



We work with others to protect the health of the people of Washington State by ensuring safe and reliable drinking water.

INTRO TO DRINKING WATER



Washington State Department of Health

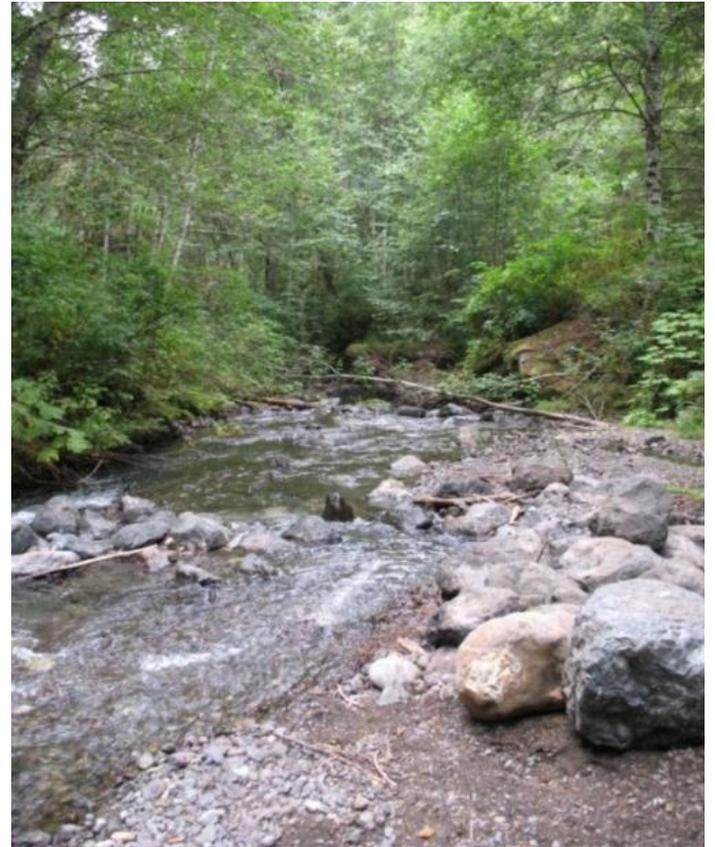


Applicability

Surface water – “a body of water open to the atmosphere and subject to surface runoff”

- Excludes seawater sources, but not estuaries

Ground water under the direct influence of surface water (GWI)



Federal Surface Water Rules

Milwaukee Crypto Outbreak (1993) – over 400,000 people sick



SWTR
(1989)

IESWTR
(1998)

FBRR
(2001)

LT1ESWTR
(2002)

LT2ESWTR
(2006)

SWTR - Surface Water Treatment Rule

IESWTR - Interim Enhanced Surface Water Treatment Rule

FBRR - Filter Backwash Recycling Rule

LT1ESWTR - Long Term 1 Enhanced Surface Water Treatment Rule

LT2ESWTR - Long Term 2 Enhanced Surface Water Treatment Rule



Target Organisms

Giardia lamblia

Viruses

Legionella, and

Heterotrophic Bacteria

Cryptosporidium – IESWTR, LT1ESWTR, and LT2ESWTR

Others??



Treatment requirements

Giardia and Virus removal + inactivation =

- At least 99.9% (3 Log) *Giardia* cysts
- At least 99.99% (4 Log) Viruses

At least 99% (2 Log) *Cryptosporidium* oocysts

Treatment Technique Requirements

- Disinfect
- Filter or meet avoidance criteria

Qualified Operators



Turbidity

What is it and why do we measure it?

- A measurement of the cloudiness caused by particulate matter.
- Measured in Nephelometric Turbidity Units (NTUs) (USEPA Method 180.1)
- Monitoring is used to:
 - -Show how efficiently the filtration system is working (rapid rate)
 - -Ensure levels won't interfere with disinfection



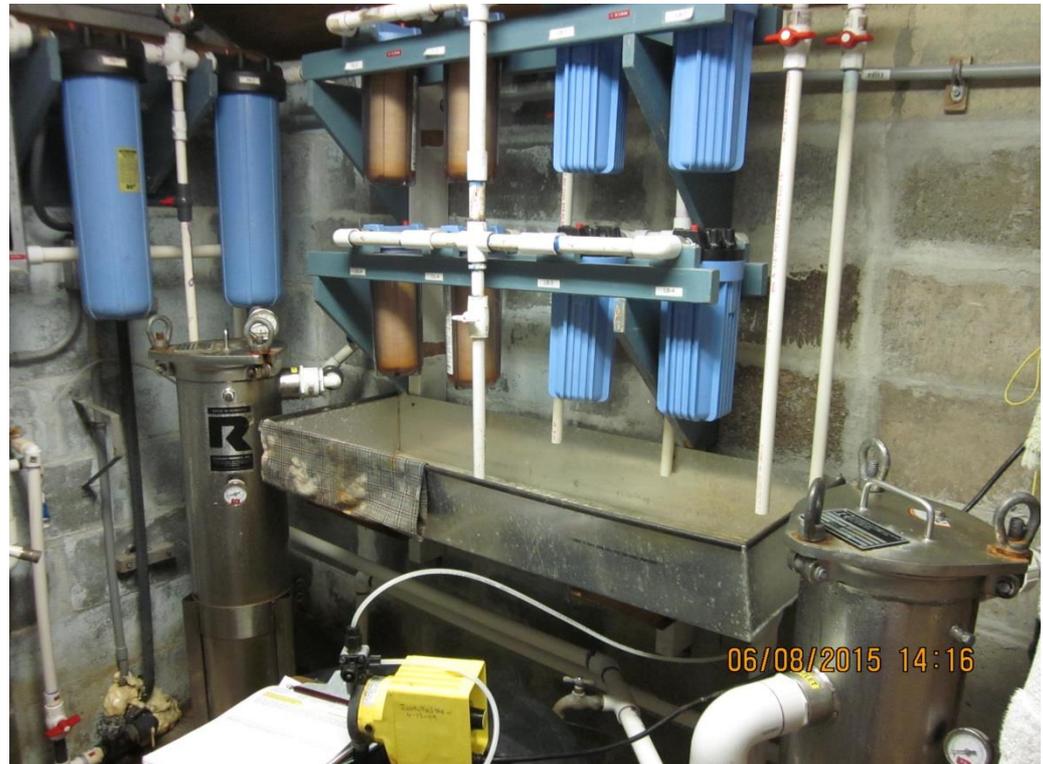
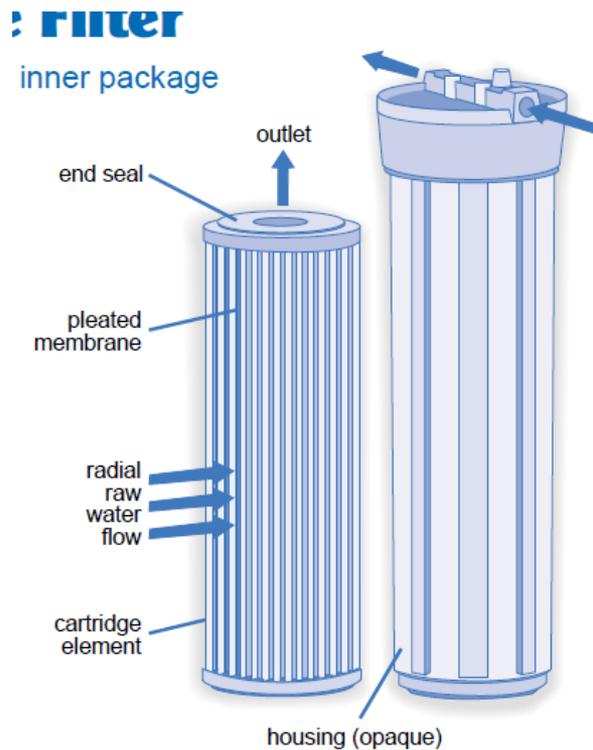
Surface Water Treatment

Every treatment plant has a limit of turbidity it can treat

- Bag filters: less than 5NTU
- Slow sand: 10 NTU with roughing filter
- Diatomaceous Earth: 20 NTU
- Rapid rate: 30 NTU
- Membranes: 80 to 100 NTU



Bag/Cartridge Filters

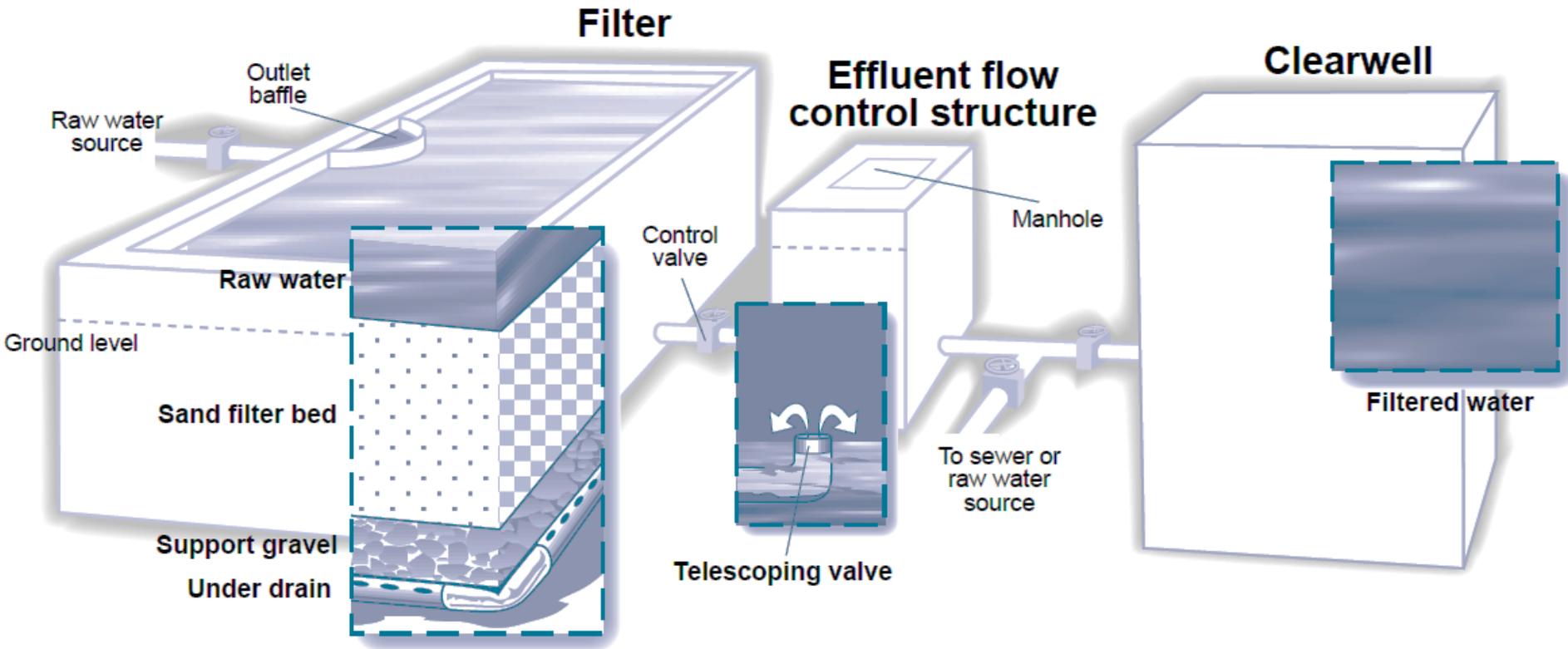


From National Drinking Water Clearinghouse Fact Sheet:
"Filtration"

Source: Camp Lutherwood Sanitary Survey



Slow Sand



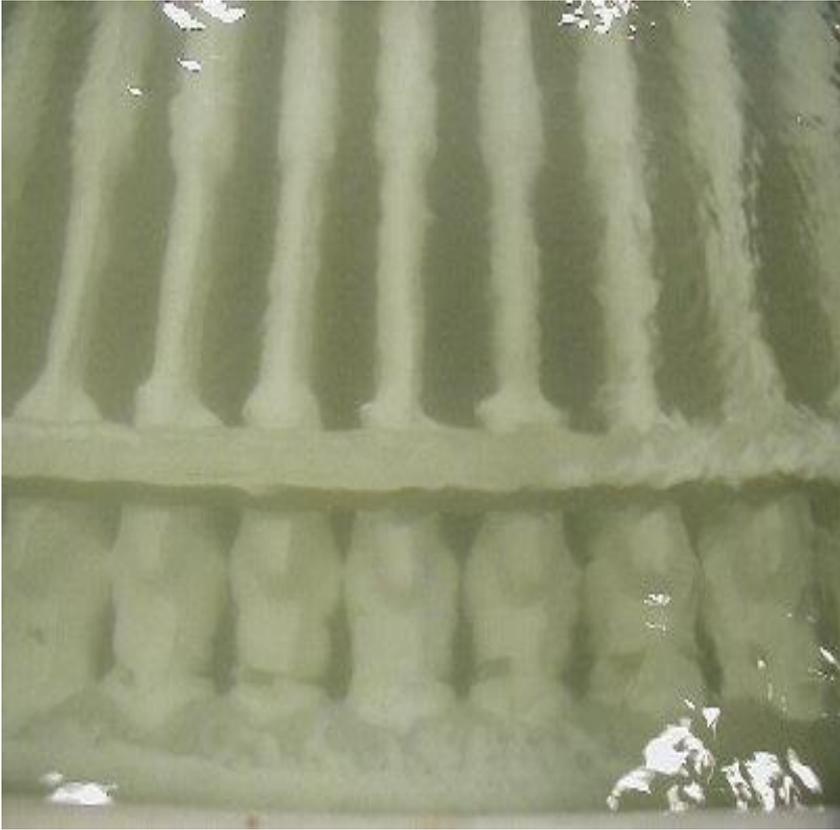
From National Drinking Water Clearinghouse Fact Sheet: "Slow Sand Filtration"

First used in the U.S. in 1872, slow sand filters are the oldest municipal water filtration technology

Depends on biological and physical filtration

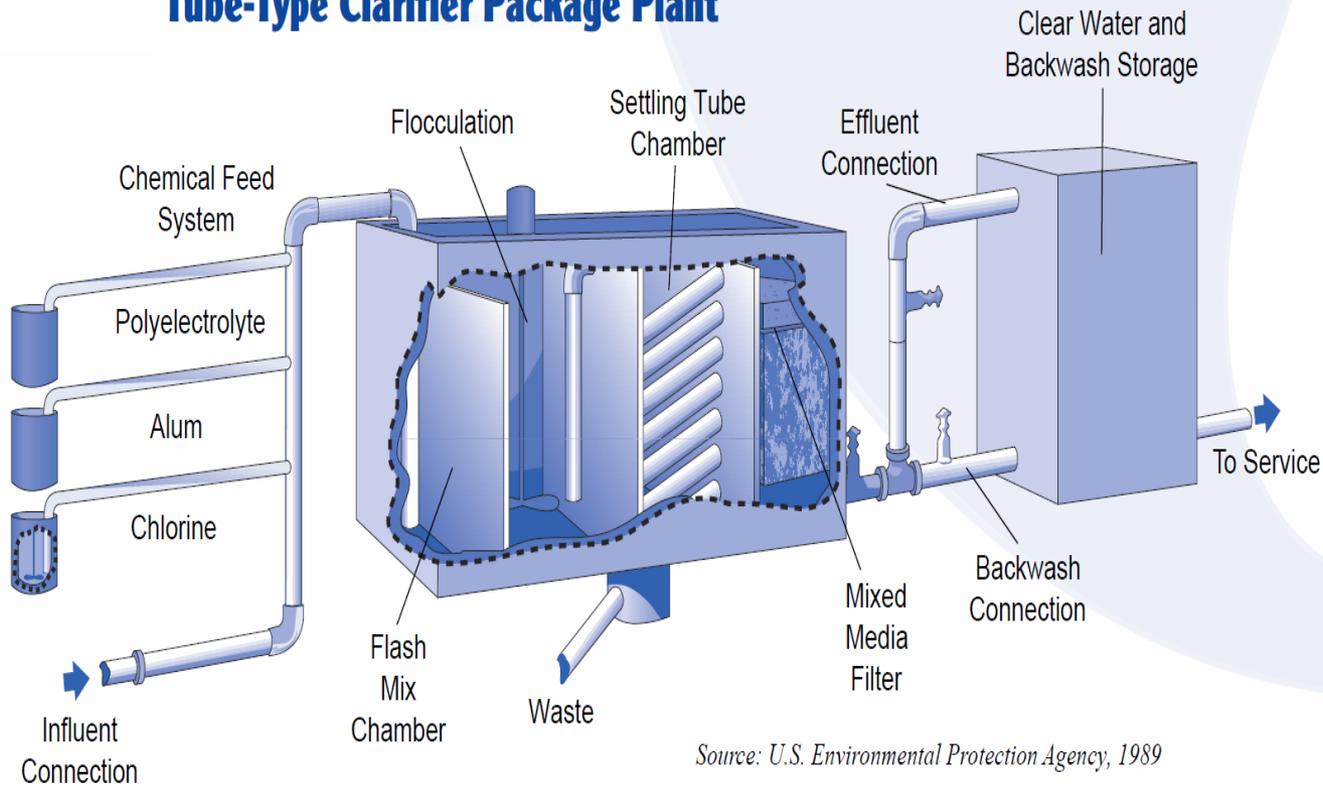


DE Filtration

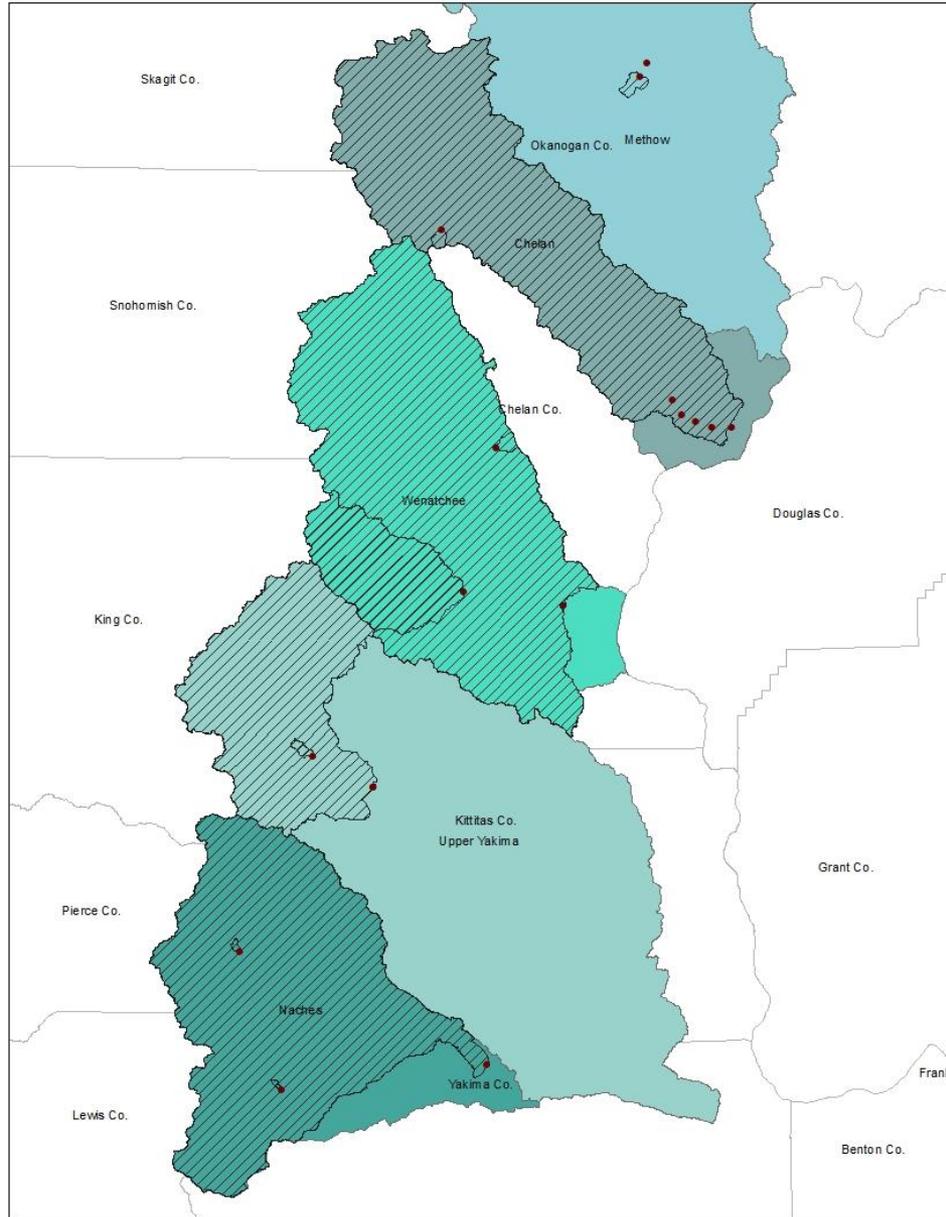


Rapid Rate

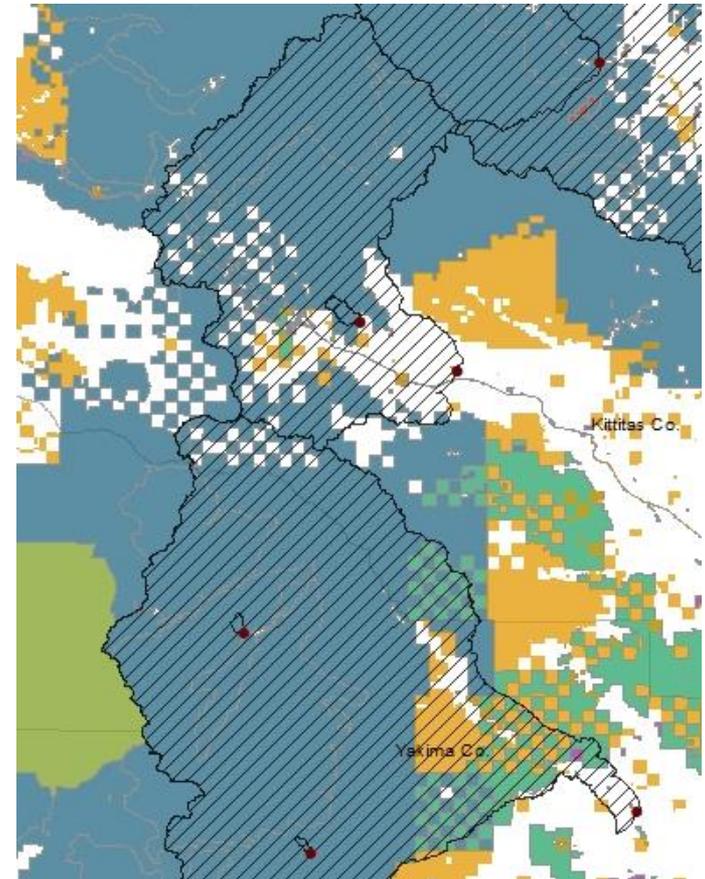
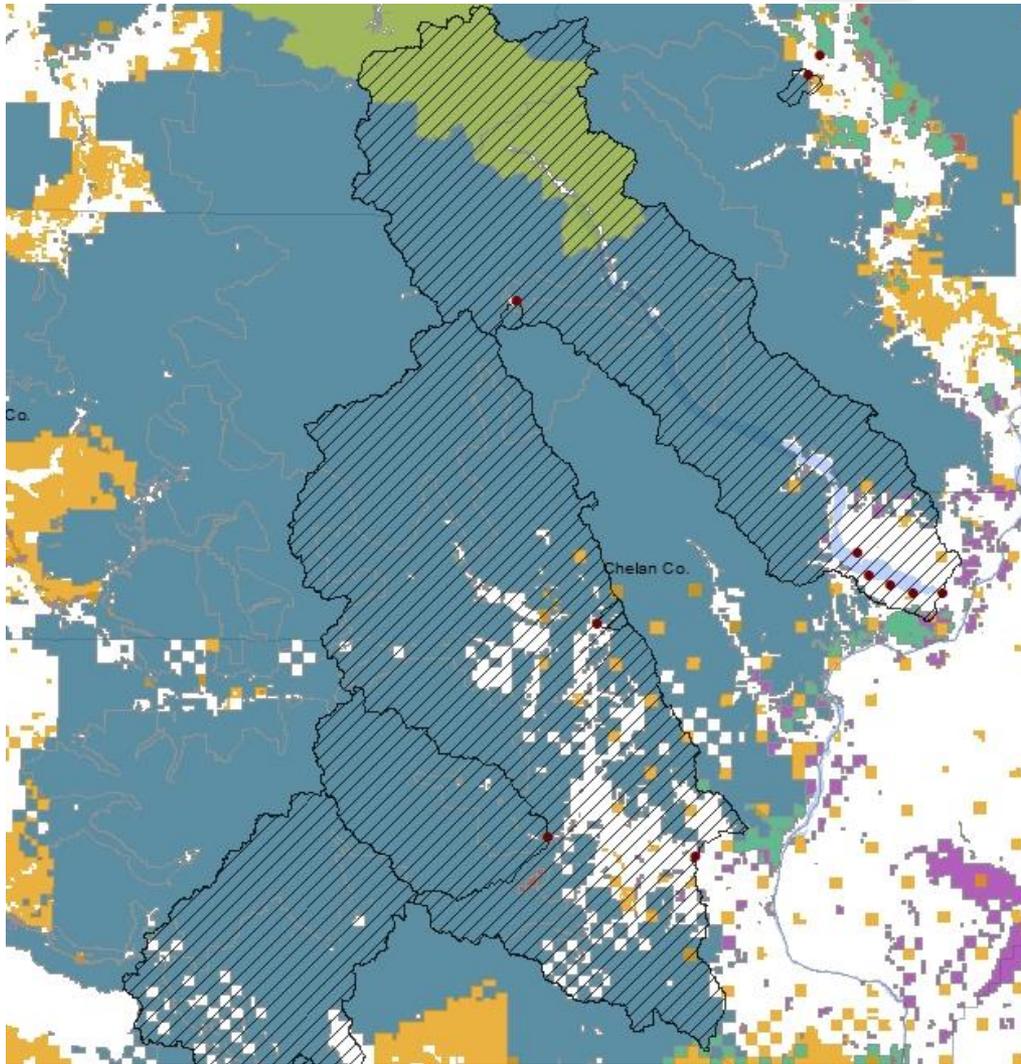
Tube-Type Clarifier Package Plant



Drinking Water—Watersheds



Ownership



- National Park Service
- US Bureau of Land Management
- US Fish and Wildlife Service
- US Forest Service
- WA Dept of Fish and Wildlife
- WA State Parks and Recreation Commission
- | DNR Lands
-



Contact Information

Corina Hayes

Source Water Protection Program Manager

Washington State Department of Health

corina.hayes@doh.wa.gov

(360)-236-3114



Questions?

