TACOMA WATER OVERVIEW

GROUNDWATER SUPPLY AND ANTICIPATED PFAS REGULATIONS

TACOMA WATER
TACOMA PUBLIC UTILITIES

WATER SUPPLY

Howard Hanson Dam operated by US Army Corps of Engineers

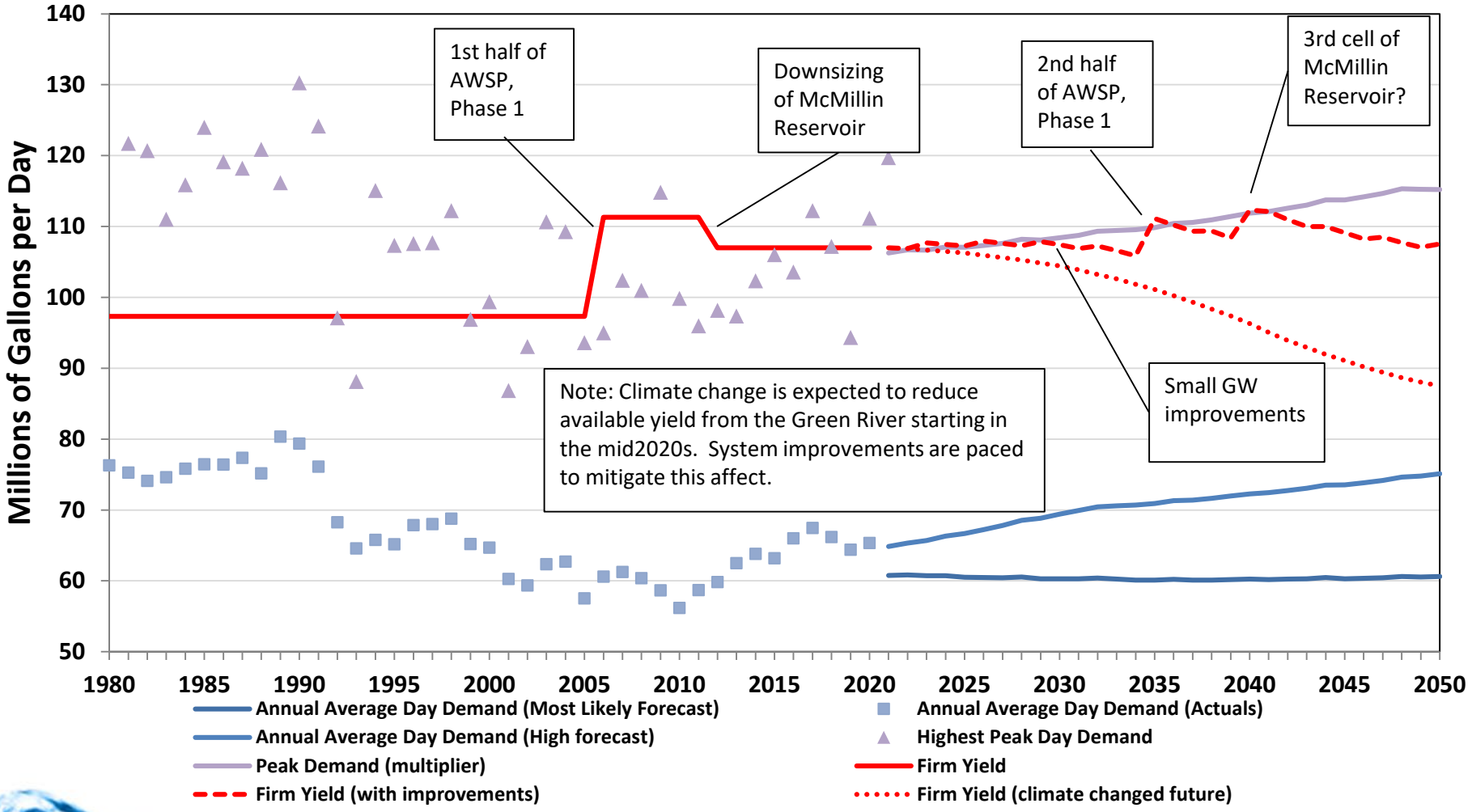
The Green River is Tacoma's Primary Water Source.

- 95% of our water in recent years

Groundwater is secondary

- Seasonal or for convenience.
- Typically, 5% of our water annually.
- Stressed years, up to 40-50% of summer demand
- Critical after an earthquake

DEMANDS VS FIRM YIELD



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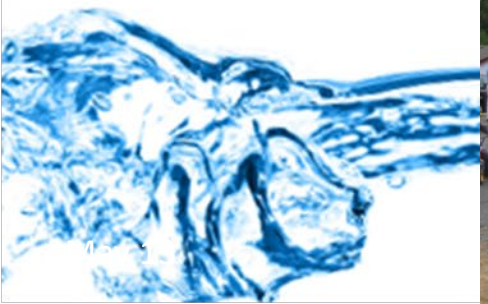
TACOMA'S SOUTH TACOMA AQUIFER LOCATION

SOUTH TACOMA WELLFIELD

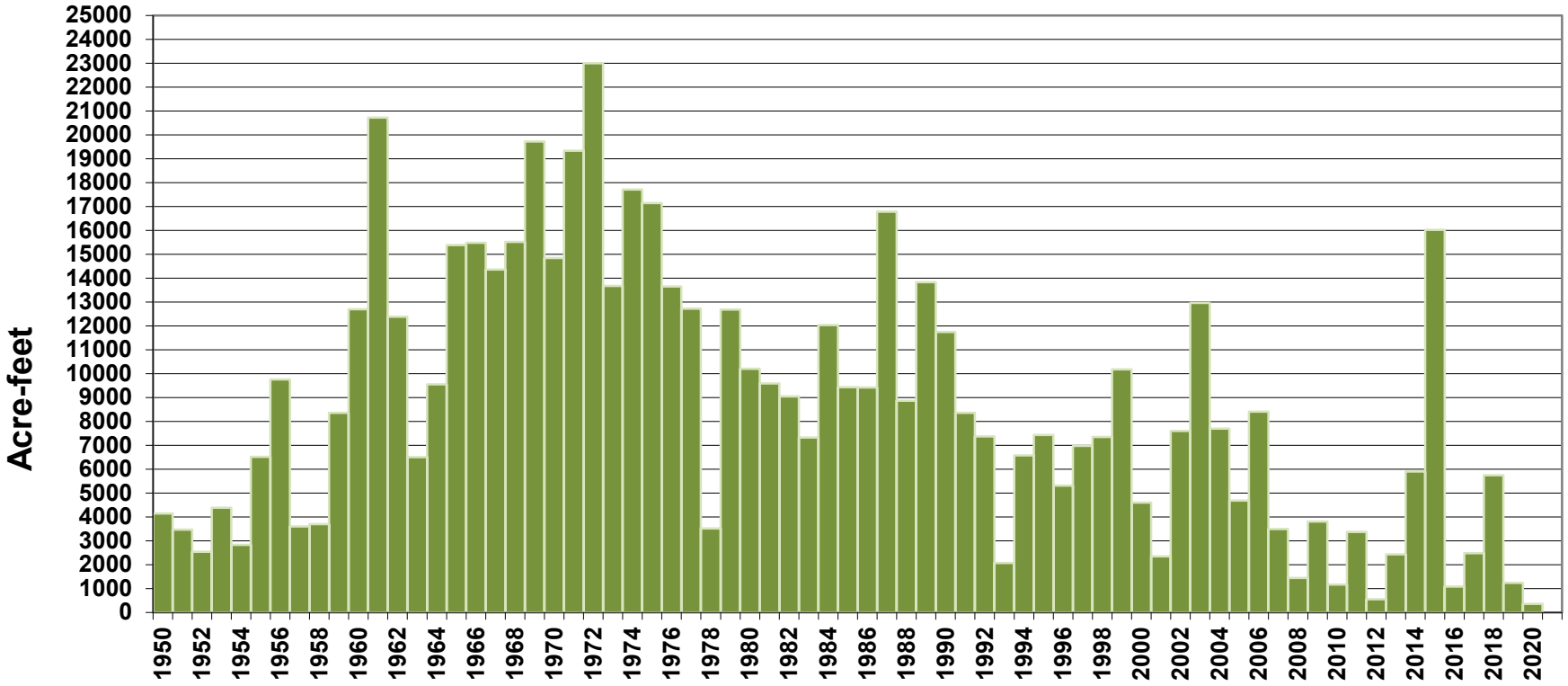
Tacoma has the ability to pump up to 40 millions of gallons per day (MGD) at any given time. A majority of this capacity is located in aquifers under South Tacoma:

- 13 wells along South Tacoma Way – highly productive
- Wells range in capacity from 0.6 MGD to 10.5 MGD
- Wells discharge to the Wells Pipeline
- The Wells Pipeline carries the water to two treatment facilities
- South Tacoma wells can produce over 33 MGD, also have several other wells that produce an additional 7 MGD

MGD = Millions of gallons per day



ANNUAL WELL PRODUCTION



The aquifer system in South Tacoma is large, and productive. The aquifers could deliver over 25000 acre-feet <u>each</u> year (additional pumps would be needed to produce this amount).

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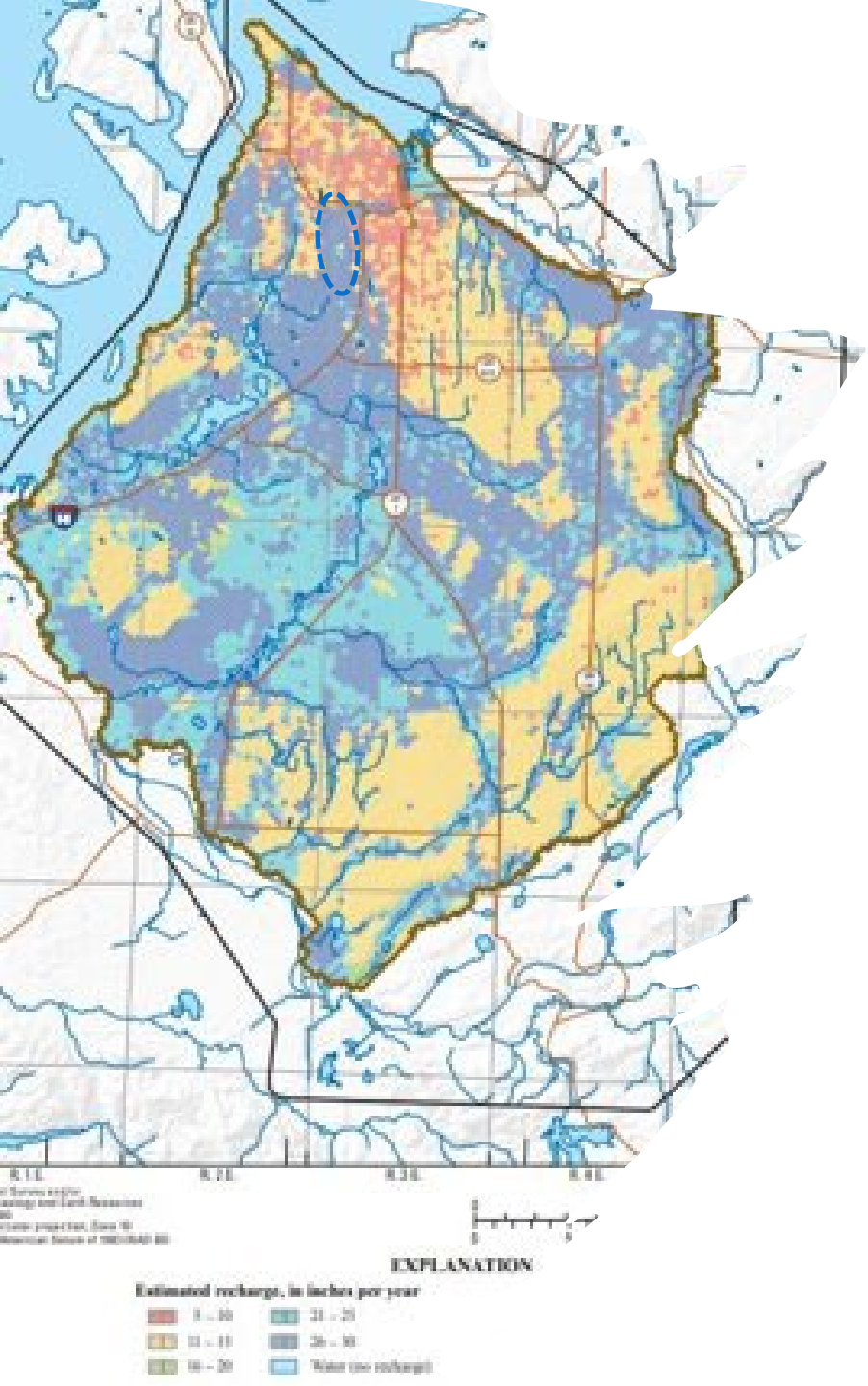


SOUTH TACOMA GROUNDWATER RECHARGE

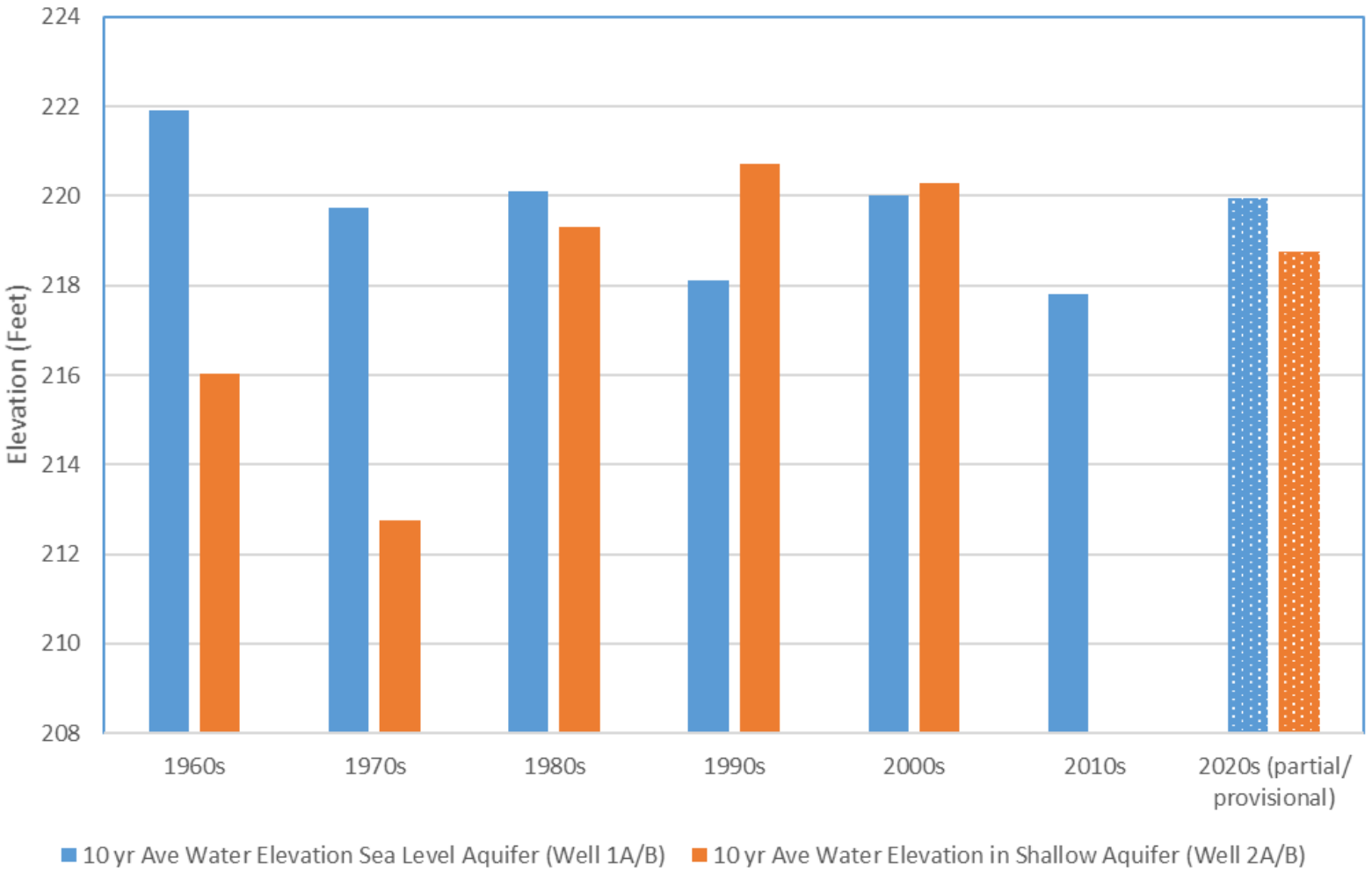
3 Aquifers combined capacity 33,000 acre-feet (recharge 25,000 acre-feet)

- Shallow
  - 115,000 acres of recharge area
  - Recharges Sea Level aquifer
- Sea Level
  - Recharges Deep aquifer
- Deep

Studies

- 1995 Multi-Agency Groundwater System
- 2007 Water Supply Portfolio
- 2010 USGS Hydrogeologic Framework
- 2023 Anticipated USGS Model & Report

STABLE GROUNDWATER ELEVATIONS OVER TIME



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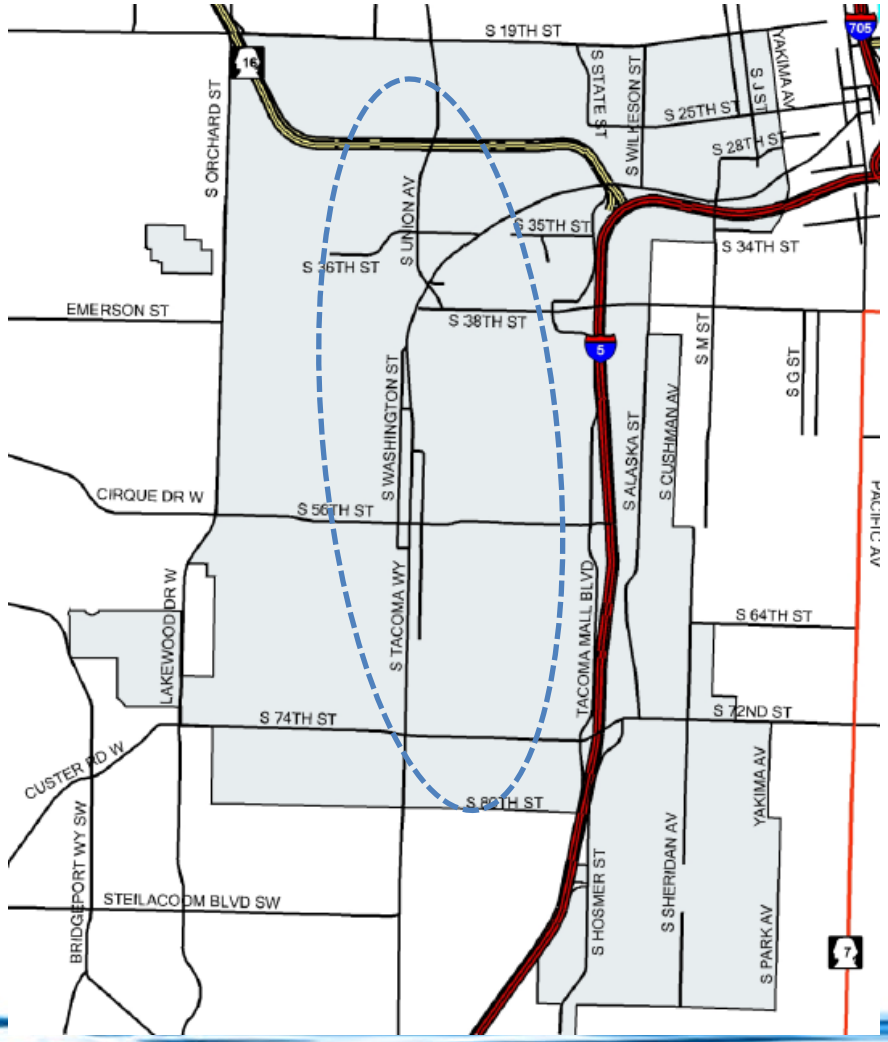
SOUTH TACOMA GROUNDWATER PROTECTION DISTRICT (STGPD)

Our groundwater resource is protected by carefully monitoring and managing activities in the areas of the City that recharge the aquifer system:

- Tacoma Water, Tacoma/Pierce County Health Department (TPCHD), City of Tacoma Environmental Services, and City of Tacoma Planning Division work together on all matters of development/land use within the STGPD
- All development/business activity within the STGPD is permitted and regulated per TMC 13.06.070D
- Tacoma Water contracts with TPCHD to implement STGPD requirements
- Tacoma Water conducts sampling at 10-12 different locations semiannually throughout the District to monitor aquifer health and serve as an early warning of potential contaminants before they reach our production wells

SOUTH TACOMA GROUNDWATER PROTECTION DISTRICT (STGPD)



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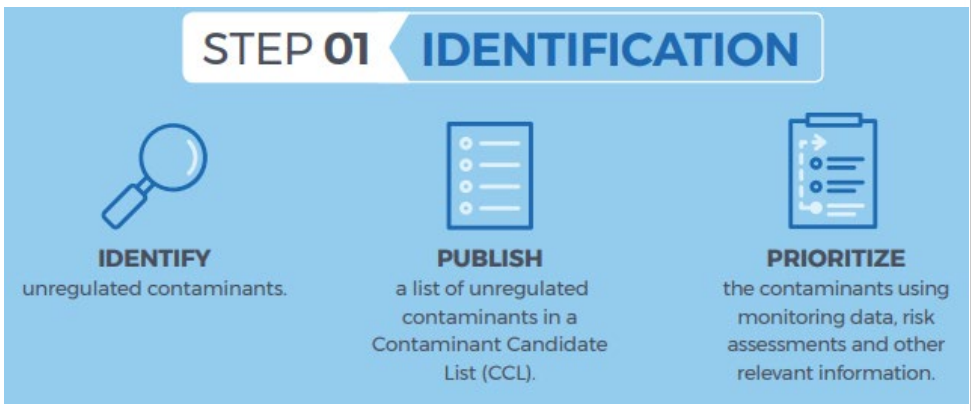
DRINKING WATER STANDARDS

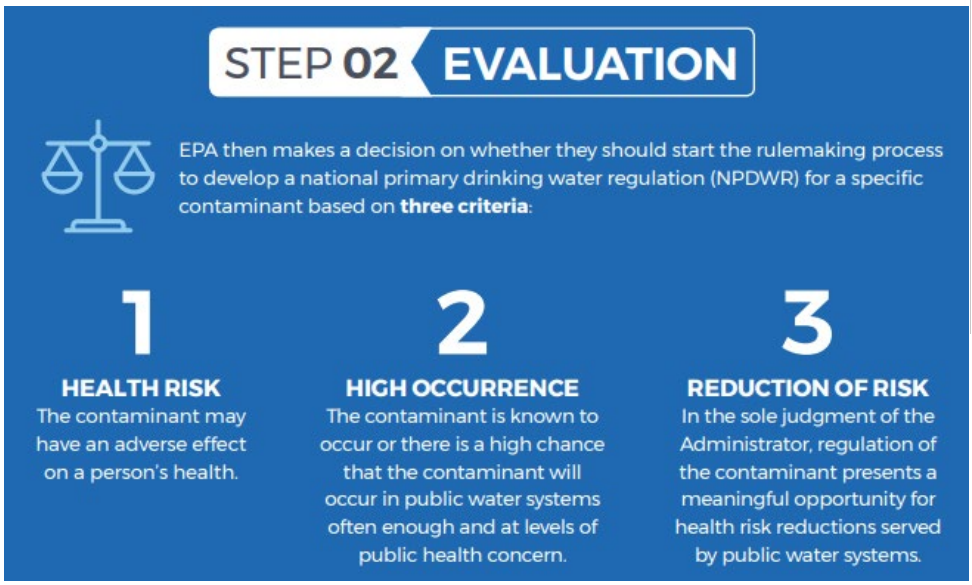
EPA works to ensure that drinking water is safe by developing National Primary Drinking Water Regulations (NPDWRs) for new contaminants under the **Safe Drinking Water Act** (SDWA)

In Washington the Department of Health has **primacy** from EPA to implement Drinking Water Standards for Public Water Systems

Washington State Department of Health
Environmental Public Health
Office of Drinking Water

They may adopt additional standards, but must be at least as stringent as the federal standards





PER- AND POLYFLUOROALKYL SUBSTANCES (PFAS)

- These are a large family (thousands) of human-made chemicals in use since the 1940's to make a wide variety of stain-resistant, water-resistant, and non-stick consumer products
- Used in certain types of firefighting foams utilized by the US military, local fire departments, and airports
- PFAS are widespread, do not break down easily in the environment, and are found in people, wildlife, and fish all over the world
- Scientific studies have shown that exposure to some PFAS in the environment may be linked to harmful health effects
- **The are many, many unknowns related to PFAS**

Image from wateronline.com

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PFAS REGULATORY DEVELOPMENT (TO DATE)

In 2016 EPA established Health Advisory Levels (HALs) for two PFAS (PFOA and PFOS) – 70 parts per trillion (ppt) combined

TYPE OF PFAS	2016 EPA HALs
PFOA	70 ppt combined
PFOS	70 ppt combined

In 2021 Washington state adopted State Action Levels (SALs) for five PFAS

TYPE OF PFAS	2021 WA SALs
PFOA	10 ppt
PFOS	15 ppt
PFNA	9 ppt
PFHxS	65 ppt
PFBS	345 ppt

In JUNE 2022 EPA released new HALs for four PFAS (*NOTE: PFOA and PFOS HALs are far below current lab detection ability*)

TYPE OF PFAS	2022 EPA HALs
PFOA	0.004 ppt
PFOS	0.02 ppt
PFBS	2000 ppt
GenX	10 ppt

By end of 2022 EPA to propose a PFAS Maximum Contaminant Level (MCL)

TACOMA WATER PFAS SAMPLING

In 2015 Tacoma Water sampled for 6 PFAS chemicals as part of the Third Unregulated Contaminant Monitoring Rule (UCMR3) – **NO DETECTIONS, but**

- Samples were blends of multiple sources collected entering the system
- Laboratory Minimum Reporting Levels (MRLs) higher than current

In 2018 Tacoma Water proactively sampled all sources for 14 PFAS chemicals at lower lab reporting limits

- Two South Tacoma wells with levels near EPA's 2016 Health Advisory Level (HAL) of 70 parts per trillion (ppt) were removed from service
- All other detections were below new 2021 State Action Levels (SALs)

In 2023 Tacoma Water plans to conduct another comprehensive round of PFAS sampling of all sources

LONG-TERM PLANNING REGARDING PFAS

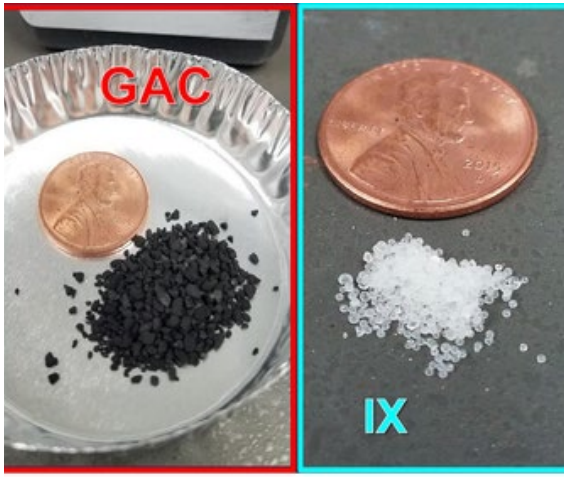
Tacoma Water is taking proactive steps to prepare for PFAS regulation:

- Incorporating PFAS treatment design into ongoing capital improvement project at the Gravity Pipeline Wells
- Prepare overall PFAS management strategy for South Tacoma Wellfield (Based on EPA proposal for PFAS regulation)
  - Consideration of whether source blending will be sufficient without treatment
  - Treatment options and additional facility requirements
  - Potential locations for treatment
  - Operational changes
- Consider need for treatment for other sources (Based on EPA proposal for PFAS regulation)

PFAS TREATMENT

PFAS treatment options are available, but limited:

- Tacoma Water's current treatment processes are not capable of removing PFAS
- Three primary treatment methods commonly used for PFAS removal
  - Granular activated carbon (most likely for Tacoma Water groundwater)
  - Ion exchange
  - Reverse osmosis



https://awwa.onlinelibrary.wiley.com/doi/full/10.1002/awwa.1975

https://awwa.onlinelibrary.wiley.com/doi/full/10.1002/awwa.1959

CONCLUSION

- Plentiful groundwater capacity available to back up primary Green River supply
- Groundwater supply is protected by the South Tacoma Groundwater Protection District and regularly monitored for contaminants
- Many unknowns related to PFAS, but Tacoma Water is engaged on regulatory development and is preparing to respond to upcoming regulations
- PFAS content available on Tacoma Water website: Testing for PFAS - Tacoma Public Utilities (mytpu.org/pfas)

APPENDIX - DEFINITIONS

Maximum Contaminant Level Goal (MCLG) – The level of a contaminant in drinking water below for which there is no known or expected risk to health. MCLG's allow for a margin of safety

Maximum Contaminant LEVEL (MCL) – The highest level of a contaminant that is allowed in drinking water. MCL's are set as close to the MCLG as feasible using the best available technology

State Action Level (SAL) – A level that is set to protect human health and is based on the best available science at the time

Health Advisory Level (HAL) – Health goals that help guide safety decisions when a contaminant occurs in drinking water, representing best available science at the time (NOTE: These are not regulations and are not enforceable)

Minimum Reporting Level (MRL) – Also known as the Method Reporting Limit, this is the smallest amount of a substance we can reliably measure and report in a sample