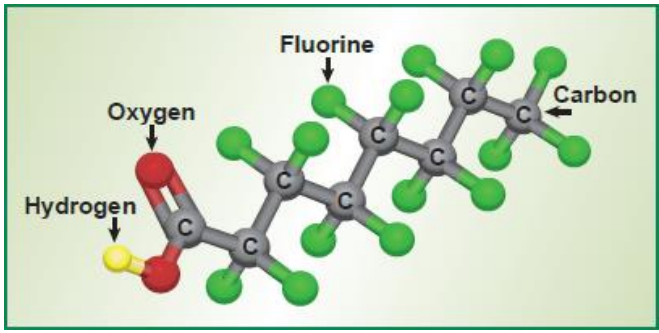
ALASKA NATIVE
TRIBAL HEALTH
CONSORTIUM

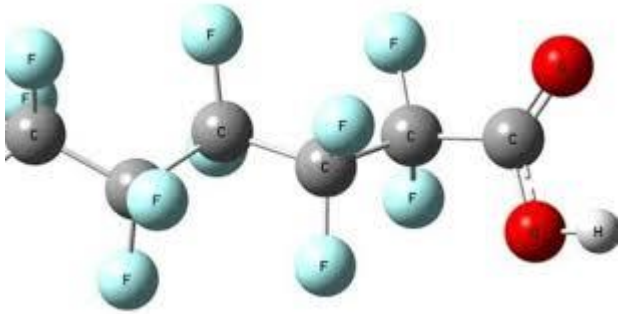
PFAS in Rural Alaska

- What are PFAS?
- How are people exposed to PFAS?
- What are the health effects?
- What is happening federally?
- What is happening with the State of Alaska?
- PFAS water contamination in Alaska
- The unknowns of PFAS contamination
- How to protect your health?

Per & Polyfluoroalkyl Substances

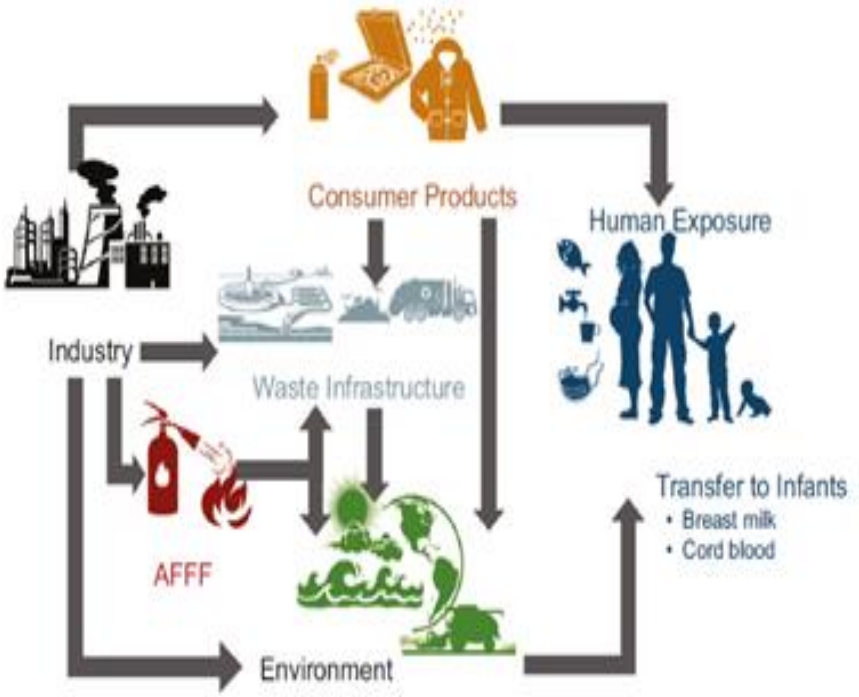
- Thousands of human made chemicals used in industry and consumer products since 1950s.
  - Defined by Carbon-Fluorine bond
  - PFOS, PFOA, PFHxS, PFBS, GenX……
- Resistant to heat, oil, grease, water, and staining.
- Used in aqueous firefighting foams (AFFF)





“Forever Chemicals”

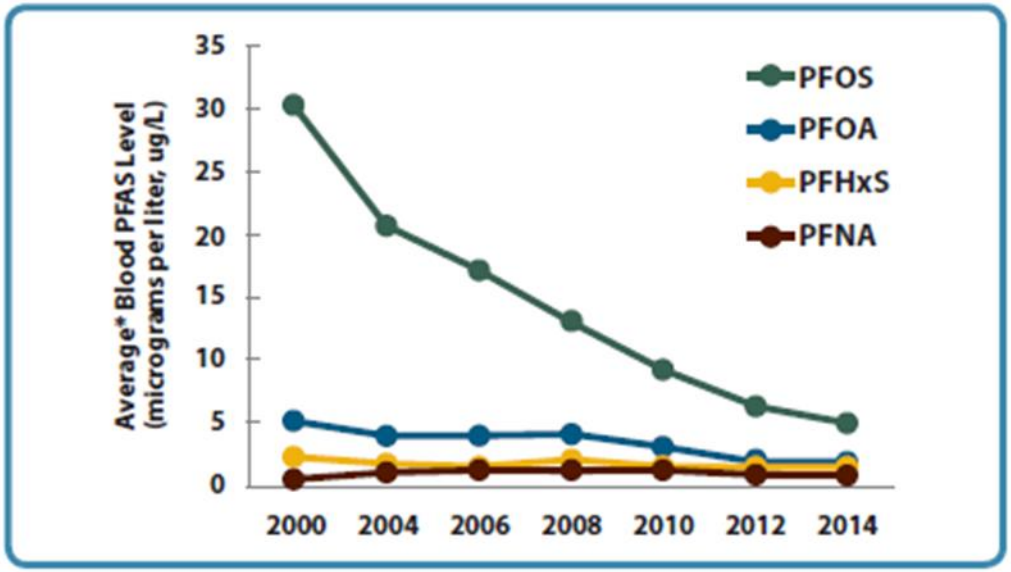
- Emerging Contaminant
- Carbon-Fluorine bond is extremely strong
  - For humans:
    - Very long half life (2-9) years
    - Bioaccumulation
    - Detectable in the blood of every US citizen
  - In the environment:
    - Water soluble and resistant to breaking down
    - Plumes travel great distances



Potential major exposure pathways of PFAS to humans.
Figure from Sunderland et. al. (2019)

How are people exposed to PFAS?

- Consumer Products are a main source of exposure:
  - Products such as:
    - Non-stick cookware (Teflon)
    - Water repellant clothing (Goretex)
    - Grease-resistant paper, fast food containers/wrappers, microwave popcorn bags, pizza boxes, and candy wrappers
    - Stain resistant coatings used on carpets, upholstery, and other fabrics (STAINMASTER, Scotchguard)
    - Cleaning products
    - Personal care products (shampoo, dental floss) and cosmetics (nail polish, eye makeup)
    - Paints, varnishes, and sealants
    - Incidental swallowing of contaminated soil or dust
    - Hand to mouth ingestion from surfaces and products treated with PFAS (rugs/furniture)



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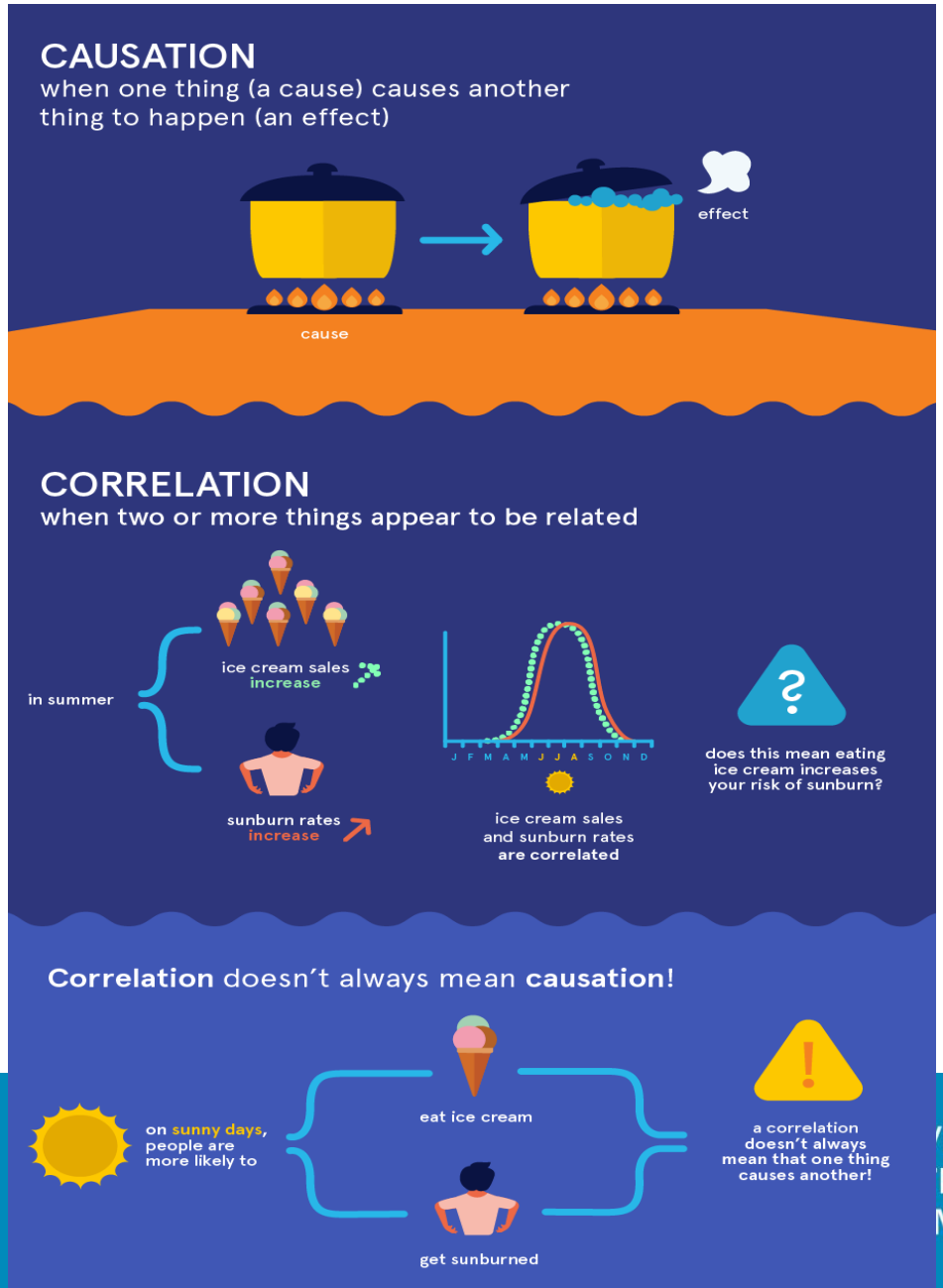
How are people exposed to PFAS?

- Food Contaminated by PFAS
  - Diet is the most common exposure pathway
- Industrial Processes and Emissions
  - The C8 Study
- Drinking Water
  - AFFF migration into drinking water sources
  - PFAS can be removed by treatment

What are the health effects of PFAS?

- How do we know if a chemical has a health impact?
  - Animal Testing
  - Epidemiological Studies
- Correlation vs Causation



Health Effects

- Alter liver and thyroid function
- Affect growth, learning and behavior in infants and older children
- Decrease fertility and increase hypertension and pre-eclampsia in pregnant women

Health Effects

- Increase cholesterol levels
- Depress the immune system
  - Reduce effectiveness of vaccinations
- Increased risk of Ulcerative Colitis
- Increased risk of testicular and kidney cancer
  - PFOA and PFOS are classified as possible carcinogens by the EPA

Current “Regulations”

- EPA
  - LHA of 70 ppt for PFOS and PFOA in DW
- ADEC
  - 400 ppt groundwater cleanup for PFOS and PFOA
  - Adopted LHA for DW (PFOS, PFOA)
  - ADEC requires responsible party to characterize and clean contamination as well as provide alternate water or treatment for those affected.
- 2018 ATSDR Toxicological Profile

State Guidelines

- **PFOA**
  - Alaska – 400 ppt
  - Maine - 130 ppt
  - Minnesota – 35 ppt
  - New Jersey - 14 ppt
  - North Carolina – 1000ppt
  - Texas – 290 ppt
  - Vermont – 20 ppt
- **PFOS**
  - Alaska – 400 ppt
  - Maine – 560 ppt
  - Minnesota – 27 ppt
  - New Jersey – 13 ppt
  - Texas – 560 ppt
  - Vermont – 20 ppt

What is happening federally?

- Unregulated Contaminant Monitoring Rule (2012)
- LHA of 70 ppt for PFOS and PFOA established in 2016
- **NOT** regulated under the following:
  - Emergency Planning and Community Right-to-know Act (EPCRA)
  - Comprehensive Environmental Response, Compensation and Liability Act (CERCLA, aka Superfund)
  - Resource Conservation and Recovery Act (RCRA)
  - Clean Water Act
  - Clean Air Act
  - Safe Drinking Water Act

EPA Environmental Action Plan – Feb 2019

- Committed to propose national drinking water regulatory determination for PFOS and PFOA for public comment in 2019
  - This will determine if MCLs will be set
- Toxicity assessment for other main PFAS compounds to be completed in 2020
- More monitoring under UCR in 2023-2025
- Development of interim GW clean up recommendations
- Consider adding PFAS chemicals to Toxic Release Inventory

What is happening In Alaska?

- PFAS are considered hazardous substances under Alaska Statute.
- ADEC adopted groundwater clean up levels and the LHA for DW in 2016 for PFOS and PFOA.
- In August 2018, they added PFHxS, PFNA, PFHpA and 2,000 ppt for PFBS to the established levels.

Then….

- In April, 2019 the Dunleavy Administration reversed to measure PFOS and PFOA only.
- In October 2019, ADEC started sampling for 18 compounds as it was no additional cost.
  - They will still only regulate PFAS and PFOA
  - $9.4 million was added to DEC's budget for PFAS response.

State Action Plan

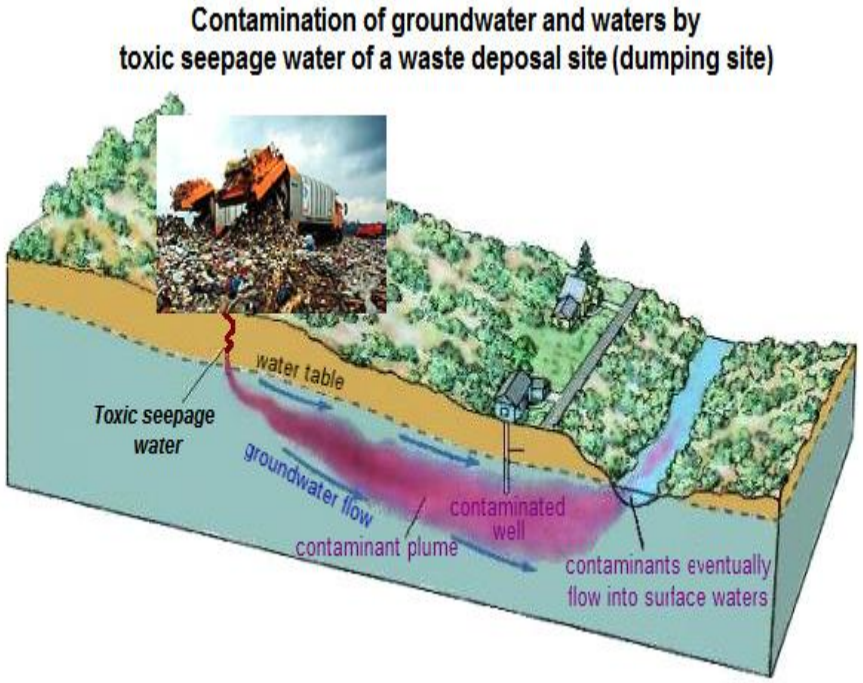
- Current
  - Identify sites where AFFF was used.
  - Evaluate and respond to DW Impacts.
    - Tech assistance for treatment and design
    - Requiring alternate water where PFAS is above 70 ppt
- Future plans (tentative)
  - Sampling in PWS across the state
  - Evaluate WW discharge and treated biosolids
  - Evaluate lakes, streams and rivers
  - Evaluate landfills as sources of PFAS contamination

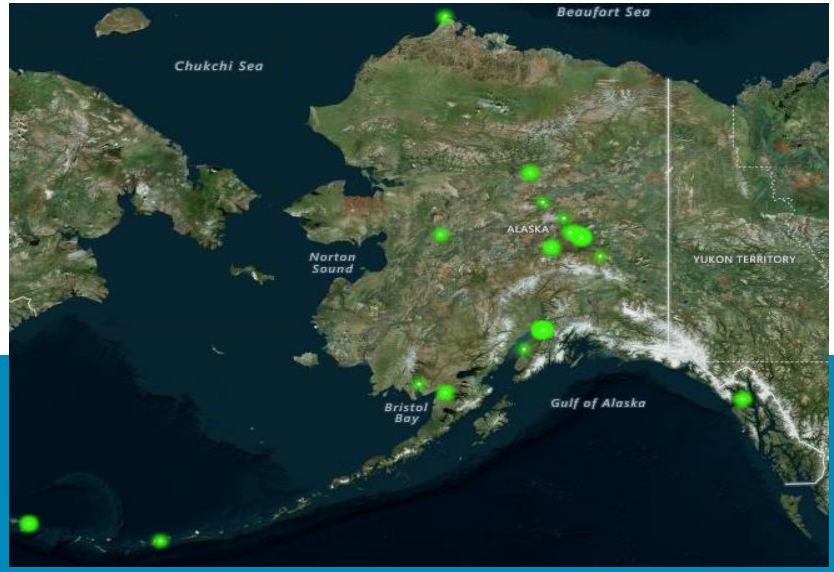
Are AFFF still used?

- YES
  - Used because they are extremely effective and have long shelf lives
  - Shorter chain PFAS are recommended
  - No longer used during training exercises
  - DOD research for replacement……

Drinking Water Contamination in Alaska

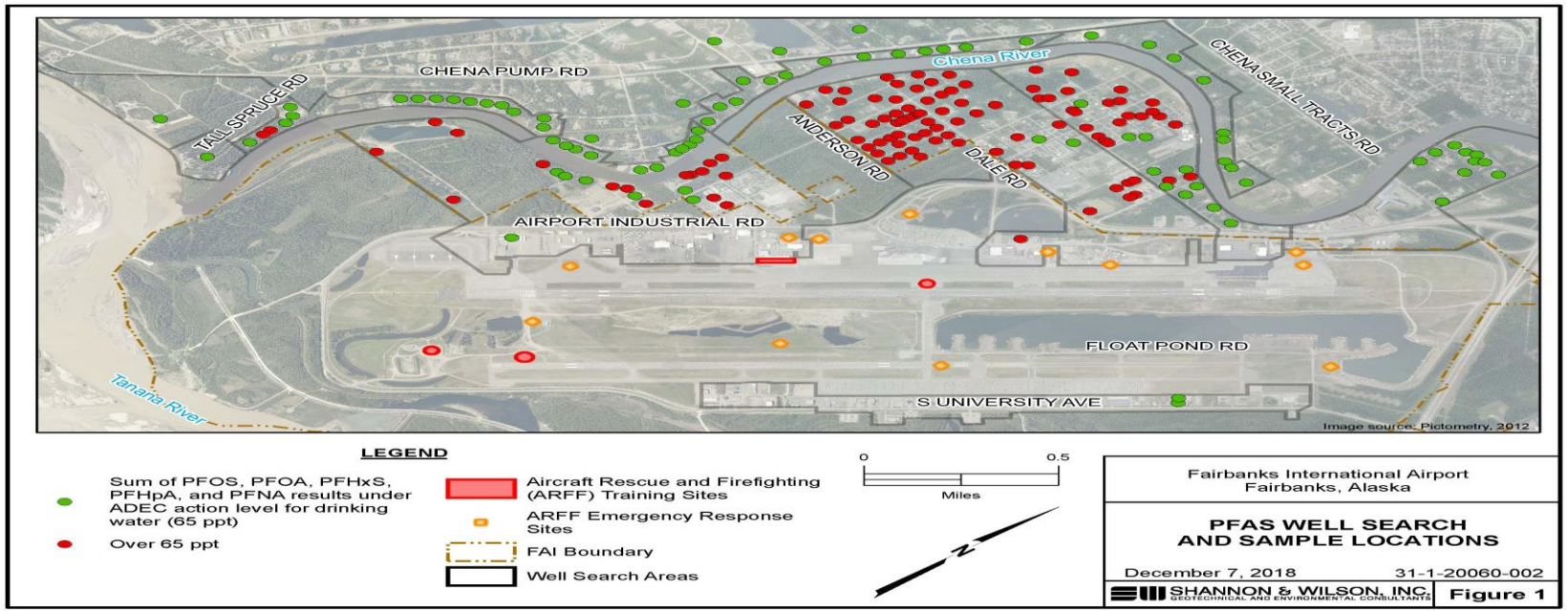
- DW contamination is usually associated with AFFF use.
  - Airports, military bases, refineries, firefighting training locations.
    - 33 Airports with known releases
- Testing lead by ADEC, DOD, DOT and FAA
- 27 locations with 100 individual sites considered contaminated



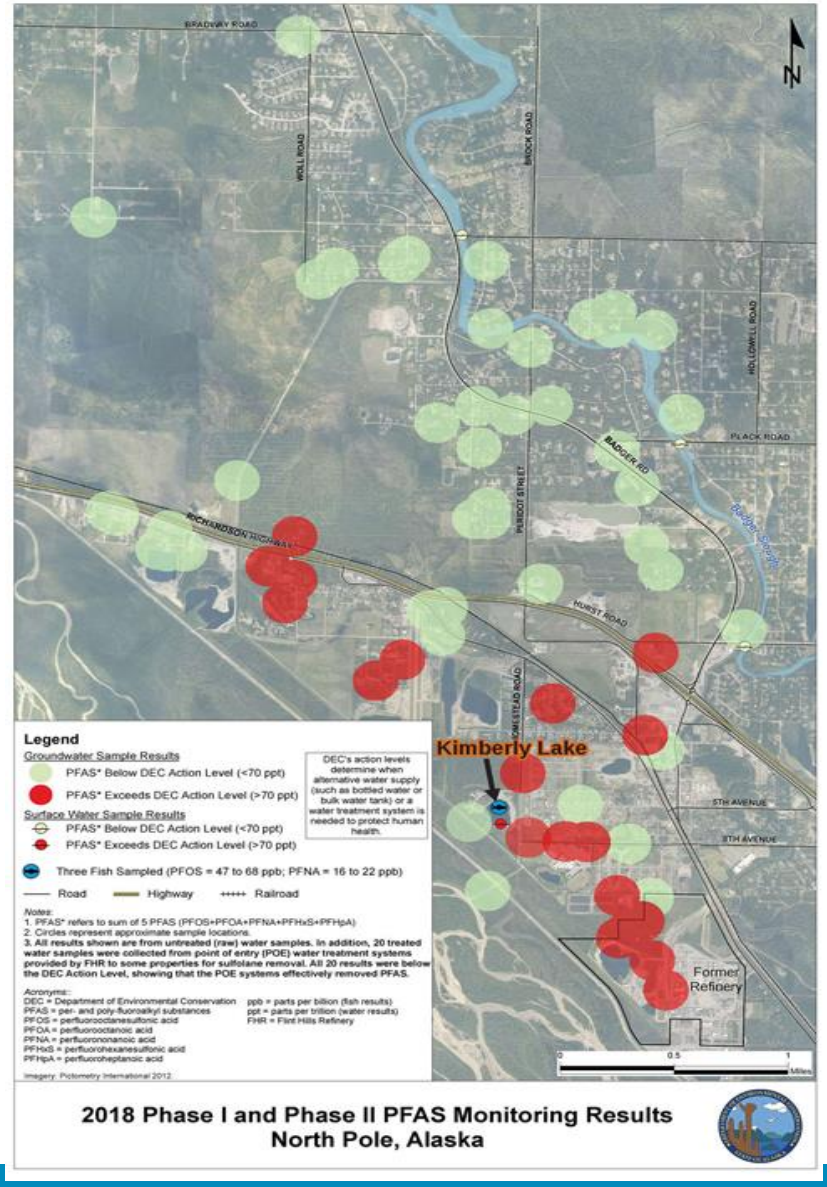


Known Contamination In Alaska

- **Fairbanks**
  - 8 PFAS sites and their plumes under investigation
  - Known contamination in private wells downgrade of airport (102 of 193)
  - Golden Heart Utilities average of 5.3-6.4 ppt
- **Moose Creek**
  - 169 of 174 private wells tested above LHA
  - WP under construction (2020)



- **Eielson Airforce Base**
  - 18 of 25 monitoring wells above LHA
  - 3 PWS on base are treating for PFAS
- **Fort Wainwright**
  - Soil samples above clean up level
  - Detected below 70 ppt in DW
  - Monitoring to begin 2020
  - Upstream of Golden Heart Utilities
- **North Pole Terminal**
  - 19 of 77 groundwater sites above DEC action levels
  - Kimberly Lake
- **Clear Airforce Station**
  - 4 of 5 areas tested exceed LHA
- **Fort Greely**
  - 3 of 4 above LHA
  - Planned more testing in September 2019



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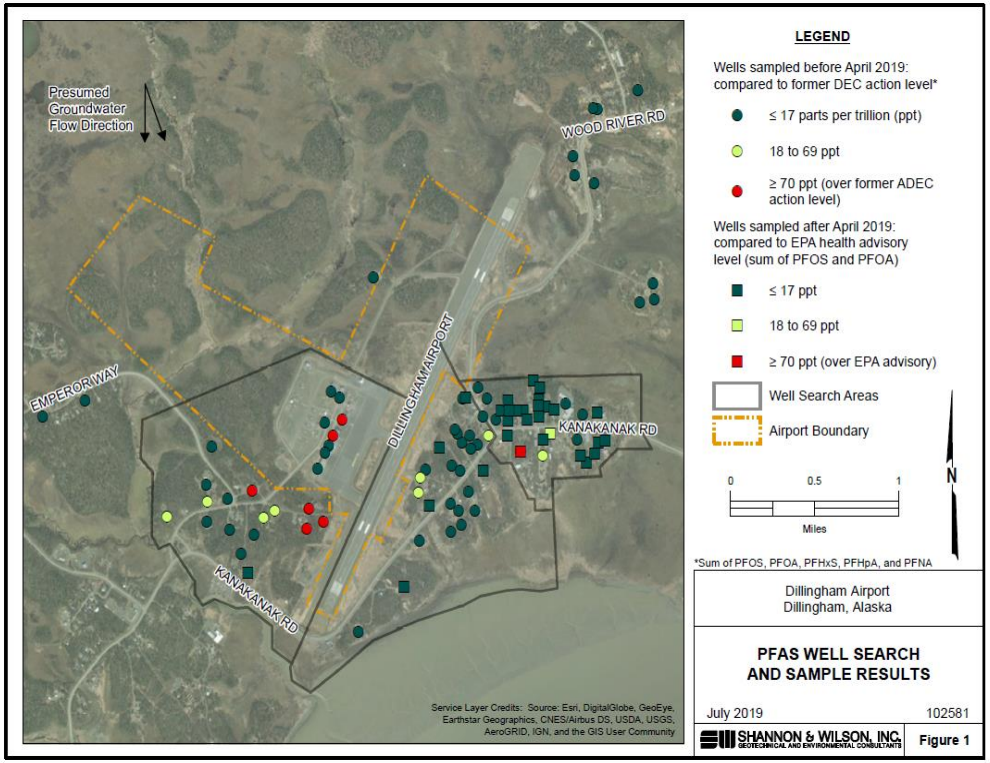
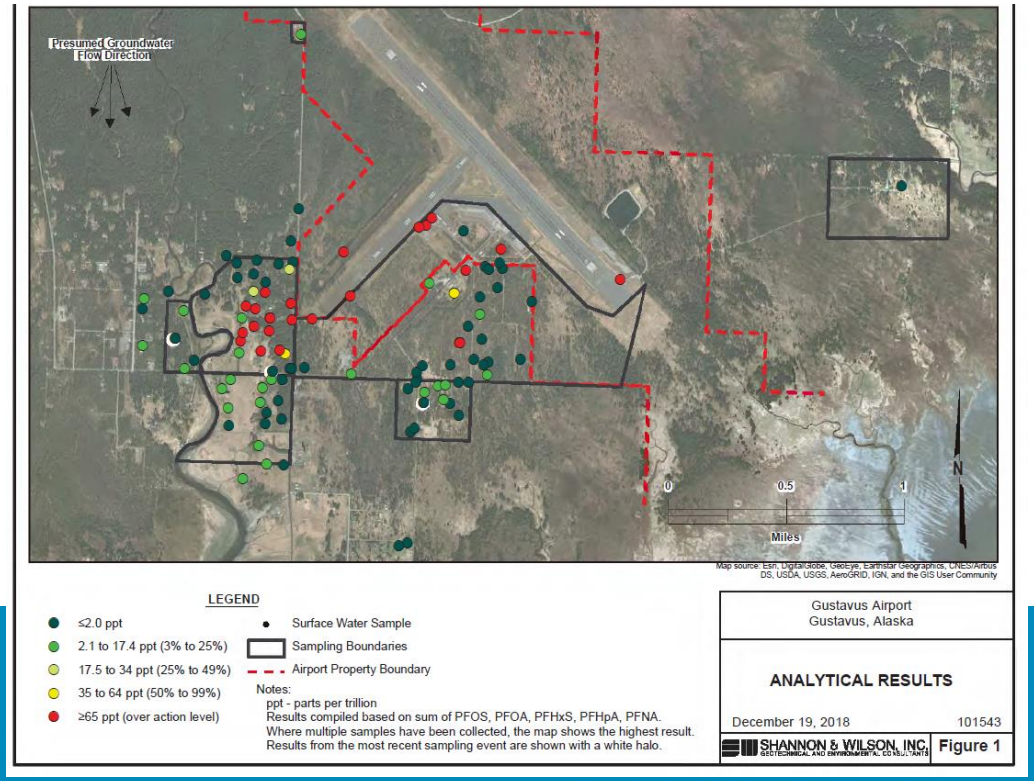
- **Anchorage**
  - Not suspected for PWS (Eklutna)
  - JBER
    - 20 of 26 sites sampled in 2016 above LHA
    - Up-gradient of Ship Creek
  - Ted Stevens International Airport
- **Dillingham**
  - Holy Rosary Church (186 ppt)
  - Private wells
    - 65 tested (PFOS and PFOA)
      - 7 @ 70 ppt
      - 8 @ 18-69 ppt
      - 20 below 17 ppt
      - 30 ND
- **Eareckson Air Station**
  - PFOA and PFOS in DW @ 52.8
  - Sum of all five is 95.2



- **Galena**
  - Monitoring wells had 21,700, ppt PFOA, 25,200 ppt PFOS
  - Treatment is being provided by PWS
  - No sampling in private wells
- **Gustavus**
  - No PWS, Shallow Private Wells
  - Airport Well @ 250 ppt PFOS, 3 PPT PFOA
  - Private well testing started in summer 2018 (101)
    - 19 greater than 65 ppt
    - 3 from 35-64 ppt
    - 1 @ 17.5-34 ppt
    - 23 @ 2.1-17.4 ppt
    - 55 below 2 ppt
  - Wild game
- **Juneau**
  - Hagevig Fire Training Center
  - PWS providing treatment



- **King Salmon**
  - KS Air Station and Airport
    - Testing in 2018 found contamination of private wells and SW in the community
    - PWS has not been tested
    - 20 private wells tested in March 2019 (using 5 PFAS)
      - Detected in 17 wells
      - 2 above LHA
      - 4 @ 18-64
      - 3 ND
- **Valdez, Kenai and Cordova**
  - All had detects but nothing about LHA
- **Yakutat**
  - 12 tested in Feb 2019 for 14 PFAS w/ sum of 5
    - 1 over LHA, 4 detects under LHA
    - 7 ND
  - 21 more tested; 8 had detects 6-60 ppt

- **Utqiagvik**
  - **Imikpuk Lake**
    - 5 locations tested in 2017; combined PFOS and PFOA from 143-262 ppt
  - **Isatkoak Reservoir**
    - PWS source for 4000 people
    - ND in finished water
      - System uses NANO filtration
      - Wastewater concern

TABLE 3. AIRPORTS IDENTIFIED BY STATE OF ALASKA FOR PFAS EVALUATION*

Part 139 Certified state-owned Airports	PFAS contamination of drinking water sources?
Adak	Unknown (not yet sampled)
Anchorage International Airport	Unknown (first sampled June 2019)
Bethel	No further investigation**
Cold Bay	No further investigation**
Cordova	NO (first sampled Dec. 2018)
Deadhorse	Unknown (not yet sampled)
Dillingham	YES (first sampled Dec. 2018)
Fairbanks International Airport (FAI)	YES (first sampled Aug. 2017)
Gustavus	YES (first sampled July 2018)
Homer	Unknown (not yet sampled)
King Salmon	YES (first sampled Dec. 2018)
Kotzebue	Unknown (not yet sampled)
Nome	Unknown (not yet sampled)
Petersburg	Unknown (not yet sampled)
Sand Point	Unknown (not yet sampled)
Sitka	Unknown (not yet sampled)
Unalaska	Unknown (not yet sampled)
Utqiagvik (Barrow)	YES (first sampled Aug. 2017)***
Wrangell	Unknown (not yet sampled)
Valdez	NO (sampled Dec. 2018)
Yakutat	YES (first sampled Feb. 2019)
Part 139 Certified Airports (muni-owned and/or operated)	**PFAS contamination of drinking water sources?**
Kenai	NO (sampled Dec. 2018)
Ketchikan	Unknown (not yet sampled)
Juneau	Unknown (first sampled Aug. 2019)
Past Part 139 Certified Airports and former DoD sites	
Aniak	Unknown (not yet sampled)
Galena (DoD)	Unknown (not yet sampled)
Iliamna	Unknown (not yet sampled)
Kodiak (USCG)	Unknown (not yet sampled)
McGrath	Unknown (not yet sampled)
Northway (DoD)	Unknown (not yet sampled)
Port Heiden	Unknown (not yet sampled)
Red Dog (owned by NANA Regional Corp)	Unknown (not yet sampled)
St Paul	Unknown (not yet sampled)

Used with permission from Alaska Community Action on Toxics; 2019 Threats to Drinking Water and Public Health In Alaska

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The Unknowns of PFAS Contamination in Alaska

- Remote communities
  - Landfill leachate
  - Wastewater
- Bioaccumulation in fish and wild game

Testing of PWS in NW Arctic (Zender and Maniilaq)

Contaminant of Concern	Former ADEC Action Levels	Current ADEC Action Level	Selawik	Buckland	Kotzebue		Kobuk	Shungnak	Ambler		Deering	Kiana		Kivalina	Noatak		Noorvik
			Raw Water	Buckland-	Devils Lake OTZ	Vortac Lake OTZ	Main Well Sample	Shungnak	2002 Well	1982 Well	Source Water	Upper Well	Lower Well L	Raw Water Tap Before Filters L	Well # 5	Well # 6	EPA 537 - PFAS
Perfluorooctanoic Acid (PFOA)	Combination of the analytes should not exceed 70 ng/L	Combination of the analytes should not exceed 70 ng/L	0.41	ND	ND	ND	0.319	ND	0.305	0.363	ND	ND	ND	ND	ND	ND	0.23
Perfluorooctane Sulfonate (PFOS)			0.434	ND	ND	ND	0.292	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Perfluoroheptanoic Acid (PFHpA)			ND	ND	ND	ND	ND	ND	ND	ND	0.212	ND	ND	ND	ND	ND	ND
Perfluorononanoic Acid (PFNA)			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Perfluorohexane Sulfonate (PFHxS)			ND	ND	5.43	ND	ND	ND	0.341	0.393	ND	ND	ND	ND	ND	ND	ND
Perfluorobutane Sulfonate (PFBS)	2000 ng/L		ND	ND	ND	3.82	ND	ND	0.269	0.278	0.376	ND	ND	ND	ND	ND	ND

How to protect your health ?

- If you have PFAS in your blood, it does not mean that you will suffer negative health effects.
  - The body's natural elimination processes is the only way to remove PFAS from the body.
  - Blood test for PFAS are not a routine test offered by doctors.
- If PFAS levels are at or above 70 ppt, use an alternative water source for drinking, food prep, cooking, tooth brushing and any activity that may result in the swallowing of water.

How to protect your health

- Be aware of the consumer products you use that have PFAS
- There is no risk in using water with PFAS for bathing or cleaning homes and clothing.
- PFAS contaminated water should not be boiled as it increases PFAS concentration.
- PFAS contaminated water should not be used in humidifiers.
- Water containing 70 ppt PFAS should not be used in gardening.
- If water exceeds 70 ppt, do not use it for baby formula.
  - Nursing mothers who have been exposed to PFAS should continue to breastfeed.

OUR VISION:

Alaska Native people are the healthiest people in the world.


gunalchéesh • qagaasakung • igamsiqanaghhalek • ‘awa’ahdah • tsin’aen • baasee’ • quyanaa • dogidinh • way dankoo • háw’aa • mahsi’ • maasee’ • chin’an • quyana • quyanaq • quyanaa

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