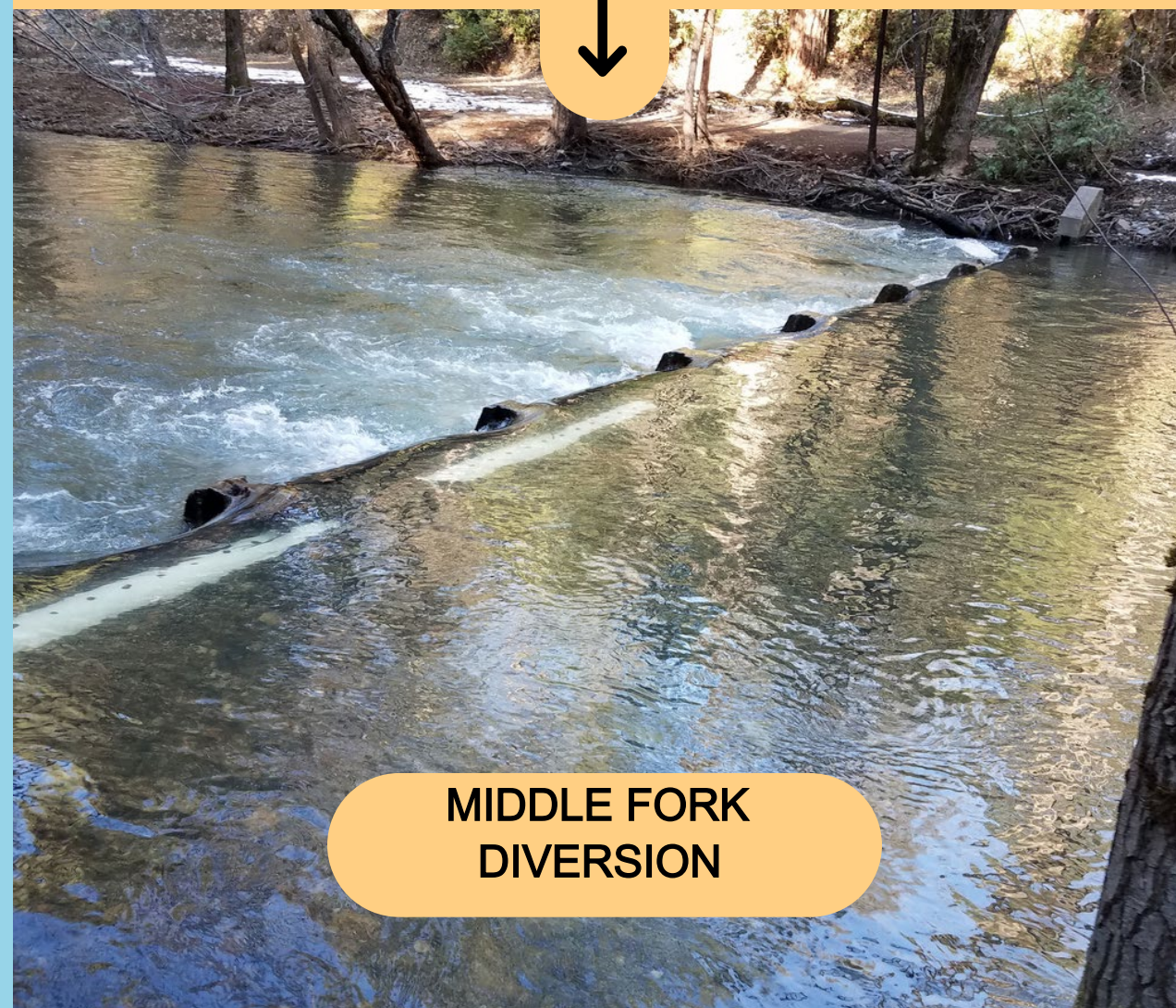
Chlorine

TOC reacts with chlorine in the disinfection process to form Total Trihalomethanes and Haloacetic Acids (TTHMS & HAAs) - Measured in Parts per Billion

Disinfection By-Products AKA - DBPs

More TOC & More CL2

The greater the amount
of TOC and Chlorine, the
more DBPs are created



MIDDLE FORK
DIVERSION



COAGULANT STORAGE
TANK



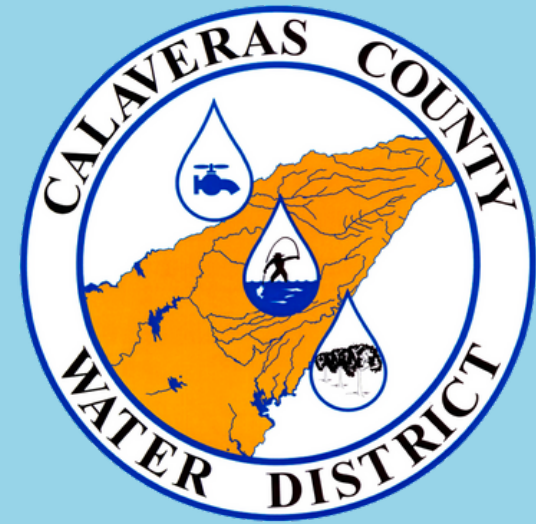
Water Age

Water Age also has an
impact on DBP formation -
the older the water the
more DBPs. Having sufficient
water for fire protection vs.
water quality (lower DBPs) is
a constant battle - EFFECTIVE
COAGULANTS AND
POLYMERS HELP KEEP DBPs
LOW

Protecting Our Water Sources & Supply is our Mission

Safeguarding our precious water sources for future generations is crucial.

So is ensuring the potable water we provide you is safe, wholesome, and reliable. Our Teams work around the clock to make that happen



THANK YOU



Questions?

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