THE

UNITED STATES AIR FORCE

INSTALLATION RESTORATION PROGRAM

FINAL

2024 ANNUAL GROUNDWATER MONITORING REPORT

FOR PER – AND POLYFLUOROALKYL SUBSTANCES

EIELSON AIR FORCE BASE, ALASKA

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ACRONYMS AND ABBREVIATIONS

°C	degrees Celsius
%R	percent recovery
µg/L	microgram(s) per liter
µS/cm	microsiemens per centimeter
4:2-FTS	4:2-Fluorotelomersulfonic acid
6:2-FTS	6:2-Fluorotelomersulfonic acid
8:2 FTS	8:2 – Fluorotelomersulfonic acid
10:2-FTS	10:2-Fluorotelomersulfonic acid
9Cl-PF3ONS	9-Chlorohexadecafluoro-3-oxanonane-1- sulfonic acid
11Cl-PF3OudS	11-Chloroeicosafluoro-3-oxaundecane-1- sulfonic acid
ADEC	Alaska Department of Environmental Conservation
AFB	Air Force Base
AFFF	aqueous film forming foam
AMSL	above mean sea level
ARAR	applicable or relevant and appropriate requirement
bgs	below ground surface
BTOC	below top of casing
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
COV	coefficient of variation
DERP	Defense Environmental Restoration Program
DL	detection limit
DO	dissolved oxygen
DoD	Department of Defense
DOE	Department of Energy
DONA	4,8-Dioxa-3H-perfluorononanoic acid
DOT	Department of Transportation
DQI	data quality indicator
DQO	data quality objective

EIS	Extracted Internal Standards
EPA	United States Environmental Protection Agency
FNSB	Fairbanks North Star Borough
ft	foot or feet
gpm	gallons per minute
HFPO-DA (GenX)	2,3,3,3-Tetrafluoro-2-(1,1,2,2,3,3,3- heptafluoropropoxy)-propanoic acid, hexafluoropropylene oxide dimer acid
HWF	hazardous waste facility
ICAL	initial calibration
ID	identification
IDW	Investigative Derived Waste
IWMP	Installation Wide Monitoring Program
LC/MS/MS	liquid chromatography with tandem mass spectrometry
LCS	laboratory control sample
LCSD	laboratory control sample duplicate
LHA	lifetime health advisories
LOD	limit of detection
LOQ	limit of quantitation
MAROS	Monitoring and Remediation Optimization System
MCL	maximum contaminant level
mg/L	milligrams per liter
MS	matrix spike
MSD	matrix spike duplicate
mV	millivolts
NEtFOSAA	N-ethyl perfluorooctanesulfonamidoacetic acid
NEtPFOSA	N-ethylperfluoro-1-octanesulfonamide
NEtPFOSAE	2-(N-ethylperfluoro-1-octanesulfonamido)- ethanol
ng/L	nanograms per liter
NIS	Non-Extracted Internal Standards
NMeFOSAA	N-methyl perfluorooctanesulfonamidoacetic acid

NMePFOSA	N-methylperfluoro-1-octanesulfonamide
NMePFOSAE	2-(N-methylperfluoro-1-octanesulfonamido)- ethanol
North Wind/EA	North Wind-EA JV, LLC
NPDL	North Pacific Division Laboratory
NPDWR	National Primary Drinking Water Regulations
NTU	nephelometric turbidity units
ORP	oxidation reduction potential
OU	Operable Unit
PAL	project action level
PARCCS	precision, accuracy, representativeness, comparability, completeness, and sensitivity
PFAS	Per- and polyfluoroalkyl substances
PFBA	Perfluoro-n-butanoic acid
PFBS	perfluorobutane sulfonate
PFC	perfluorinated compound
PFDA	Perfluorodecanoic acid
PFDoDA	Perfluorododecanoic acid
PFDoDS	Perfluorododecanesulfonic acid
PFDS	Perfluorodecanesulfonic acid
PFHpA	Perfluoroheptanoic acid
PFHpS	Perfluoroheptanesulfonic acid
PFHxA	Perfluorohexanoic acid
PFHxDA	Perfluorohexadecanoic acid
PFHxS	Perfluorohexanesulfonic acid
PFNA	Perfluorononanoic acid
PFNS	Perfluorononanesulfonic acid
PFOA	perfluorooctanoic acid
PFODA	Perfluorooctadecanoic acid
PFOS	perfluorooctanesulfonic acid
PFOSA	Perfluorooctanesulfonamide

PFPeA	Perfluoro-n-pentanoic acidPFPeS Perfluoropentanesulfonic acid
ppt	parts per trillion
PFTeDA	Perfluorotetradecanoic acid
PFTrDA	Perfluorotridecanoic acid
PFUnA	Perfluoroundecanoic acid
PVC	polyvinyl chloride
PWTS	PFAS wastewater treatment system
QAPP	quality assurance project plan
QC	quality control
QSM	quality systems manual
RA	risk assessment
RI	remedial investigation
RL	reporting limit
RPD	relative percent difference
RSL	regional screening level
SDG	sample delivery group
UFP	Uniform Federal Policy
USACE	United States Army Corps of Engineers
USAF	United States Air Force

EXECUTIVE SUMMARY

This report presents the groundwater monitoring activities performed at Eielson Air Force Base (AFB) and Off Base areas consisting of the northwest adjacent communities of Moose Creek, Alaska and North Pole, Alaska.

Groundwater sampling was performed at 78 wells in July 2024 and 80 wells in October 2024. Groundwater samples were analyzed for perfluoroalkyl substances (PFAS). Analytical results exceeded the U.S. Environmental Protection Agency (EPA) Maximum Contaminant Levels (MCLs) for perfluorooctanoic acid (PFOA); perfluorosulfonic acid (PFOS); perfluorohexansulfonic acid (PFHxS); perfluorononanoic acid (PFNA); and mixtures of two or more of PFHxS, PFNA, hexafluoropropylene oxide dimer acid (HFPO-DA), and perfluorobutanesulfonic acid (PFBS). In July, PFAS exceeding the applicable MCLs were detected in 48 of the 78 sampled wells. In October, PFAS exceeding the applicable MCLs were detected in 55 of the 80 sampled wells.

Individual well trend analyses for PFAS with exceedances indicate there are generally more well-analyte combinations with decreasing/probably decreasing trends on Eielson AFB than Off Base, and more increasing/probably increasing trends Off Base than on Eielson AFB, supporting the observation that the plume is continuing to migrate Off Base to the northwest. Trends observed at well clusters MW1, MW2, HCMW01, HCMW02, and HCMW03 indicate that contamination may be spreading vertically to depths of 70-100 feet.

Plume-wide trend analyses indicate that the plume is continuing to spread downgradient and laterally towards the North Pole vicinity. However, the trends Off Base are likely influenced by the addition of the new North Pole wells (NPB-20, NPC-20, etc.) to the trend analysis. Confidence in the Off Base plume trends will increase as additional data are gathered. Ideally, the data analyzed should be collected from the same timeframe. Thus, once 6 to 10 sets of data have been collected from the new wells, it may be useful to revise the timeframe of the entire plume analysis to 2023 to present (eliminating the spatial increase caused by the addition of wells in 2023).

Approximately 200 gallons of purge water from the July sampling event was containerized, treated at the PFAS Wastewater Treatment System (PWTS) located at the Hazardous Waste Facility (HWF) at Eielson AFB, and discharged to the drainage swale located directly south of the HWF once the analytical data confirmed that the effluent limits in the Alaska Pollutant Discharge Elimination System permit were achieved. In October, approximately 150 gallons of purge water was containerized and transported to the Eielson AFB LF003 Holding Cell #2. The purge water is temporarily being stored at LF003 Holding Cell #2 until spring 2025 and will then be transferred to the PWTS for treatment.

It is recommended that the sampling network and frequency be maintained without changes for at least three years to collect sufficient data to support a strong plume trend analysis, with the exception of replacing HCMW05DP (due to compromised well construction) with 20PS-MW04 in the 2025 sampling events. In addition, due to uncertainty/ unavailability of survey data for MW-2 and USAP and DSAP monitoring wells, these wells should be considered for resurvey in the future.

1.0 INTRODUCTION

This report summarizes the 2024 groundwater monitoring activities conducted at Eielson Air Force Base (AFB) and Off Base areas consisting of the northwest adjacent communities of Moose Creek, Alaska and North Pole, Alaska. The United States Army Corps of Engineers (USACE) Alaska District has contracted North Wind-EA JV, LLC (North Wind/EA) to conduct bi-annual sampling, once in the spring and once in the fall, at 80 existing monitoring wells to further evaluate a per – and polyfluoroalkyl substances (PFAS) groundwater contaminant plume within the boundary and northwest of Eielson AFB. The purpose of the sampling is to evaluate plume characteristics and characterize plume concentrations. This work is conducted under Contract No. W911KB-20-D-0012 for the USACE at the Eielson AFB, Alaska. The USACE North Pacific Division Laboratory (NPDL) number assigned for this project is 24-028.

Supplemental data that support the results presented herein are provided in the following appendices:

- Appendix A includes photographic logs,
- Appendix B includes field forms and notes,
- Appendix C presents complete analytical data tables,
- Appendix D presents the laboratory analytical reports,
- Appendix E presents the analytical Data Validation Summary Reports,
- Appendix F presents the Monitoring and Remediation Optimization System (MAROS) and ProUCL input files
- Appendix G presents Mann Kendall trend analysis graphs of select wells
- Appendix H presents the Monitoring and Remediation Optimization System (MAROS) plume analysis report, and
- Appendix I presents the responses to regulatory review comments and approval letters.

The groundwater monitoring activities described in this report were conducted in accordance with the final *Per- and Polyfluoroalkyl Substances (PFAS) Plume Monitoring, Eielson Air Force Base, Alaska, Uniform Federal Policy – Quality Assurance Project Plan (UFP-QAPP)* (North Wind/EA, 2024).

1.1 Site Description and History

Eielson AFB is an active military installation that has been used for military operations since its establishment in 1944. Eielson AFB is located within the Fairbanks North Star Borough (FNSB), a county-scale municipality. The FNSB also includes the City of Fairbanks, the City of North Pole, Moose Creek, and Salcha. North Pole is located approximately 7 miles northwest of the Base, and Moose Creek is located approximately 3 miles north of the Base (Figure 1). Eielson AFB encompasses 19,790 acres of the FNSB. Approximately 3,651 acres of the Base is improved or partially improved land, and 16,139 acres is undeveloped land encompassing forests, wetlands, lakes, and ponds.

Historical operations at Eielson AFB have generated varying quantities of hazardous and nonhazardous wastes from industrial and airfield operations, and fuel management. On 21 November 1989, the United States Environmental Protection Agency (EPA) listed Eielson AFB on the National Priorities List of federal Superfund sites by the EPA (site is currently active), and a Federal Facility Agreement was signed in 1990 (EPA, 1990). In the 1993 Remedial Investigation (RI) and Feasibility Study for Eielson AFB (USAF, 1993), 64 source areas of possible contamination were found. These sites were evaluated through the Comprehensive Environmental Response, Comprehensive, and Liability Act (CERCLA).

In the 1996 Record of Decision for Eielson AFB, 29 areas were divided into six Operable Units (OUs) based on common characteristics or contaminants, and 31 other areas of contamination were evaluated through a source evaluation process. A seventh OU (the Sitewide OU), which contains one source area (SS67), was added after the Federal Facility Agreement was signed (EPA, ADEC, and USAF 1990). The remaining contaminated sites are addressed through Alaska Department of Environmental Conservation (ADEC) regulations (USAF, 1996).

In November 2012, ADEC issued a letter requesting the United States Air Force (USAF) to sample for perfluorinated compounds (PFCs) at four fire training areas (South Ramp Spray Test Area, KC-135 Fire, Former Ball Field Spray Test Area, and Foamed Runway) (Figure 2). In July 2014, the USAF collected groundwater, soil, and surface water samples from the four areas, and the results indicated widespread PFC contamination (USAF, 2015). In January 2015, the EPA issued a letter requesting USAF samples of the base drinking water for PFCs. Several of the base drinking water supply wells were found to contain perfluorooctanesulfonic acid (PFOS) exceeding the public health advisory of 0.2 micrograms per liter (µg/L).

In April 2015, groundwater and surface water were sampled along the northern boundary of Eielson AFB to determine if contamination was migrating off-base, and the results found PFOS over a broad front and extending to a depth of 100 feet (ft) below ground surface (bgs). In May 2015, the USAF developed plans and began sampling residential drinking water wells in the community of Moose Creek. The sampling results found all the wells contained PFOS, and approximately 90% exceeded the public health advisory. Affected residents were therefore supplied with bottled water or had granular activated carbon filtration systems installed.

In 2015, the USAF initiated a supplemental remedial investigation-risk assessment (RI-RA), and work plans were developed for each of the six OUs to address the need for additional data and/or mitigation. As of 2022, the RI-RA reports were finalized. The USAF has begun developing work plans for supplemental RI/RA data gaps investigations. ADEC and the EPA are currently reviewing the work plans.

In 2016, site inspections were conducted at 15 aqueous film forming foam (AFFF) areas at Eielson AFB. PFAS concentrations were found to be highest in soil and groundwater within the Former Ball Field Spray Test Area and Former Fire Training Areas by the current Entomology Building (Figure 2).

The *Expanded Perfluorooctanoic acid (PFOA) and Perfluorooctanesulfonic (PFOS) and Perfluorobutane Sulfonate (PFBS) Site Inspection, Eielson Air Force Base and Moose Creek, Alaska Uniform Federal Policy-Quality Assurance Project Plan Work Plan* (EA, 2019) was approved by the EPA and ADEC in September 2019. The inspection is ongoing and has provided information on the extent of PFOS and perfluorooctanoic acid (PFOA) in groundwater. The work includes installation of permanent monitoring wells on the PFOS/PFOA plume edge.

A PFAS RI (Phase 1) is being developed to further investigate the soil, sediments, groundwater, and surface water throughout the Eielson AFB. The RI in progress has included beginning delineation of source areas, 3-dimensional mapping of the groundwater plume and surface contamination, and will provide input to future CERCLA actions. Additional field work performed in the summer of 2022 included further delineation of the horizontal and vertical extent of groundwater contamination to inform a hydrogeologic model. Further sampling, including off-base, non-source area soil sampling in Moose Creek, was done as planned for the summer and fall of 2023 and 2024.

Sites with remedies in place at Eielson AFB that have groundwater contamination are in the Installation Wide Monitoring Program (IWMP) to ensure the plumes of legacy contaminants are stable or decreasing. Institutional controls (i.e., restriction of groundwater use in certain areas), treatment systems on drinking water wells, fishing advisories, and dig restrictions are in place at Eielson AFB to prevent exposure to remaining contamination (ADEC, 2022). However, PFAS is not currently included in the IWMP.

1.2 Physical Characteristics

Eielson AFB was constructed on the floodplain of the Tanana River, a relatively flat surface with meandering streams and a complex network of shallow swales. Approximately 89% of the Eielson AFB is flat alluvial floodplain with elevations ranging from 520 to 556 ft. The remaining 11% of the AFB occurs in the uplands along the eastern edge of the valley. Elevations in the main industrial area surrounding the flightline range from 548 to 556 ft. Engineer Hill, which reaches 1,000 ft above mean sea level (AMSL), is located in the uplands at the northeast extent of the AFB. The highest elevation is 1,125 ft, which occurs on Quarry Hill in the uplands at the southeastern corner of the AFB (AECOM, 2013).

1.3 Geology

Consolidated rocks in the Eielson AFB area are part of the Birch Creek Schist of Precambrian age. This unit is primarily slate to schistose, although it includes quartzite and quartz veins (Cederstrom, 1963). The schist weathers to silt and clayey silt. The weathering product has been described as yellow clay in drill logs. The weathering zone may be relatively thick (≥150 ft). Because thick sediment accumulations are present in the Tanana Basin, depth to bedrock is several hundred feet deep in the middle of the valley.

In the Eielson AFB area, the low hills and lower slopes consist primarily of Quaternary loess sediments, with shallow or outcropping bedrock where sediments are thin or not present. Some of these sediments have been reworked and redistributed downslope. The valley floor consists primarily of alluvium. Sedimentary deposits overlie the Birch Creek Schist in much of the area surrounding Eielson AFB. The most recent glaciation occurred during the Late Pleistocene (Wisconsinan glaciation), at which time the ice sheet advanced nearly to the Tanana River. During glacial retreat, outwash and alluvial fans were deposited to the south and west of the river. This glacial environment created extreme changes in surface-water flow rates, including high flow created by melt water and low flow when no melt water was available. As a result, the Tanana is braided with multiple channels that wander across the valley, leaving abandoned channel belts.

The prevailing wind direction appears to have been from the west, blowing silt-size particles from the alluvial fans and plastering them on the hill slopes of the Tanana Uplands, east of Eielson AFB. These are well sorted, massive silt deposits with little jointing or stratification, and are thickest near major rivers draining glaciated areas (Pewe and Bell, 1975). Along the hill slopes and underlying the loess are sediments deposited by solifluction occurring in periglacial settings where water-saturated soil is moved downslope with melt water. Weathered bedrock fragments may be included in the reworked material. This solifluction layer is widespread and inactive and has been referred to as the Tanana Formation (Pewe and Bell, 1975). The valley-fill deposits of the Tanana Basin are complex and heterogeneous, consisting of alternating sand, gravel, and silt (Cederstrom, 1963). These braided river deposits are composed of variable gradations of fine and coarse material. Generally, individual lenses are <20 ft thick. Many structures found in these deposits are small-scale and cannot be correlated over great distances.

Today, perennially frozen ground is not usually continuous over wide areas on the valley floor. The thick masses of permafrost (where present) may thin laterally, either gradually or abruptly, generally where a stream or the course of a former stream is approached. Where thick permafrost has been penetrated by wells in Fairbanks, Alaska, the mass is ordinarily solid, and apparently unfrozen layers are absent. Near the edge of the frozen mass, however, lateral melting at different rates has produced a sawtooth pattern in cross sections.

Eielson AFB is in the area of an abandoned river-channel belt, and the subsurface underlying most of the Base consists of braided river deposits. These deposits are complex in structure but similar in lithology. In the Tanana River Valley, these deposits are ≥300 ft thick. In the developed portion of the Base, fill material, generally described as silty sand and gravelly sand, was used during construction. This material was quarried nearby and is lithologically similar to natural soil, although the sedimentary structures would have been obliterated. Only the upper part of the floodplain sediments (<30 ft in some areas) has been explored. These sediments consist primarily of gravelly sand and sandy gravel (AECOM, 2013).

1.4 Hydrogeology

The Birch Creek Schist underlies the unconsolidated, sedimentary deposits near Eielson AFB. However, the unconsolidated deposits do not extend far up the hill slopes. Groundwater flows down the hill slopes within the Birch Creek Schist and within the overlying sediments of the valley fill toward the basin.

Water supply wells in these areas tap into the schist, which is an inferior water-bearing formation seldom yielding more than 10 gallons per minute (gpm). Of more significance, in terms of well yield, are the sediment-filled valleys along the mountain slopes. These valleys are commonly underlain with sand and gravel, and wells drilled into these deposits may yield ≥100 gpm (Cederstrom, 1963).

By contrast, the sands and gravels underlying the Tanana River Valley (i.e., braided river deposits) provide large quantities of water (≥1,000 gpm) to wells. This unit has been called the Tanana Basin Aquifer. Well yields of up to 3,400 gpm with minimal drawdown have been reported. Recharge is predominantly from seepage into the aquifer from stream beds during periods of melt water rather than from precipitation. During these times, the river elevations are higher than the groundwater levels.

Recharge to the Tanana Basin aquifer is from precipitation, snowmelt, and infiltration from stream beds. Historical water-level data indicate that recharge typically increases from April through May, often beginning in late March and continuing through mid-June, indicating recharge from snowmelt and from high water levels in the rivers and streams. Declines in water-level begin in July or August. The largest recharge to the aquifer is from the river during periods of high flow. There also is recharge from the Birch Creek Schist from groundwater flowing down the hill slopes to the valley. The wetlands at the foot of the uplands, which are located to the east of Eielson AFB, are likely fed from this source and precipitation perched on permafrost. Therefore, the wetlands also may lose water to the Tanana Basin aquifer. The water within the Tanana Basin aquifer is a calcium bicarbonate or calcium magnesium bicarbonate type. The water quality is highly variable, suitable for most uses in many areas, but locally contains high iron and manganese and may not be usable for drinking water without treatment.

Water levels in the Tanana Basin aquifer vary seasonally, rising during snowmelt and declining in winter. Analysis of river stage elevations compared with groundwater levels indicates that there is little separation between the two (<0.2 ft), although data are limited. Based on these data, the sloughs at or near Eielson AFB are likely to be at the same elevation as the groundwater. Eielson AFB is surrounded by wetland areas. On the eastern side of Eielson AFB, these wetlands likely recharge groundwater.

In general, groundwater flow is to the north-northwest, turning more westerly to the north, paralleling the sloughs. This parallel flow pattern indicates that the overall groundwater flow is more influenced by aquifer boundaries than the tendency to receive recharge from or discharge to the sloughs. The aquifer is bounded by lower permeability schist and alluvial fans. These features act hydraulically as no-flow boundaries, although a small amount of groundwater is present in both. This hydraulic boundary effect is the result of the contrast in permeability, the schist and alluvial fans being low, and the braided river deposits being very high. Therefore, the shape of the valley controls the overall direction of groundwater flow. However, local perturbations in the contours created by changes in river stage may occur.

Alluvial fans fine toward their distal ends. These fan deposits are typically much finer than the braided river deposits encountered at the Base, causing the boundary effect. However, the thickness of the alluvial fans is unknown. It is likely that at least a portion of the fans has pushed out over older braided river deposits. If this is the case, the groundwater flow direction in the deep part of the aquifer could be more westerly than the shallow flow direction.

The Tanana Basin aquifer is composed of a heterogeneous mixture of gravelly sands and sandy gravels. Although very permeable, this heterogeneity causes local changes in groundwater flow velocity. Groundwater depths range from the ground surface in wetland areas to 10 ft bgs in developed areas of Eielson AFB, and groundwater flow is generally to the northwest (AECOM, 2013).

1.5 Regulatory Background

PFAS are a class of synthetic fluorinated chemicals used in industrial and consumer products, including defense-related applications. In the early 1970s, the USAF began using AFFF containing PFOS. Releases of AFFF to the environment routinely occur during fire training, equipment maintenance, storage, and use.

This work is performed under the Installation Restoration Program, which was developed to provide response actions for Department of Defense (DoD) installations, as required by Section 120 of CERCLA (as clarified by Executive Order 12316 and amended by the Superfund Amendments and Reauthorization Act of 1986). The current DoD policy, which was specified in the Defense Environmental Quality Program Policy Memorandum 81-5 (December 11, 1981), was implemented by the USAF in a message dated January 21, 1982. The DoD policy is to identify and fully evaluate suspected problems associated with past operations that may have caused hazardous waste contamination, and to implement remedial actions that will minimize the hazards to human health and the environment resulting from such past operations. The EPA and ADEC are the regulatory agencies for this project.

The USAF investigation and mitigation actions are guided by CERCLA applicable state laws, the Defense Environmental Restoration Program (DERP), and EPA's maximum contaminant levels (MCLs). While CERCLA does not contain any specific cleanup standards, it does require that response actions under the Superfund program protect public health and the environment and normally comply with federal laws and regulations that constitute applicable or relevant and appropriate requirements (ARARs). ADEC has a statutory responsibility to conduct oversight on the cleanup of all contaminated sites statewide. In 1991, ADEC and the DoD entered into a State Memorandum of Agreement that defines the process used for DoD-led site cleanups.

Regulatory guidance has been on-going since 2016, when the EPA published lifetime health advisories (LHAs) under the Safe Drinking Water Act for PFOS and PFOA (EPA, 2016). Each time the EPA has released new guidance, the DoD has issued guidance aligning with the EPA guidance and/or regulations.

In April 2024, the EPA released a Final PFAS National Primary Drinking Water Regulation setting enforceable MCLs at 4.0 ppt for PFOA and PFOS; 10 ppt for perfluorohexanesulfonic acid (PFHxS), perfluoronanoic acid (PFNA), and hexafluoropropylene oxide dimer acid (HFPO-DA, commonly known as GenX); and a hazard index (HI) of 1 for mixtures containing two or more of PFHxS, PFNA, HFPO-DA, and PFBS (EPA, 2024a).

The analytical results from the 2024 sample events will be compared to the EPA drinking water MCLs.

Table 1-1. EPA Drinking Water MCLs

Analyte	Final MCL (ng/L)[1]
Perfluorooctanesulfonic acid (PFOS)	4.0
Perfluorooctanoic acid (PFOA)	4.0
Perfluorohexanesulfonic acid (PFHxS)	10
Perfluorononanoic acid (PFNA)	10
HFPO-DA (GEN X)	10
Mixtures containing two or more of PFHxS, PFNA, HFPO-DA, and PFBS	1 (unitless) Hazard Index

[1] EPA, 2024
ng/L – nanograms per liter

1.6 Report Objective

The objective of this report is to document the 2024 annual groundwater monitoring results. All activities were conducted in accordance with the plans and procedures described in the *PFAS Plume Monitoring, Eielson Air Force Base, Alaska, UFP-QAPP* (North Wind/EA, 2024).

2.0 REPORTING PERIOD ACTIVITIES

Groundwater samples were collected by North Wind/EA from 15 July 2024 through 29 July 2024 (spring 2024 sample event) and 4 September 2024 through 10 September 2024 (fall 2024 sample event). Due to unforeseen delay in the approval of the UFP-QAPP (North Wind/EA 2024), the spring sample event was postponed from the normal sampling schedule of late May to June. For consistency of reporting, this event will still be referred to as the spring 2024 sample event. The locations and details pertaining to the wells selected for the 2024 sampling events are presented in Figure 2 and Table 1. Photographs documenting the 2024 field activities are provided in Appendix A. The UFP-QAPP (North Wind/EA, 2024) and ADEC *Field Sampling Guidance* (ADEC, 2024) were implemented to fulfill the groundwater monitoring program requirements specific to Eielson AFB. Field personnel followed the sampling and analysis requirements described in the UFP-QAPP. The following activities were conducted during the reporting period:

- Measurement of groundwater levels at all wells that were sampled;
- Collection and submission of groundwater samples for laboratory analyses;
- MAROS trend analysis and determination of the center of the plume mass in the upper aquifer and trend (expanding, contracting, or stable);
- Data validation, data analysis, and reporting; and
- Photographs documenting field activities.

2.1 Monitoring Well Network

In 2021, forty existing monitoring wells were scheduled to be sampled bi-annually (once in the spring and once in the fall) using low flow groundwater sampling procedures in accordance with the UFP-QAPP (North Wind/EA 2018) and the 2021-22 UFP-QAPP Addendum (North Wind, 2021). Initially, the 40 wells proposed to be sampled included wells 20PS-MW26 and 20PS-MW28. Monitoring well 20PS-MW26 was located adjacent to 20PS-MW13, and 20PS-MW28 was located adjacent to 20PS-MW15. However, as the wells had similar analytical results and both 20PS-MW26 and 20PS-MW28 were screened below the water table, the USAF decommissioned these wells during the summer of 2021. USAP-1 and DSAP-11 were then sampled in place of these wells. In 2022, an additional addendum to the UFP-QAPP added 40 existing wells to the sampling program under the contract, for a total of 80 wells.

In 2024, a new contract was established to continue sampling 80 wells. The following monitoring wells were added in North Pole, AK to the sampling program (Table 1):

- NPA-40;
- NPB-20 and NPB-40;
- NPC-20 and NPC-40;
- NPD-20 and NPD-40;
- NPF-20 and NPF-40; and
- NPG-20 and NPG-40.

The following wells were removed from the previous sampling program and replaced with the wells above:

- 20PS-MW04, 20PS-MW05, 20PS-MW16, 20PS-MW18;
- MW-BKG-11;
- HCMW-04 well cluster (HCMW04WT, HCMW04DP, and HCMW04MD);
- USAP-2;
- North Pole Well-A and North Pole Well-B.

Note that one instance in Worksheet #17 of the UFP-QAPP mistakenly lists 20PS-MW18 instead of NPB-20. However, as all other well lists in the UFP-QAPP correctly list NPB-20 instead of 20PS-MW18, sampling NPB-20 is not considered a deviation from the UFP-QAPP.

2.2 Water Level Gauging

Eielson AFB static water levels were gauged at the 80 monitoring wells during the 2024 sampling events. Depths to water were measured from the top of each well casing. During the 2024 spring and fall sampling events, the water levels were gauged with an electronic water level meter. Portions of the cable and probe that contacted groundwater were decontaminated before use at each well. The recorded depths and groundwater elevations from the 2024 sampling event are provided in Table 2. The general groundwater flow direction at the site is north-northwest.

During the spring sampling event, monitoring wells 20PS-MW14 and 20PS-MW27 were not sampled as they could not be accessed due to flooding. During the fall 2024 sampling event, these wells were accessible and sampled (Table 2).

2.3 Groundwater Sampling and Analysis

During the 2024 spring and fall events, final groundwater quality parameters were recorded prior to sampling (Table 3). Field forms (i.e., field logbooks and groundwater sampling forms) are provided in Appendix B. Per preliminary data from 2023 and the approved UFP-QAPP (North Wind/EA, 2024), monitoring well NPB-20 (installed in 2023) was recorded as NPB-22 in the field documentation and sample identification numbers. However, the final well identification is NPB-20 and will be identified as such throughout this report. The discrepancy with the field documentation and sample identification numbers is noted in the tables within this report.

Samples were analyzed by Eurofins Sacramento (Eurofins) using EPA Draft Method 1633 (EPA, 2023). Samples analyzed were compliant with DoD Quality Systems Manual (QSM) 5.4, Table B-24, PFAS by Liquid Chromatography with Tandem Mass Spectrometry (LC/MS/MS). The analytical data were reviewed and validated with the DoD QSM 5.4 and Module 6: *Data Validation Procedure for Per- and Polyfluorinated Substances Analysis* by QSM Table B-24 (DoD, 2022) guidelines. A summary of the samples collected is provided in Table 4. During the spring and fall 2024 sampling events, all the wells were sampled and analyzed for the following 40 PFAS compounds:

- Perfluorobutanoic acid (PFBA);
- Perfluoropentanoic acid (PFPeA) ;
- Perfluorohexanoic acid (PFHxA);
- Perfluoroheptanoic acid (PFHpA);
- Perfluorooctanoic acid (PFOA) ;
- Perfluorononanoic acid (PFNA);
- Perfluorodecanoic acid (PFDA);
- Perfluoroundecanoic acid (PFUnA);
- Perfluorododecanoic acid (PFDoA);
- Perfluorotridecanoic acid (PFTrDA) ;
- Perfluorotetradecanoic acid (PFTeA) ;
- Perfluorobutanesulfonic acid (PFBS);
- Perfluoropentanesulfonic acid (PFPeS);
- Perfluorohexanesulfonic acid (PFHxS);
- Perfluoroheptanesulfonic Acid (PFHpS);
- Perfluorooctanesulfonic acid (PFOS);
- N-methyl perfluorooctanesulfonamidoacetic acid (NMeFOSAA);
- Perfluorononanesulfonic acid (PFNS);
- Perfluorodecanesulfonic acid (PFDS);
- Perfluorododecanesulfonic acid (PFDoS);
- Nonafluoro-3,6-dioxaheptanoic acid (NFDHA);
- Perfluoro-4-methoxybutanoic acid (PFMBA);
- Perfluorooctanesulfonamide (FOSA);
- N-ethylperfluoro-1-octanesulfonamidoacetic acid (NEtFOSAA);
- 4:2 Fluorotelomer sulfonic acid (4:2 FTS);
- 6:2-Fluorotelomersulfonic acid (6:2 FTS);
- 8:2 Fluorotelomer sulfonic acid (8:2 FTS);
- N-ethyl Perfluorooctanesulfonamide (NEtFOSA);
- N-methyl Perfluorooctanesulfonamide (NMeFOSA);
- N-methyl perfluorooctanesulfonamidoethanol (NMeFOSE);
- N-ethyl perfluorooctanesulfonamidoethanol (NEtFOSE);
- 9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid (9Cl-PF3ONS);
- Hexafluoropropylene oxide dimer acid (HFPO-DA [GenX]);
- 11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3OUdS);
- 4,8-Dioxa-3H-perfluorononanoic acid (ADONA);
- 3-Perfluoropropyl propanoic acid (3:3 FTCA);
- 2H,2H,3H,3H-Perfluorooctanoic acid (5:3 FTCA);
- 3-Perfluoroheptyl propanoic acid (7:3 FTCA);
- Perfluoro-3-methoxypropanoic acid (PFMPA); and
- Perfluoro(2-ethoxyethane)sulfonic acid (PFEESA).

2.4 Well Conditions

The HCMW05 well cluster (HCMW05DP, HCMW05MD, and HCMW05WT) is in a marshy area, and all the wells appear to have been affected by frost heave. The frost heave appears to have significantly compromised the well construction (as is evidenced by loose casing) at monitoring well HCMW05DP along with higher pH (greater than 11) measurements. The pH at this well has consistently been elevated during sampling events since at least 2022 and is an indicator that grout contamination has likely occurred (USAF 2024a, USAF 2024b). This contamination may affect the analytical data; therefore, this well is recommended to be replaced by well 20PS-MW04 in the 2025 sampling events. Although the depth of 20PS-MW04 (13 feet bgs) is not the same as HCMW05DP (203 feet bgs) it is the only well in the vicinity of the HCMW05 well cluster that could serve as a replacement. The pH readings at monitoring wells HCMW05MD and HCMW05WT are not elevated and should remain in the sampling network.

Both shallow wells and deep wells across the site appear to have been affected by frost heave. A peristaltic pump cannot be used to sample any deep wells in the network, as these wells are no longer straight enough to place tubing down to approximately 150-200 feet bgs. To sample the deep wells, a submersible pump must be used instead, as the submersible pump has sufficient weight and rigidity to reach the required depth.

Heaved concrete footings and heaved polyvinyl chloride (PVC) casings indicate that monitoring wells 20PS-MW01, 20PS-MW02, 20PS-MW11, 20PS-MW13, 20PS-MW17, 20PS-MW30, HCMW03DP, and HCMW05MD have likely been affected by frost heave (as shown in photographs in the 2022 and 2023 reports [USAF 2024a, USAF 2024b]).

Currently, this does not affect sampling of the wells discussed above, with the exception of HCMW05DP, and the data does not provide any indication that the construction of these wells have been compromised. Therefore, there are no recommendations to replace these wells at this time. Please note that this does not include a comprehensive list of the condition of all the wells sampled within the network and only includes general observations noted at the time of sampling.

3.0 GROUNDWATER MONITORING RESULTS

This section provides a review of collected data (i.e., groundwater levels) and analytical results for the bi-annual groundwater sampling at Eielson AFB in 2024.

3.1 Groundwater Elevations and Flow Conditions

Groundwater elevations measured in the monitoring wells in the spring ranged from 485.24 ft AMSL at well USAP-1 to 552.85 ft AMSL at well HCMW06DP. In the fall, groundwater elevations ranged from 486.28 ft AMSL at USAP-1 to 552.38 ft AMSL at HCMW06DP. The general groundwater flow direction at the site is north-northwest.

Note that the groundwater elevations at all USAP and DSAP wells are inconsistent with other wells in the vicinity (North Pole well clusters, 20PS-MW22, 20PS-MW25, etc.). Limited information is available on these wells, and due to the elevation inconsistencies with wells in the vicinity it is likely that the available top of casing survey information is inaccurate.

Groundwater elevations for spring and fall are provided in Table 2 and Figure 3. Potentiometric surface contours are not illustrated, due to the inaccuracies presented by the USAP and DSAP wells, and because the data were collected over multiple days. In addition, only groundwater data is collected for this effort, and potentiometric surface maps would not incorporate surface water data or reflect the more complex hydrogeology that is present in the area. Comprehensive groundwater modeling is conducted in a separate Groundwater Model Update Summary and Quality Report (AFCEC, 2024b).

3.2 Groundwater Quality

Sampling procedures occurred in accordance with the UFP-QAPP (North Wind/EA, 2024). Prior to sampling, the depth to groundwater and the total depth of the wells were gauged. The wells were purged at a maximum flow rate of 0.13 gpm until the water quality parameters stabilized for three consecutive measurements. Water quality parameters include oxidation-reduction potential (ORP), dissolved oxygen (DO), pH, conductivity, temperature, and turbidity. Water quality measurements were taken every 3 to 5 minutes until water quality parameters stabilized. Stabilization occurs when, for at least three consecutive measurements, three (or four if using temperature) of the following parameters are reached:

- ±0.2 degrees Celsius (°C) temperature;
- pH remains constant within +/- 0.1 Standard Unit;
- Specific conductance varies no more than 3%;
- ±10 millivolts (mV) ORP;
- ±10% DO; and
- ±10% or <10 Nephelometric Turbidity Units (NTU) for turbidity.

Groundwater samples were collected once groundwater parameters stabilized and/or a minimum of one well casing volume was removed. Final water quality parameters, which were recorded prior to sampling during each event, are presented in Table 3.

Monitoring wells 20PS-MW02D, 20PS-MW11, 20PS-MW17, 20PS-MW19, 20PS-MW24, 20PS-MW30, DSAP-8S, HCMW03DP, MW-BKG-04, MW-BKG-12, NPD-20 and NPG-40 had turbidity readings exceeding 30 NTU in one or both sampling events in 2024. The elevated turbidity may influence PFAS concentrations.

HCMW05DP, in keeping with previous sample events, had an elevated pH of 11.25 during the spring sampling and 11.61 during the fall sampling. This elevated pH measurement is likely caused by grout contamination in the well (discussed in Section 2.4).

3.3 Deviations from the UFP-QAPP

The following deviations from the approved UFP-QAPP (North Wind, 2024) occurred during the 2024 groundwater sampling event:

- During the spring 2024 sampling event, 20PS-MW14 and 20PS-MW27 were flooded, and the wells were unable to be sampled.

3.4 Analytical Results

During the spring 2024 sampling event, PFAS exceeding the applicable MCLs were detected in 48 of the 78 sampled wells. During the fall 2024 sampling event, PFAS exceeding the applicable MCLs were detected in 55 of the 80 sampled wells.

In the spring, PFOS, PFOA, and PFHxS exceeded the applicable MCLs. In the fall, PFOS, PFOA, PFNA, and PFHxS exceeded applicable MCLs. No concentrations of HPFO-DA exceeded the MCL during either sampling event, although the limit of detection (LOD) exceeded the MCL at some wells (Table 5). The analytical exceedances are presented in Table 5. Here and in subsequent sections, non-detect analytes with LODs exceeding the MCL are not counted as exceedances.

Per the EPA fact sheet for the PFAS Hazard Index MCL (EPA, 2024b) the Hazard Index for each sample was calculated as follows:

$$Individual\ Hazard\ Index\ (1\ unitless) = \frac{HFPO - DA_{ppt}}{10\ ppt} + \frac{PFBS_{ppt}}{2000\ ppt} + \frac{PFNA_{ppt}}{10\ ppt} + \frac{PFHxS_{ppt}}{10\ ppt}$$

where:

- each the analyte represents the measured concentration of the analyte in a given sample, and
- ppt = parts per trillion

As these samples are not drinking water compliance monitoring samples, as defined in the Nation Primary Drinking Water Regulations (NPDWR), the running annual average Hazard Index for each location was not calculated.

The spring sample for 20PS-MW06 (laboratory sample ID 320-114270-8) and the equipment blank from 25 July 2024 (laboratory sample ID 320-114270-7) were rerun in December 2024 to confirm a suspected sample switch. The initial equipment blank results corresponded with the concentrations typically seen at 20PS-MW06 (Table 6), while the non-detect results initially reported for 20PS-MW06 corresponded with the expected results for an equipment blank. All other equipment blank samples from the 2024 sampling events were non-detect for all analytes. The only other sample with all non-detect results in SDG 320-114270 was 20PS-MW02C. This is a deep well which has only had single detection of PFAS analytes – a

PFOS detection of 0.49 ng/L in September 2024. Thus, the non-detect results at 20PS-MW02C are expected; analytical data for all other wells in this SDG corresponded with concentrations historically seen at the wells, and only 20PS-MW06 and the equipment blank results were suspected as switched samples.

The rerun results confirmed the 20PS-MW06 and equipment blank sample switch, as the equipment blank rerun results were all non-detect, and the 20PS-MW06 rerun results corresponded with typical historical concentrations (Table 6). As the rerun results confirmed the sample switch, the rerun data were not reported as usable and validated, due the hold time exceedance, and are provided in tables and the laboratory report for comparative purposes only. See Section 4.0 for additional details.

Complete analytical data for the spring and fall 2024 sampling events are presented in Appendix C. Laboratory analytical reports are provided in Appendix D, and data validation summary reports are provided in Appendix E.

Figure 4 and Figure 5 display PFAS MCL exceedances and the estimated extent of PFAS contamination exceeding the applicable MCLs.

A summary of wells with MCL exceedances follows, discussed by depth (shallow or intermediate/deep) and location (Eielson AFB or Off Base). At Eielson AFB, wells less than 50 feet deep are considered shallow, to include the shallowest wells at the MW1, MW2, and MW3 well clusters. Off Base wells less than 25 feet deep are considered shallow, to include the shallowest wells in the North Pole well clusters.

For samples with field duplicates, all analytical results discussed in the text and used for analysis (i.e., plume contours and statistical evaluation) are the higher value, unless specified otherwise.

3.4.1 Eielson AFB On-Site Shallow Wells

During the 2024 spring and fall sampling events, 22 shallow wells were sampled at Eielson AFB. Exceedances are presented in Table 5.

PFAS MCL exceedances in the spring were as follows:

- PFOS exceeded the MCL of 4.0 ng/L at 13 wells, with exceedances ranging from 4.4 ng/L (MW-BKG-12) to 2,300 QN ng/L (MW2-50).
- PFOA exceeded the MCL of 4.0 ng/L at 12 wells, with exceedances ranging from 5.7 ng/L (20PS-MW03) to 300 ng/L (MW2-50).
- PFHxS exceeded the MCL of 11 ng/L at 13 wells, with exceedances ranging from 13 J ng/L (HCMW03WT) to 870 QN ng/L (MW2-50).

PFAS MCL exceedances in the fall were as follows:

- PFOS exceeded the MCL at 14 wells, with exceedances ranging from 6.8 ng/L (HCMW03WT) to 2,400 ng/L (MW2-50).
- PFOA exceeded the MCL at 13 wells, with exceedances ranging from 4.5 J ng/L (MW-BKG-12) to 410 ng/L (MW2-50).
- PFHxS exceeded the MCL at 15 wells, with exceedances ranging from 12 ng/L (MW-BKG-04) to 770 ng/L (MW2-50).

- PFNA exceeded the MCL of 10 ng/L at a concentration of 16 ng/L in one well (MW2-50).

3.4.2 Eielson AFB On-Site Intermediate/Deep wells

During the 2024 spring and fall sampling events, 14 intermediate/deep wells were sampled at Eielson AFB. Exceedances are presented in Table 5.

PFAS MCL exceedances in the spring were as follows:

- PFOS exceeded the MCL at 8 wells, with exceedances ranging from 5.1 QH ng/L (MW2-150) to 340 QN ng/L (MW2-100).
- PFOA exceeded the MCL at 7 wells, with exceedances ranging from 4.5 QN ng/L (MW1-150) to 52 ng/L (MW2-100).
- PFHxS exceeded the MCL at 7 wells, with exceedances ranging from 12 QN ng/L (MW1-150) to 180 ng/L (MW2-100).

PFAS MCL exceedances in the fall were as follows:

- PFOS exceeded the MCL at 9 wells, with exceedances ranging from 4.5 QN ng/L (HCMW05DP) to 280 ng/L (MW2-100).
- PFOA exceeded the MCL at 7 wells, with exceedances ranging from 4.6 ng/L (MW1-150) to 69 ng/L (HCMW03MD).
- PFHxS exceeded the MCL at 6 wells, with exceedances ranging from 19 ng/L (MW3-100) to 140 ng/L (MW2-100).

3.4.3 Off Base Shallow wells

During the spring sampling event, 27 shallow wells were sampled Off Base. During the fall sampling event 29 wells were sampled. Exceedances are presented in Table 5.

PFAS MCL exceedances in the spring were as follows:

- PFOS exceeded the MCL at 17 wells, with exceedances ranging from 4.6 H ng/L (DSAP-11) to 50 QN ng/L (20PS-MW09).
- PFOA exceeded the MCL at 16 wells, with exceedances ranging from 4.1 QN ng/L (NPG-20) to 15 QN ng/L (20PS-MW09).
- PFHxS exceeded the MCL at 16 wells, with exceedances ranging from 11 QN ng/L (NPG-20) to 50 QN ng/L (20PS-MW09).

PFAS MCL exceedances in the fall were as follows:

- PFOS exceeded the MCL at 22 wells, with exceedances ranging from 4.3 ng/L (20PS-MW22) to 52 QN ng/L (20PS-MW09).
- PFOA exceeded the MCL at 21 wells, with exceedances ranging from 4.6 ng/L (DSAP-8S) to 19 ng/L (20PS-MW27).
- PFHxS exceeded the MCL at 18 wells, with exceedances ranging from 13 ng/L (NPC-20 and 20PS-MW23) to 39 ng/L (20PS-MW27).

3.4.4 Off Base Intermediate/Deep wells

During the spring and fall sampling events, 15 intermediate/deep wells were sampled Off Base. Exceedances are presented in Table 5.

PFAS MCL exceedances in the spring were as follows:

- PFOS exceeded the MCL at 6 wells, with exceedances ranging from 4.3 QN ng/L (NPC-40) to 25 QL ng/L (19PS-MW02A). At well 19PS-MW01A, PFOS was non-detect. However, the LOD exceeded the MCL.
- PFOA exceeded the MCL at 1 well, with an exceedance of 7.4 QL ng/L (19PS-MW02A).
- PFHxS exceeded the MCL at 4 wells, with exceedances ranging from 11 QLJ ng/L at 19PS-MW01A, 11 ng/L at NPB-40, and 11 QN ng/L NPD-40 to 16 QL ng/L at 19PS-MW02A.

PFAS MCL exceedances in the fall were as follows:

- PFOS exceeded the MCL at 6 wells, with exceedances ranging from 5.3 ng/L (NPD-40) to 24 ng/L (19PS-MW02A).
- PFOA exceeded the MCL at 6 wells, with exceedances ranging from 4.3 ng/L (NPD-40) to 7.5 ng/L (19PS-MW02A).
- PFHxS exceeded the MCL at 3 wells, with exceedances ranging from 11 ng/L (NPG-40) to 14 ng/L (19PS-MW02A).

4.0 QUALITY ASSURANCE ASSESSMENT AND DATA USABILITY

The following subsections summarize the validation and usability assessments completed for the 11 spring and 12 fall Level IV PFAS data packages, compliant with DoD/Department of Energy (DOE) Consolidated QSM version 5.4, for the 2024 sampling events. Sampling for the spring 2024 data took place from July 15, 2024, through July 29, 2024. Sampling for the fall 2024 data took place from September 4, 2024, through September 10, 2024. All analytical PFAS data obtained during the 2024 sampling events were generated by Eurofins, Sacramento, CA.

The data were validated using the requirements and protocols outlined in the following documents and analytical methods:

- *Per- and Polyfluoroalkyl Substances (PFAS) Plume Monitoring, Eielson Air Force Base, Alaska, Uniform Federal Policy- Quality Assurance Project Plan (UFP-QAPP)*, July (North Wind/EA, 2024).
- *Department of Defense (DoD)/Department of Energy (DOE) Consolidated Quality Systems Manual for Environmental Laboratories*, Version 5.4. May (DoD, 2021).
- *Data Validation Guidelines Module 6: Data Validation Procedure for Per- and Polyfluoroalkyl Substances Analysis by QSM Table B-24*. May (DoD, 2022).

4.1 Summary of Data Sets

The spring data set consisted of 11 Level IV sample delivery groups (SDGs), with a total of 96 samples (including quality control [QC]), while the fall data set consisted of 12 Level IV SDGs with a total of 97 samples (including QC). The samples for both spring and fall were analyzed for PFAS by the laboratory's internal draft method EPA 1633, compliant with DoD QSM Table B-24. All SDGs for both spring and fall underwent a Level 2b data validation, and the final data validation reports have been provided in Appendix E. Below are the number and type of samples collected for the sampling effort.

Table 4-1. Samples Collected for Spring and Fall 2024

Sampling Effort	Analysis Method	Sample Type	Number of Samples
Spring 2024	PFAS by LC/MS/MS (EPA Draft Method 1633) Compliant with Table B-24 of QSM 5.4	Normal Field Samples	78
		Field Blank	5
		Field Duplicates	10
		Equipment Blank	3*
Fall 2024	PFAS by LC/MS/MS (EPA Draft Method 1633) Compliant with Table B-24 of QSM 5.4	Normal Field Samples	80
		Field Blank	4
		Field Duplicates	10
		Equipment Blank	3*

*Equipment blanks are only collected daily when reusable equipment (i.e., a submersible pump) is in contact with the samples. Where a peristaltic pump was used, sample tubing is dedicated for each well and equipment blanks are not necessary.

4.2 Summary of Data Quality

Data validation qualifiers, which include 'J', 'B', 'H', 'QH', 'QL', 'QN', and 'R', were assigned in accordance with the UFP-QAPP (North Wind/EA, 2024) and the USACE Alaska District Manual for Electronic Deliverables (2017). Qualifiers were assigned upon evaluating the following criteria:

- Holding times,
- Initial calibrations (ICALs),
- Method blanks and field blanks,
- Laboratory control samples (LCSs) and laboratory control sample duplicates (LCSDs);
- Matrix spikes (MSs) and matrix spike duplicates (MSDs),
- Ion ratios,
- Extracted Internal Standards (EIS) (i.e., Surrogate or Isotope Dilution Standard),
- Non-Extracted Internal Standards (NIS), and
- Results reported below the limit of quantitation (LOQ).

It should be noted that the data qualifiers used in this assessment, specifically 'J', 'B', 'H', 'QH', 'QL', 'QN', were used to provide an overall assessment of the quality of the data within allowable method criteria and do not negatively impact the usability of the data. These four data qualifiers provide insight into potential bias as they may relate to QC, calibration, or field data (i.e., field blanks), and are utilized only when sample results are reported within acceptable method deviation limits. In contrast, data reported outside acceptable method deviation limits are qualified 'R' and are recommended for rejection. The qualified results are presented in the data validation reports provided in Appendix E. The ADEC Data Review Checklists are included in Appendix E.

4.2.1 Sampling Summary

Due to suspicion of an inadvertent sample swap by the lab for samples EB01-07252024 (lab ID 320-114270-7) and 24-20PS-MW06-0727 (lab ID 320-114270-8), the samples were re-extracted on 12/13/24 with extra sample volume that the laboratory had retained.

The initial equipment blank results corresponded with the concentrations typically seen at 20PS-MW06 (Table 6), while the non-detect results initially reported for 20PS-MW06 corresponded with the expected results for an equipment blank. All other equipment blank samples from the 2024 sampling events were non-detect for all analytes. The only other sample with all non-detect results in SDG 320-114270 was 20PS-MW02C. This is a deep well which has only had single detection of PFAS analytes – a PFOS detection of 0.49 ng/L in September 2024. Thus, the non-detect results at 20PS-MW02C are expected; analytical data for all other wells in this SDG corresponded with concentrations historically seen at the wells, and only 20PS-MW06 and the equipment blank results were suspected as switched samples.

The re-extraction occurred 139-141 days of collection, which grossly exceeds the 28-day collection to extraction hold time and the 90-day laboratory sample retainment time per the DoD QSM 6.0, Module 6, Table II. In the reanalysis, all equipment blank analytes were non-detect and 20PS-MW06 analytes generally corresponded with the initial results, as well as the concentrations historically seen at this well (Table 6).

Sample 24-20PS-MW06-0727 (lab ID 320-114270-8) was initially analyzed on 08/14/24 with an initial sample volume of 50 mL due to possible high analyte concentrations. Sample 24-20PS-MW06-0727 (lab ID 320-114270-8) was re-extracted on 12/13/24 and analyzed on 12/16/24 with a sample volume of 529.5 mL, resulting in lower detection limits. The reanalysis confirmed that the initial results were switched; however, due to the higher sample volume used in the reanalysis and the lower detection limits, PFBA, PFNA, PFBS, and PFHpS were reported as detections above the LOD in the 12/16/24 reanalysis. The results from the 12/13/24 re-extraction of 24-20PS-MW06-0727 (lab ID 320-114270-8) and EB01-07252024 (lab ID 320-114270-7) have been marked as "Do Not Use" and are provided in Appendix C for comparative purposes only.

The spring 2024 data set consists of 78 normal groundwater samples and 10 field duplicates analyzed for PFAS, which resulted in 3,601 target analyte data points (for non-blank samples). There were 23 data points that were recommended for rejection ('R' flagged) due to significant data quality concerns. As a result, there are 3,578 target analyte data points (excluding blank samples) considered usable for evaluating site conditions. MS/MSD samples were collected at a rate of 5% of the total normal samples collected. Although one MS/MSD was not requested per CoC, a total of 5 MS/MSD sample pairs were collected and analyzed, exceeding the 5% total collection criteria for spring 2024.

The fall 2024 data set consists of 80 normal groundwater samples and 10 field duplicates analyzed for PFAS, which resulted in 3,644 target analyte data points (for non-blank samples). There were 37 data points that were recommended for rejection due to significant data quality concerns. As a result, there are 3,607 target analyte data points (excluding blank samples) considered usable for evaluating site conditions. MS/MSD samples were collected at a rate of 5% of the total normal samples collected. Although one MS/MSD was not requested per CoC, a total of 4 MS/MSD sample pairs were collected and analyzed, meeting the 5% total collection criteria for fall 2024.

4.2.2 Field and Equipment Blanks Summary

Five field blanks and three equipment blanks were collected during the 2024 spring sampling event, and four field blanks and three equipment blanks were collected during the 2024 fall sampling event. Laboratory-provided PFAS free water was used to rinse the equipment after decontamination; the rinsate was collected for the equipment blank samples. One blank sample, an equipment blank collected during the spring event (EB01-07252024), had detections for multiple analytes. All remaining field blank and equipment blank results were non-detect. Table 7 lists all blank samples collected during the spring and fall 2024 sampling events.

4.2.3 Field Duplicates Summary

Ten pairs of field duplicates were collected during both the spring and fall 2024 sampling events for a total of 20 field duplicate pairs. The field duplicate pairs are listed in Table 8.

The following data assessments were made based on field duplicate considerations:

- <u>SDG 320-114280-1</u>: The RPD for PFPeA between parent sample 24-19PS-MW02A-0728 and field duplicate 24-DUP01-0728 was 99%, exceeding the criteria of 30%. However, the parent sample was non-detect and the field duplicate was less than the laboratory's LOQ; therefore, no qualifications were warranted.

- SDG 320-114960-1: The RPD for FOSA between parent sample 24-HCMW02WT-0724 and field duplicate 24-DUP01-0724 was 45.4%, exceeding the criteria of 30%. However, the parent sample was non-detect and the field duplicate was less than the laboratory's LOQ; therefore, no qualifications were warranted.
- SDG 320-115197-1: The RPD for FOSA between parent sample 24-02MW11-0907 and field duplicate 24-DUP01-0907 was 130.7%, exceeding the criteria of 30%. However, the duplicate sample was non-detect and the parent sample was less than the laboratory's LOQ; therefore, no qualifications were warranted.
- SDG 320-115197-1: The RPD for PFOA between parent sample 24-20PS-MW15-0906 and field duplicate 24-DUP01-0906 was 31.9%, exceeding the criteria of 30%. As a result, both samples were qualified QN for PFOA.
    - The RPD for PFNA in this parent sample and field duplicate pair was 31.6%, exceeding the criteria of 30%. As both sample concentrations were less than the laboratory's LOQ, no validation qualifications were warranted.
- SDG 320-115187-1: The RPD for PFBS between parent sample 24-USAP-1-0908 and 24-DUP02-0908 was 53.5%, exceeding the criteria of 30%. As a result, both samples were qualified QN for PFBS.

Non-detect results were reported by the laboratory at the detection limit; therefore, the detection limit was utilized in the lab duplicate RPD calculation. The remaining field duplicate criteria were met.

4.3 Data Quality Indicators

Achievement of the data quality objectives (DQOs) was determined in part by the use of data quality indicators (DQIs). The DQIs for measurement data are expressed in terms of what are collectively referred to as the precision, accuracy, representativeness, comparability, completeness, and sensitivity (PARCCS) parameters. The DQIs provide a mechanism for ongoing control to evaluate and measure data quality throughout the project.

DQOs are achieved by using approved sampling procedures and analytical methodologies. By following the procedures described in the UFP-QAPP (North Wind/EA, 2024) for this sampling event and future sampling events, sample analysis should yield results representative of environmental conditions at the time of sampling. Similarly, reasonable comparability of analytical results for this and future sampling events can be achieved if approved analytical methods and standardized reporting units are employed during each sampling event.

These criteria are defined in the sections below.

4.3.1 Precision

Precision is the measurement of the ability to obtain the same value on re-analysis of a sample through the entire analytical process. The closer the measurement results, the greater the precision. Precision has nothing to do with accuracy or true values of the sample. Instead, it is focused on random errors inherent in the analysis that stem from the measurement process and are compounded by the non-homogeneous nature of some samples. Precision is measured by analyzing two portions of the sample (sample and duplicate) and then comparing the results. This comparison can be expressed in terms of RPD, which is calculated as the absolute difference between the two measurements divided by the average of the two measurements, as shown in the formula below:

$$RPD = \left(\frac{(A - B)}{\frac{A + B}{2}}\right) x\ 100$$

A condition with this formula is that it depends on the average of the two measurements, and the magnitude of the calculated RPD is intimately linked to the magnitude of the results. When sample results are close to the reporting limit (RL), the RPD is greater but does not necessarily indicate that the precision is out of control limits, just that the sample concentrations are low.

RPD as a measure of precision works well in those cases where the same level of analyte is present in the sample and duplicate; however, it does not work well as a quantitative tool when varying levels are present. When both results were ≥RL, the RPD criteria were utilized. Professional judgment was utilized for evaluating the differences between sample results that were close to the RL. Sample results are qualified if the RPD is outside of criteria or due to professional judgment.

Because of the limitations with the use of RPDs for field duplicate precision evaluation, precision is also calculated on spiked samples, either on a MS/MSD pair or on a LCS and LCSD pair. For spike samples, a known concentration of analyte has been added to each sample, and evaluations of RPD can be made that are more applicable to variations in environmental measurements. The drawback is that the precision measurement is applicable only to the particular spike level used.

For the groundwater samples, precision was evaluated by reviewing RPD results for MS/MSDs, LCS/LCSDs, and field duplicates. Laboratory RPD control limits are presented in the UFP-QAPP (North Wind/EA, 2024) or are laboratory specific. For laboratory duplicates, the laboratory specific RPD was used. The RPD criterion for PFAS is 30%.

Based on the laboratory and/or field duplicate precision criteria during the validation process, qualifiers were applied to applicable sample results and are presented in Appendix E.

4.3.2 Accuracy

Accuracy is a concept from quantitative analysis that attempts to address the question of how close the analytical result is to the true value of the analyte in the sample. Accuracy is determined through a spike procedure, where a known amount of the target analyte is added to a portion of the sample and then the sample and the spiked sample are analyzed. The quantitative measure of accuracy is the percent recovery (%R), calculated as follows:

$$\%\boldsymbol{R} = \left(\frac{(\boldsymbol{Total\ Analyte\ Found - Analyte\ Originally\ Present}}{\boldsymbol{Analyte\ Added}}\right) \boldsymbol{x\ 100}$$

Each measurement performed on a sample is subject to random and systematic error. Accuracy is related to the systematic error. Attempts to assess systematic error are always complicated by the inherent random error of the measurement.

Analytical accuracy for the entire data collection activity is difficult to assess because several sources of error exist. Errors can be introduced by any of the following:

- Sampling procedure,
- Field contamination,
- Sample preservation and handling,

- Sample matrix,
- Sample preparation, and/or
- Analytical techniques.

Accuracy is maintained to the extent possible by adhering to the approved field and analytical standard operating procedures.

The following QC measures are used to assess laboratory accuracy:

- Calibrations: The objective of the ICAL is to ensure that the instrument is capable of producing acceptable qualitative and quantitative data. The ICAL demonstrates that the instrument is capable of acceptable performance prior to sample analysis and of producing an acceptable calibration curve. Continuing calibrations demonstrate that the ICAL is still valid by checking the performance of the instrument on a continuing basis.

- EIS (i.e., Surrogate or Isotope Dilution Standard): EIS recovery is a QC measure for isotope dilution. EIS compounds are added to every sample at the beginning of the sample preparation to monitor the success of the sample preparation and analytical procedures on an individual sample basis. Ideally, each target analyte would have a corresponding synthetic isotope used as the EIS. However, PFAS standards are not currently available for each compound. For target analytes that do not have a synthetic isotope, EIS are selected based on their ability to mimic the behavior of the target analyte. The EIS factors into the calculation of the target analyte result. Thus, the recovery of the EIS corrects the final result.

- NIS (i.e., Isotope Performance Standard or Recovery Standard): NIS measure the instrument sensitivity and response stability during each analysis.

- LCS and LCSD: LCSs consist of a portion of analyte-free water spiked with target analytes at a known concentration. The recovery demonstrates the performance of the analytical approach free of matrix interferences.

- MS and MSD: MSs are an aliquot of a field sample that has been fortified (spiked) with a known amount of the target analytes before being processed in an identical manner as is required for the unspiked version of the same field sample. The MS recovery is used to evaluate the effects of the sample matrix on the accuracy of the method. It is calculated by subtracting the unspiked sample result (i.e., background) from the spiked sample results and then dividing by the known spike amount. The final value is converted to a percentage (i.e., %R = ([MS Result-Sample Result]/Spike added)*100). The recovery demonstrates the performance of the analytical approach on the sample matrix.

For the groundwater samples, accuracy was evaluated by reviewing the ICAL coefficient of regression (r^2 value) and/or the relative response factors; continuing calibration percent difference or percent drift [%D]; and EIS, NIS, LCS/LCSD, and MS/MSD recovery. These QC results assist in identifying the type and magnitude of effects that may have contributed to system error introduced from laboratory procedures or matrix affects.

Sample preservation, handling, and holding times are additional measures of data accuracy. Holding times are defined as the amount of time that elapses from collection of the sample in the field to the sample preparation and from the sample preparation to the analysis. Preservation is defined as the technique used to maintain the target analyte at a concentration representative of the source sampled.

In summary, sample results that have been qualified as estimated (“J, QH, QL, QN”) due to accuracy criteria are usable for project decisions.

4.3.3 Representativeness

Representativeness is a qualitative term that expresses the degree to which the sample data accurately and precisely represent the environmental conditions corresponding to the location and depth interval of sample collection. Requirements and procedures for sample collection are designed to maximize sample representativeness. Representativeness also can be monitored by reviewing field documentation and/or performing field audits. For this report, a detailed review was performed on the chain-of-custody forms, laboratory sample confirmation logs, and data validation packages.

For spring 2024, representativeness has been achieved by the performed field work and laboratory analyses. There were 23 (0.64%) of the total 3,601 sample data points qualified as rejected (‘R’) and are unusable for project decisions. As a result, the remaining 99.36% of data points collected are considered to represent environmental conditions accurately and precisely as they existed during the spring 2024 event. These data points are considered usable for project decisions.

For fall 2024, representativeness has been achieved by the performed field work and laboratory analyses. There were 37 (1.02%) of the total 3,644 sample data points qualified as rejected (‘R’) and are unusable for project decisions. As a result, the remaining 98.98% of data points collected are considered to represent environmental conditions accurately and precisely as they existed during the fall 2024 event. These data points are considered usable for project decisions.

4.3.4 Comparability

Comparability is a qualitative term that expresses the confidence with which a data set can be compared with another. Strict adherence to standard sample collection procedures, analytical detection limits, reporting units, and analytical methods ensures that data from like samples and sample conditions are comparable. This comparability is independent of laboratory personnel, data reviewers, or sampling personnel. Comparability criteria are met for the project if, based on data review, the sample collection and analytical procedures are determined to have been followed, or defined to show that variations did not affect the values reported.

To ensure comparability of data generated for the site, North Wind/EA utilized standard sample collection procedures. Approved analytical methods were performed by Eurofins. Similar methods and concentration levels to those used for previous sampling events also allow for comparable data. Utilizing such procedures and methods enables the current data to be comparable with previous and future data sets generated.

4.3.5 Completeness

Data completeness is a measure of the amount of valid data obtained using a measurement system. In order to satisfy the project objectives, assessments may include both sampling completeness and analytical completeness.

- Sampling completeness is a measure of the number of valid samples collected and compared against the amount of samples expected to be collected under normal conditions, as presented in the UFP-QAPP. While it is expected that 100% of the planned sampling points will be collected, unforeseen field complications may occur (i.e., a dry well, physical obstruction, biological hazards, etc.). As a result, a standard field sampling completeness goal of 90% has been set for this project. The sampling completeness is defined as:

$$Sampling\ \%\ Completeness = \frac{Valid\ Samples\ Collected}{Expected\ Samples\ (QAPP)}\ x\ 100$$

For the purposes of this equation, a "valid" sample is one that was obtained following the methods and SOPs put forth in the UFP-QAPP and its subsequent updates. Appropriate corrective actions may be implemented, as necessary, to compensate for sampling deviations that may result in a lower-than-expected quantity of valid samples collected to ensure that the DQOs are met.

- Analytical completeness is a measure of the amount of valid laboratory data obtained compared to the amount expected to be obtained. While it is expected that 100% of the planned analytical data will be deemed usable, quality assurance and/or QC failures often result in data exclusion (as noted in Section 3.2.1). As a result, a standard analytical completes goal of 90% has been set for this project. The analytical completeness is defined as:

$$Analytical\ \%\ Completeness = \frac{Valid\ Analytical\ Data}{Expected\ Analytical\ Data}\ x\ 100$$

For the purposes of this equation, "valid" analytical data include both data that pass all the QC criteria (unqualified data) and data that may not pass all the QC criteria but had appropriate corrective actions taken (qualified but usable data).

For the spring 2024 sampling event, a sampling completeness of 97.5% was achieved (78 of the 80 planned monitoring wells). Two monitoring wells (20PS-MW14 and 20PS-MW27) were unable to be sampled during the spring 2024 event due to flooding (see Section 2.1). The analytical completeness achieved for acceptable data was 99.36% of the non-blank groundwater sample results for the number of measurements judged to be valid versus the total number of measurements made for all non-blank samples analyzed. There were 23 non-blank sample data points (0.64% of the total) rejected ('R') and are unusable for project decisions. The remaining 3,578 non-blank data points (99.36% of the total) are considered usable for project decisions.

For the fall 2024 sampling event, a sampling completeness of 100.0% was achieved (80 of the 80 planned monitoring wells). The analytical completeness achieved for acceptable data was 98.98% of the non-blank groundwater sample results for the number of measurements judged to be valid versus the total number of measurements made for all non-blank samples analyzed. There were 37 non-blank sample data points (1.02% of the total) rejected ('R') and are unusable for project decisions. The remaining 3,607 non-blank data points (98.98 of the total) are considered usable for project decisions.

4.3.6 Sensitivity

Sensitivity is related to the ability to compare analytical results with project-specific levels of interest (i.e., risk-based screening levels or action levels). Analytical detection limits for the various sample analytes should be below the level of interest to allow an effective comparison.

4.4 Blank Contamination

Blanks are used to determine the level of laboratory and field contamination introduced into the samples, independent of the level of target analytes found in the sample source. Sources of sample contamination can include the following:

- Containers and equipment used to collect the sample,
- Preservatives added to the sample,
- Cross contamination from other samples in transport coolers and sample storage refrigerators,
- Standards used to calibrate instruments,
- Glassware and reagents used to prepare samples for analysis,
- Airborne contamination in the laboratory preparation area, and
- Analytical instrument sample introduction equipment.

Each analyte group has its own particular suite of common laboratory contaminants. Active measures must be performed to continually measure the ambient contamination levels and steps taken to discover the source of the contamination and to eliminate or minimize the levels. Random spot contamination can also occur from analytes that are not common laboratory problems but that can arise as a problem for a specific project or over a short period of time. Field blanks, equipment blanks, and laboratory method blanks were analyzed to identify possible sources of contamination.

The data validation reports (Appendix E) discuss the specific results that were qualified as estimated high "B" based on blank contamination.

4.5 Evaluation of Quantitation Limits

The DL is the smallest analyte concentration that can be demonstrated to be different from zero or a blank concentration with 99% confidence. At the DL, the false positive rate (Type I error) is 1%. A DL may be used as the lowest concentration for reliably reporting a detection of a specific analyte in a specific matrix with a specific method with 99% confidence.

The LOD is the smallest concentration of a substance that must be present in a sample in order to be detected at the DL with 99% confidence. At the LOD, the false negative rate (Type II error) is 1%. A LOD may be used as the lowest concentration for reliably reporting a non-detect of a specific analyte in a specific matrix with a specific method with 99% confidence. The LOD must be two to four times the DL.

The LOQ is the smallest concentration that produces a quantitative result with known and recorded precision and bias. The LOQ is set at or above the concentration of the lowest ICAL standard and within the calibration range. The LOQ must be greater than the LOD.

Laboratory results are reported according to rules that provide an established certainty for each limit. The result for an analyte is flagged with a "U" if that analyte was not detected and is reported as less than the LOD. If an analyte is present at a concentration between the DL and the LOQ, the analytical result is flagged with a "J," indicating an estimated quantity. Qualifying the result as an estimated concentration reflects increased uncertainty in the reported value. These qualifiers were applied to sample results by the laboratory and during the validation process.

5.0 WASTE MANAGEMENT

During the 2024 spring and fall sampling events, the management and disposal of IDW followed the UFP-QAPP guidelines (North Wind/EA, 2024). During the spring 2024 sampling event, approximately 200 gallons of IDW was containerized into four 55-gallon Department of Transportation (DOT) approved containers and transported to the Eielson AFB LF003 Holding Cell #2 pending treatment at the PFAS

Wastewater Treatment System (PWTS) located at the Hazardous Waste Facility (HWF) at Eielson AFB. On August 23, 2024, the IDW from the spring 2024 sampling event was treated at the PWTS and discharged to the drainage swale located directly south of the HWF once the analytical data confirmed that the effluent limits in the Alaska Pollutant Discharge Elimination System permit were achieved. During the fall 2024 sampling event, approximately 150 gallons of IDW was containerized into four 55-gallon DOT approved containers and transported to the Eielson AFB LF003 Holding Cell #2. The IDW collected from the fall 2024 sampling event is temporarily being stored at LF003 Holding Cell #2 until spring 2025 and will then be transferred to the PWTS for treatment.

6.0 TREND EVALUATION

MAROS (version 3.0) and ProUCL (version 5.2) software were used to evaluate the site groundwater concentration trends. The MAROS software was developed by GSI Environmental Inc. on behalf of the Air Force Center for Engineering and the Environment as a data management and evaluation tool specifically designed to improve long-term groundwater monitoring programs (AFCEE, 2012). The software includes several statistical modules that allow a determination of overall plume trends, center of mass, trends at individual wells, and the determination of suggested modifications to long-term monitoring programs. MAROS also includes a linear regression trend analysis as well as the nonparametric Mann-Kendall statistical method, which will be the primary statistical tool used to determine trend status. ProUCL is a statistical software that was developed by the EPA for the analysis of environmental data sets with and without non-detect data. The software also includes a Trend Analysis option of the Statistical Test module. The trend module performs Mann-Kendall tests with Theil-Sen to analyze data collected over time for consistently increasing or decreasing trends (EPA, 2022).

Statistical analyses were performed in accordance with approved UFP-QAPP (North Wind/EA, 2024). A given PFAS constituent was only evaluated if it exceeded or has historically exceeded the applicable MCLs anywhere in the monitoring well network. Exceedances of PFHxS, PFNA, PFOA, and PFOS have been detected at concentration exceeding applicable MCLs in the monitoring well network, and thus were selected for statistical evaluation.

6.1 Trend Analyses

Due to software limitations, only shallow wells near the top of the water table (less than 50 feet bgs or shallowest available resulting from a clustered monitoring well series) were evaluated using MAROS. MAROS does not include PFOA, PFOS, PFNA, and PFHxS in the pre-set list of constituents within MAROS. Therefore, the MAROS source files were modified by inserting the Environmental Resources Program Information Management System name and ID number for each analyte prior to modeling. Trend analyses for the intermediate and deeper wells were evaluated using ProUCL.

In MAROS, the individual well trend analysis module and plume analysis module provide results of the Mann-Kendall trend analyses. For trend evaluation, non-detect sample points were set equal to the LOD, trace or “J” flag data were used as estimated by the laboratory, and the maximum concentrations were used for duplicate values. The plume module completes spatial analyses providing the overall plume mass (Zeroth Moment), coordinates of the center of mass coordinates (First Moment), and square feet of the plume area (Second Moment). After conducting the spatial analyses, Mann-Kendall trends are then calculated for each of these parameters.

The output of the Mann-Kendall test is the S-statistic. Positive and negative S-statistics are indicators of increasing and decreasing concentration trends, respectively. To differentiate whether a trend finding from the S-statistic is statistically significant, a decision matrix based on the S-statistic, the confidence in the trend, and the coefficient of variation (COV) is used. The confidence level, expressed as a percentage, is calculated by subtracting the probability (p) from 1 (e.g., confidence = [1-p] x 100). The p-value indicates if the association between the response and predictor (analyte concentration versus time) is statistically significant at the given level of confidence. The COV is defined as the standard deviation of the sample set divided by the average of the sample set. The concentration trend indicated by the S-statistic is determined by the following decision matrix:

Table 6-1. Mann-Kendall Analysis Decision Matrix

Mann-Kendall Statistic	Confidence in Trend (%) and COV	Statistical Trend
S > 0	>95%	Increasing
S > 0	90-95%	Probably Increasing
S > 0	<90%	No Trend
S ≤ 0	<90% and COV ≥1	No Trend
S ≤ 0	<90% and COV <1	Stable
S < 0	90-95%	Probably Decreasing
S < 0	>95%	Decreasing

6.2 Datasets

PFOA, PFOS, PFNA, and PFHxS data from sampling events conducted from 2019 through 2024 were used for the evaluation. Although 12 monitoring events at each well could theoretically be possible for this timeframe, that much data were not available for most wells due to groundwater monitoring variability. The groundwater monitoring program for this site has varied over the years, and most of the monitoring wells have only been consistently sampled since June 2022. In addition, the sampling program was changed in 2024 and 11 wells were added to the sampling program.

The distance and general low density of wells between Eielson AFB (e.g., near 20PS-MW08 and 20PS-MW01) and the Off Base area (e.g., 20PS-MW09 and beyond) is a substantial area with no monitoring wells. Rather than have the MAROS program interpolate and estimate concentrations for this area, two discrete MAROS input files were used to evaluate the on-site and off-site shallow groundwater separately. For the purposes of the MAROS evaluation, the shallowest available wells were included in "shallow" groupings to represent water table conditions. The three datasets were as follows:

- **Eielson AFB Shallow Wells (MAROS):** 22 wells located within the Eielson AFB boundary.
- **Off Base Shallow Wells (MAROS)**: 30 wells north and west from 20PS-MW09.
- **Intermediate/Deep Wells (ProUCL):** 28 intermediate and deep wells located throughout the site (both Eielson AFB and Off Base).

The historic data for each grouping were compiled and used as input for the MAROS and ProUCL programs, as applicable. Input files for MAROS and ProUCL are included in Appendix F.

6.3 Results of MAROS and ProUCL Evaluation

The findings of the MAROS and ProUCL evaluations are discussed below by individual well trends (for MAROS and ProUCL) and plume-wide Moment Analysis (for MAROS).

6.3.1 Individual Well Trends

Results of the Mann-Kendall trend analysis for individual wells using data collected between 2019 and 2024 are shown in Table 9. A map of individual well trends is provided in Figure 6. Graphical representations of the distribution of trends across the analytes and datasets are provided in Figure 7 through Figure 9. A summary of the trend distribution is provided in Table 10.

As seen in Figures 7 through 9, many wells did not exhibit a trend, were all non-detect for each constituent analyzed, or had an insufficient number of sampling events to calculate a trend. This, along with inconsistently dispersed increasing and decreasing trends across the site, provides difficulties in interpreting the individual well-analyte trends across the site. However, as seen in Figure 6, there are generally more well-analyte combinations with decreasing/probably decreasing trends on Eielson AFB than Off Base, and more increasing/probably increasing trends Off Base than on Eielson AFB. This supports the plume trend analysis discussed in Section 6.3.2.

Trends along the leading (northwestern) edge of the plume are unclear. While increasing/probably increasing trends for multiple analytes are seen at some wells (20PS-MW17, 20PS-MW19, DSAP-10, and DSAP-14), decreasing/probably decreasing trends for multiple analytes are seen at others (20PS-MW20, 20PS-MW30, DSAP-8D). Stable trends for multiple analytes are seen at well DSAP-11, while multiple analytes at wells DSAP-8S and DSAP-13 along the leading edge had no trend.

Notable trends on Eielson AFB were seen at several well clusters. See Table 9 and Figure 6 for details on the trends summarized below.

- At the MW1 well cluster, trends were decreasing/probably decreasing for all constituents at MW1-50 and decreasing for all constituents at MW-150, except for PFNA, which was increasing. However, at MW-100, PFHxS and PFOA were increasing.

- At the MW2 well cluster, trends were stable, decreasing/probably decreasing, or had no trend at MW2-50, MW2-100, and MW2-150 for most constituents. However, at MW2-100, PFNA had an increasing trend.

- At well clusters HCMW01, HCMW02, and HCMW03, most analytes were stable, non-detect, or had no trend for the shallow and deep wells. However, most analytes were increasing or probably increasing at the intermediate depth wells.

These trends indicate that contamination may be spreading vertically to the intermediate depths.

Additional increasing trends for multiple analytes at Eielson AFB wells were observed at 02MW11, 20PS-MW06, 20PS-MW07, 20PS-MW08, HCMW01MD, HCMW02MD, and HCMW03MD. Additional decreasing trends for multiple analytes at Eielson AFB wells were observed at MW-2, HCMW06WT, MW-BKG-09, HCMW05MD, and HCMW05DP. Notably, while PFNA only exceeded the MCL in one sample in 2024, trends were increasing/probably increasing at 15 locations across the monitoring well network. See Table 9 and Figure 6 for trend details.

The trend analysis results and graphs of select background and leading-edge wells are provided in Appendix G. Although the new North Pole well clusters (NPB, NPC, etc.) are leading-edge wells, they do not currently have enough sampling events for trend analysis. A minimum of four data points is required to perform a Mann-Kendall trend analysis. The graphs of these wells will be included in the 2025 report, when there will be 5 sets of data. Note that the statistical power of the trends will continue to increase as more data are collected.

6.3.2 Plume Mass and Trend Analysis

The Plume Analysis module of MAROS was used to calculate plume mass (zeroth moment), center of mass (first moment), and plume spread (second and third moment) within the monitoring network for PFHxS, PFNA, PFOS, and PFOA (Table 11). Detailed results of the analysis, including the mass estimates, are provided in Appendix H. The analysis was performed twice – once using a plume thickness of 25 feet, and once using a plume thickness of 50 feet. Although the total dissolved mass estimates were larger for the 50 feet thickness, the trends did not change.

At Eielson AFB, the trends for the total dissolved mass and center of mass are stable or have no trend for most analytes, except for the total dissolved mass of PFNA, which is increasing. However, the trends for the lateral and downgradient spread of the plume (Second Moment X and Second Moment Y, respectively) are increasing for all analytes.

Off Base, the trends for total dissolved mass, center of mass, and lateral and downgradient spread of the plume are increasing or probably increasing for all analytes.

These trends indicate that the plume is continuing to spread downgradient and laterally towards the North Pole vicinity. However, the trends Off Base are likely influenced by the addition of the new North Pole wells (NPB-20, NPC-20, etc.). Confidence in the Off Base plume trends will increase as additional data are gathered. Ideally, the data analyzed should be collected from the same timeframe. Thus, once 6 to 10 sets of data have been collected from the new wells, it may be useful to revise the timeframe of the entire plume analysis to 2023 to present (eliminating the spatial increase caused by the addition of wells in 2023).

It is recommended that the sampling network and frequency be maintained without changes for at least three years to collect sufficient data to support a strong plume trend analysis. 20PS-MW04 may replace HCMW05DP with minimal disruption to the plume analysis, as 20PS-MW04 was formerly included in the plume analysis and will only be missing two sample events, while HCMW05DP is not included in the plume analysis as it is a deep well.

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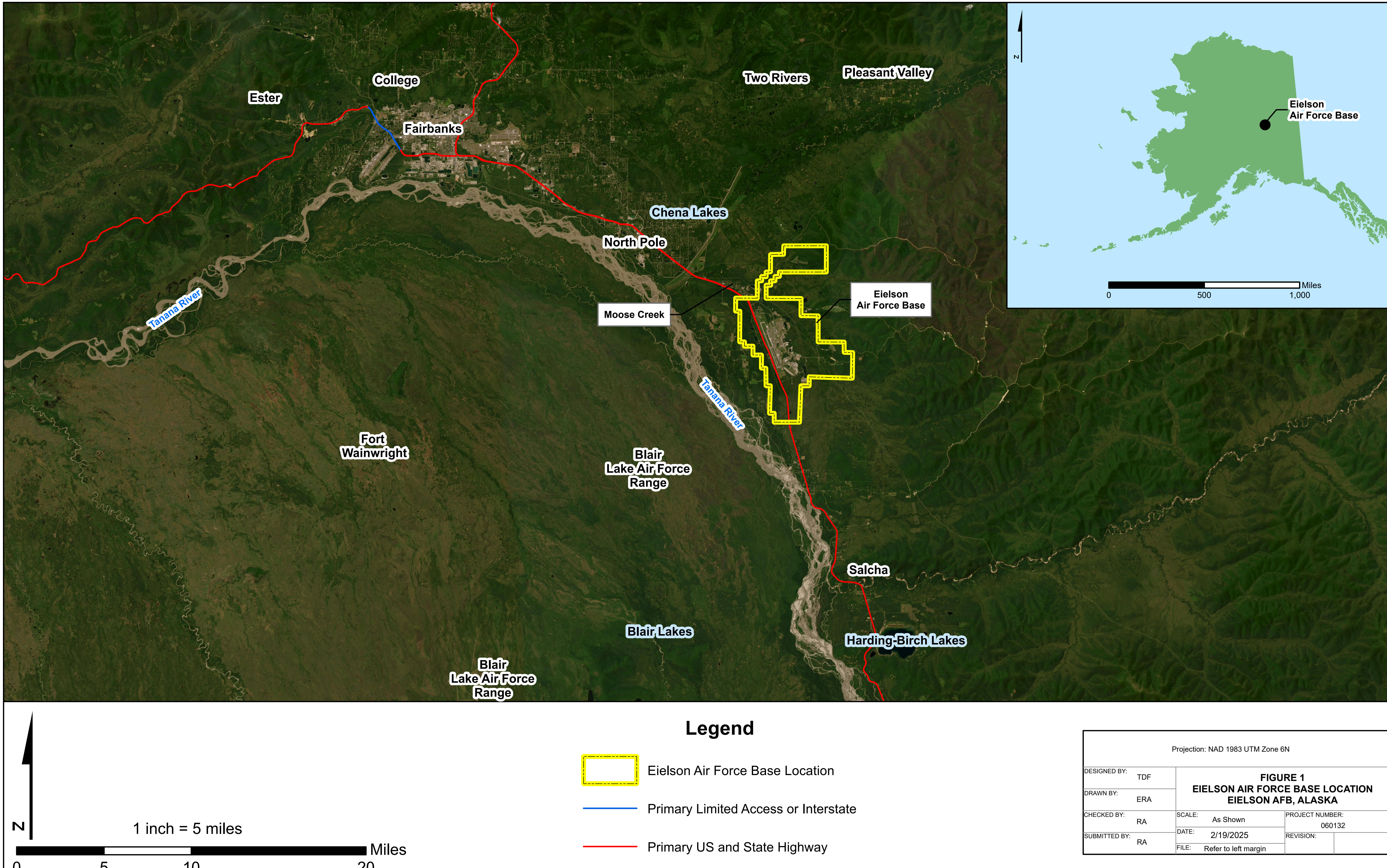
FIGURES



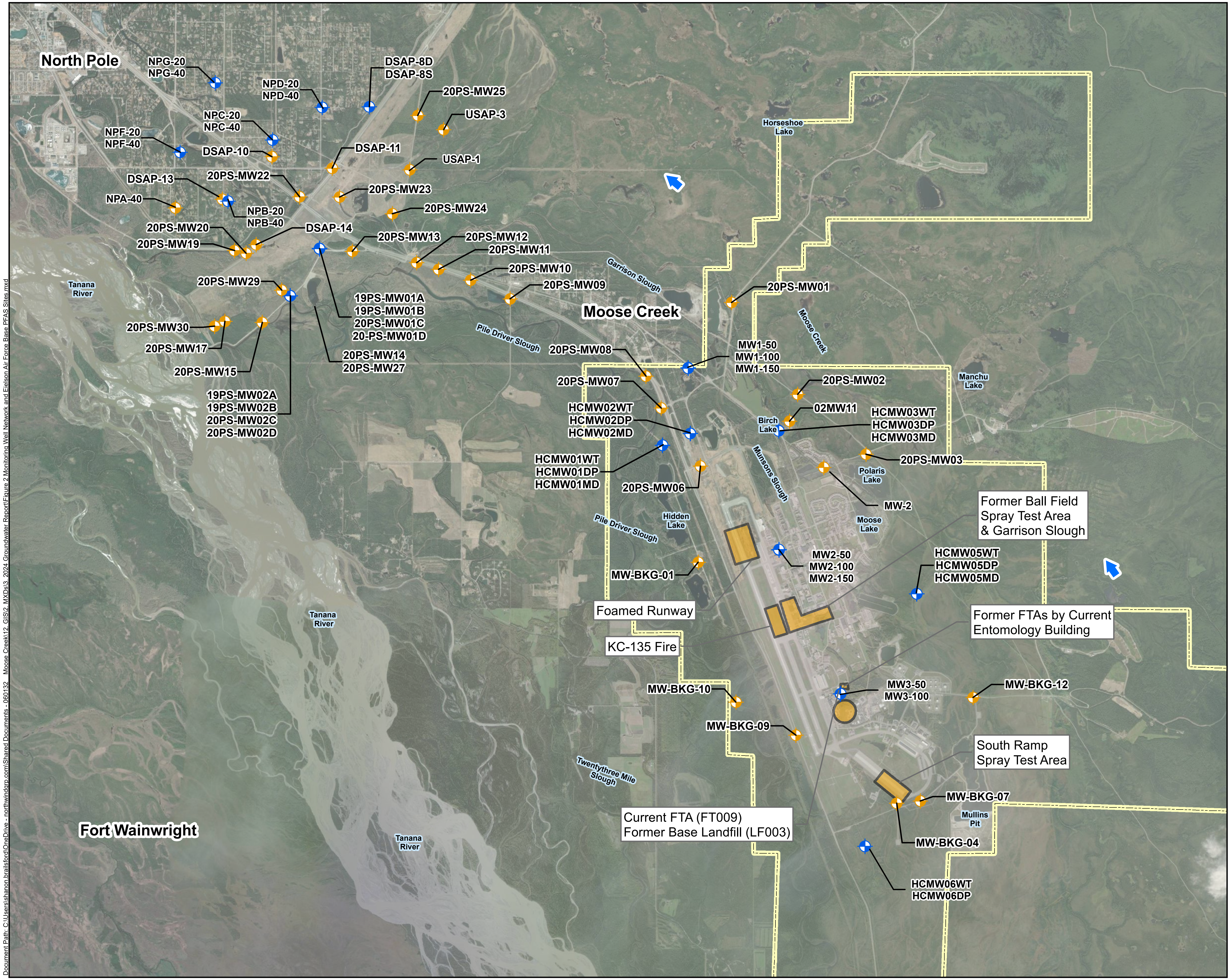
Legend

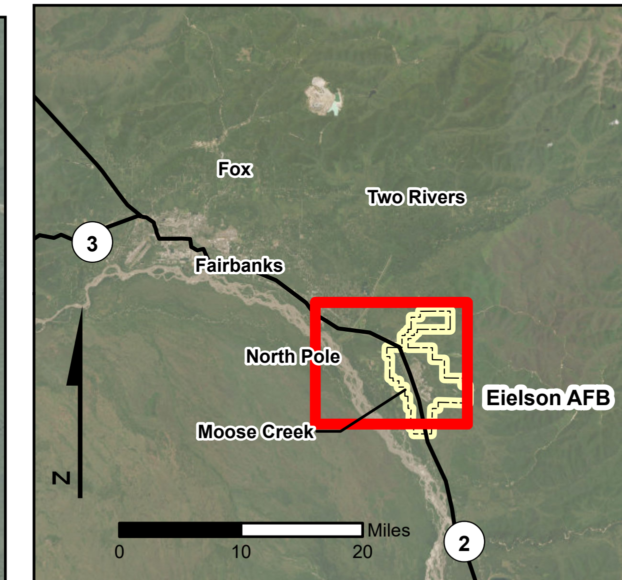
- Eielson Air Force Base Location
- Primary Limited Access or Interstate
- Primary US and State Highway

Projection: NAD 1983 UTM Zone 6N

DESIGNED BY: TDF	FIGURE 1 EIELSON AIR FORCE BASE LOCATION EIELSON AFB, ALASKA		
DRAWN BY: ERA			
CHECKED BY: RA	SCALE: As Shown	PROJECT NUMBER: 060132	
SUBMITTED BY: RA	DATE: 2/19/2025 FILE: Refer to left margin	REVISION:	

Document Path: C:\Users\shanon.brailsford\OneDrive - northwindgrp.com\Shared Documents - 060132 _ Moose Creek\12. GIS\2. MXDs\3. 2024 Groundwater Report\Figure 1 Site Location Eielson-Moose Creek.mxd





Legend

- Clustered Wells
- Shallow Well
- Eielson AFB PFAS Sites
- Eielson Air Force Base Location
- Approximate Groundwater Flow

Note
20PS-MW14 and 20PS-MW27 were not sampled during the spring 2024 sampling event due to flooding.

N W E S

1 inch = 5,000 feet

0 2,600 5,200 7,800 10,400 Feet

Service Layer Credits: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

PREPARED FOR EIELSON AIR FORCE BASE, ALASKA			
Projection: NAD 1983 UTM Zone 6N			
DESIGNED BY: TDF	**Figure 2 Monitoring Well Network and Eielson Air Force Base PFAS Sites Eielson AFB, Alaska**		
DRAWN BY: ERA			
CHECKED BY: RA	SCALE: As Shown	PROJECT NUMBER: 060132	
SUBMITTED BY: RA	DATE: 6/26/2025	REVISION:	
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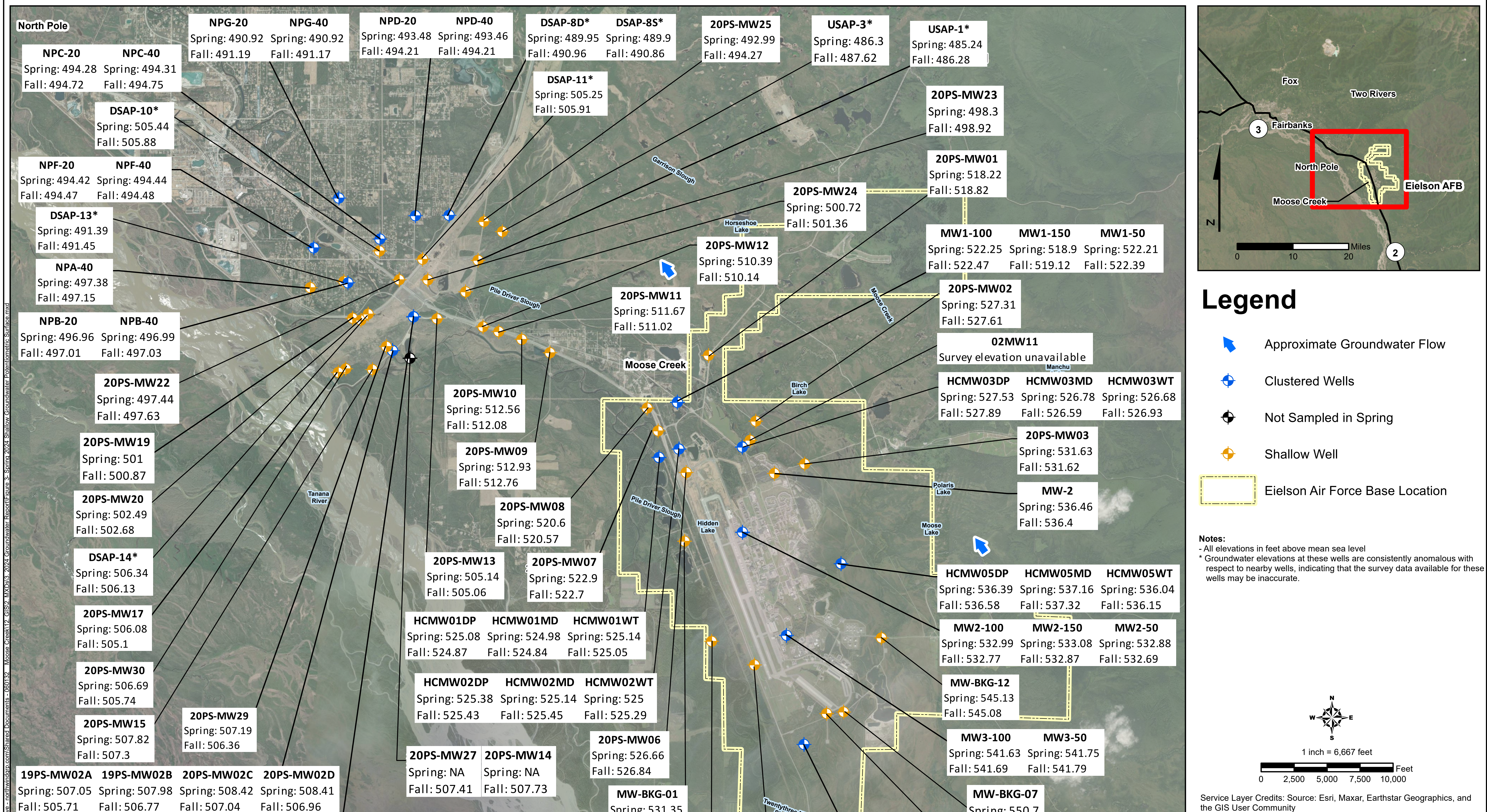

PREPARED FOR EIELSON AIR FORCE BASE, ALASKA

Projection: NAD 1983 UTM Zone 6N

DESIGNED BY: TDF	Figure 3 2024 Groundwater Elevations Eielson AFB, Alaska		
DRAWN BY: SJB			
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SUBMITTED BY: RA	DATE: 2/20/2025	REVISION:	
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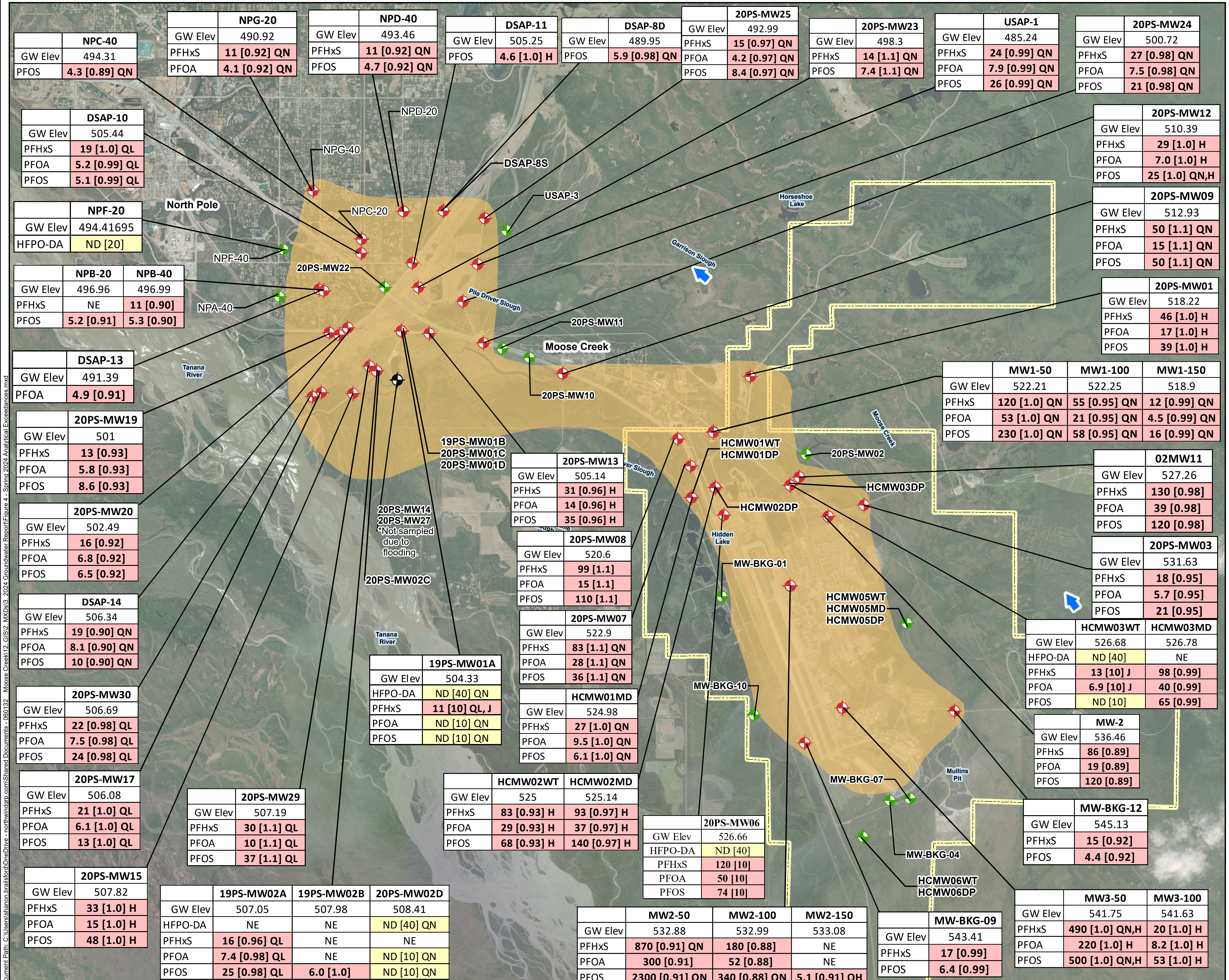


	NPC-40
GW Elev	494.31
PFOS	4.3 [0.89] QN

	NPG-20
GW Elev	490.92
PFHxS	11 [0.92] QN
PFOA	4.1 [0.92] QN

	NPD-40
GW Elev	493.46
PFHxS	11 [0.92] QN
PFOS	4.7 [0.92] QN

	DSAP-11
GW Elev	505.25
PFOS	4.6 [1.0] H

	DSAP-8D
GW Elev	489.95
PFOS	5.9 [0.98] QN

	20PS-MW25
GW Elev	492.99
PFHxS	15 [0.97] QN
PFOA	4.2 [0.97] QN
PFOS	8.4 [0.97] QN

	20PS-MW23
GW Elev	498.3
PFHxS	14 [1.1] QN
PFOS	7.4 [1.1] QN

	USAP-1
GW Elev	485.24
PFHxS	24 [0.99] QN
PFOA	7.9 [0.99] QN
PFOS	26 [0.99] QN

	20PS-MW24
GW Elev	500.72
PFHxS	27 [0.98] QN
PFOA	7.5 [0.98] QN
PFOS	21 [0.98] QN

	DSAP-10
GW Elev	505.44
PFHxS	19 [1.0] QL
PFOA	5.2 [0.99] QL
PFOS	5.1 [0.99] QL

	NPF-20
GW Elev	494.41695
HFPO-DA	ND [20]

	NPB-20	NPB-40
GW Elev	496.96	496.99
PFHxS	NE	11 [0.90]
PFOS	5.2 [0.91]	5.3 [0.90]

	DSAP-13
GW Elev	491.39
PFOA	4.9 [0.91]

	20PS-MW19
GW Elev	501
PFHxS	13 [0.93]
PFOA	5.8 [0.93]
PFOS	8.6 [0.93]

	20PS-MW20
GW Elev	502.49
PFHxS	16 [0.92]
PFOA	6.8 [0.92]
PFOS	6.5 [0.92]

	DSAP-14
GW Elev	506.34
PFHxS	19 [0.90] QN
PFOA	8.1 [0.90] QN
PFOS	10 [0.90] QN

	20PS-MW30
GW Elev	506.69
PFHxS	22 [0.98] QL
PFOA	7.5 [0.98] QL
PFOS	24 [0.98] QL

	20PS-MW17
GW Elev	506.08
PFHxS	21 [1.0] QL
PFOA	6.1 [1.0] QL
PFOS	13 [1.0] QL

	20PS-MW15
GW Elev	507.82
PFHxS	33 [1.0] H
PFOA	15 [1.0] H
PFOS	48 [1.0] H

	19PS-MW02A	19PS-MW02B	20PS-MW02D
GW Elev	507.05	507.98	508.41
HFPO-DA	NE	NE	ND [40] QN
PFHxS	16 [0.96] QL	NE	NE
PFOA	7.4 [0.98] QL	NE	ND [10] QN
PFOS	25 [0.98] QL	6.0 [1.0]	ND [10] QN

	20PS-MW29
GW Elev	507.19
PFHxS	30 [1.1] QL
PFOA	10 [1.1] QL
PFOS	37 [1.1] QL

	19PS-MW01A
GW Elev	504.33
HFPO-DA	ND [40] QN
PFHxS	11 [10] QL, J
PFOA	ND [10] QN
PFOS	ND [10] QN

	20PS-MW13
GW Elev	505.14
PFHxS	31 [0.96] H
PFOA	14 [0.96] H
PFOS	35 [0.96] H

	20PS-MW08
GW Elev	520.6
PFHxS	99 [1.1]
PFOA	15 [1.1]
PFOS	110 [1.1]

	20PS-MW07
GW Elev	522.9
PFHxS	83 [1.1] QN
PFOA	28 [1.1] QN
PFOS	36 [1.1] QN

	HCMW01MD
GW Elev	524.98
PFHxS	27 [1.0] QN
PFOA	9.5 [1.0] QN
PFOS	6.1 [1.0] QN

	HCMW02WT	HCMW02MD
GW Elev	525	525.14
PFHxS	83 [0.93] H	93 [0.97] H
PFOA	29 [0.93] H	37 [0.97] H
PFOS	68 [0.93] H	140 [0.97] H

	20PS-MW06
GW Elev	526.66
HFPO-DA	ND [40]
PFHxS	120 [10]
PFOA	50 [10]
PFOS	74 [10]

	MW2-50	MW2-100	MW2-150
GW Elev	532.88	532.99	533.08
PFHxS	870 [0.91] QN	180 [0.88]	NE
PFOA	300 [0.91]	52 [0.88]	NE
PFOS	2300 [0.91] QN	340 [0.88] QN	5.1 [0.91] QH

	MW-BKG-09
GW Elev	543.41
PFHxS	17 [0.99]
PFOS	6.4 [0.99]

	MW3-50	MW3-100
GW Elev	541.75	541.63
PFHxS	490 [1.0] QN,H	20 [1.0] H
PFOA	220 [1.0] H	8.2 [1.0] H
PFOS	500 [1.0] QN,H	53 [1.0] H

	MW-BKG-12
GW Elev	545.13
PFHxS	15 [0.92]
PFOS	4.4 [0.92]

	MW-2
GW Elev	536.46
PFHxS	86 [0.89]
PFOA	19 [0.89]
PFOS	120 [0.89]

	HCMW03WT	HCMW03MD
GW Elev	526.68	526.78
HFPO-DA	ND [40]	NE
PFHxS	13 [10] J	98 [0.99]
PFOA	6.9 [10] J	40 [0.99]
PFOS	ND [10]	65 [0.99]

	20PS-MW03
GW Elev	531.63
PFHxS	18 [0.95]
PFOA	5.7 [0.95]
PFOS	21 [0.95]

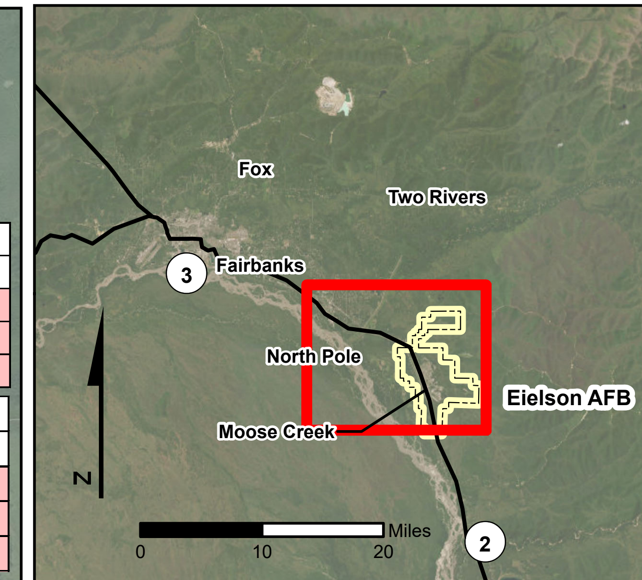
	02MW11
GW Elev	527.26
PFHxS	130 [0.98]
PFOA	39 [0.98]
PFOS	120 [0.98]

	MW1-50	MW1-100	MW1-150
GW Elev	522.21	522.25	518.9
PFHxS	120 [1.0] QN	55 [0.95] QN	12 [0.99] QN
PFOA	53 [1.0] QN	21 [0.95] QN	4.5 [0.99] QN
PFOS	230 [1.0] QN	58 [0.95] QN	16 [0.99] QN

	20PS-MW01
GW Elev	518.22
PFHxS	46 [1.0] H
PFOA	17 [1.0] H
PFOS	39 [1.0] H

	20PS-MW09
GW Elev	512.93
PFHxS	50 [1.1] QN
PFOA	15 [1.1] QN
PFOS	50 [1.1] QN

	20PS-MW12
GW Elev	510.39
PFHxS	29 [1.0] H
PFOA	7.0 [1.0] H
PFOS	25 [1.0] QN,H



Legend

- Approximate Groundwater Flow
- Wells with MCL exceedances
- Wells with no MCL exceedances
- Not Sampled
- Estimated Extent of PFAS Exceeding MCLs
- Eielson Air Force Base Location

Notes:
- Only exceedances of the EPA MCLs and instances where the LOD exceeds the MCL are displayed.
- The average of the hazard index values calculated for the two sampling events is presented in Table 6.
- All analytical concentrations are presented in nanograms per liter.
- All groundwater elevations are presented in feet above mean sea level.
- 20PS-MW06 and 20PS-MW22 are included within the estimated extent of contamination due to concentrations historically seen at these wells.
- The higher value in field duplicate pairs is presented.

H = Estimated value, biased low due to hold time exceedance
J = Estimated value
MCL = maximum contaminant level
ND = non-detect
NE = no MCL exceedance
QH = Estimated value biased high, due to quality control failure
QL = Estimated value biased low, due to quality control failure
QN = Estimated value, due to quality control failure
Red highlight = value exceeds MCL
Yellow highlight = value is ND, but the LOD exceeds the MCL

2024 EPA Final Rule MCLs (ng/L)	
HFPO-DA	10
PFHxS	10
PFOS	4.0
PFOA	4.0
PFNA	10

1 inch = 5,833 feet

0 2,500 5,000 7,500 10,000 Feet

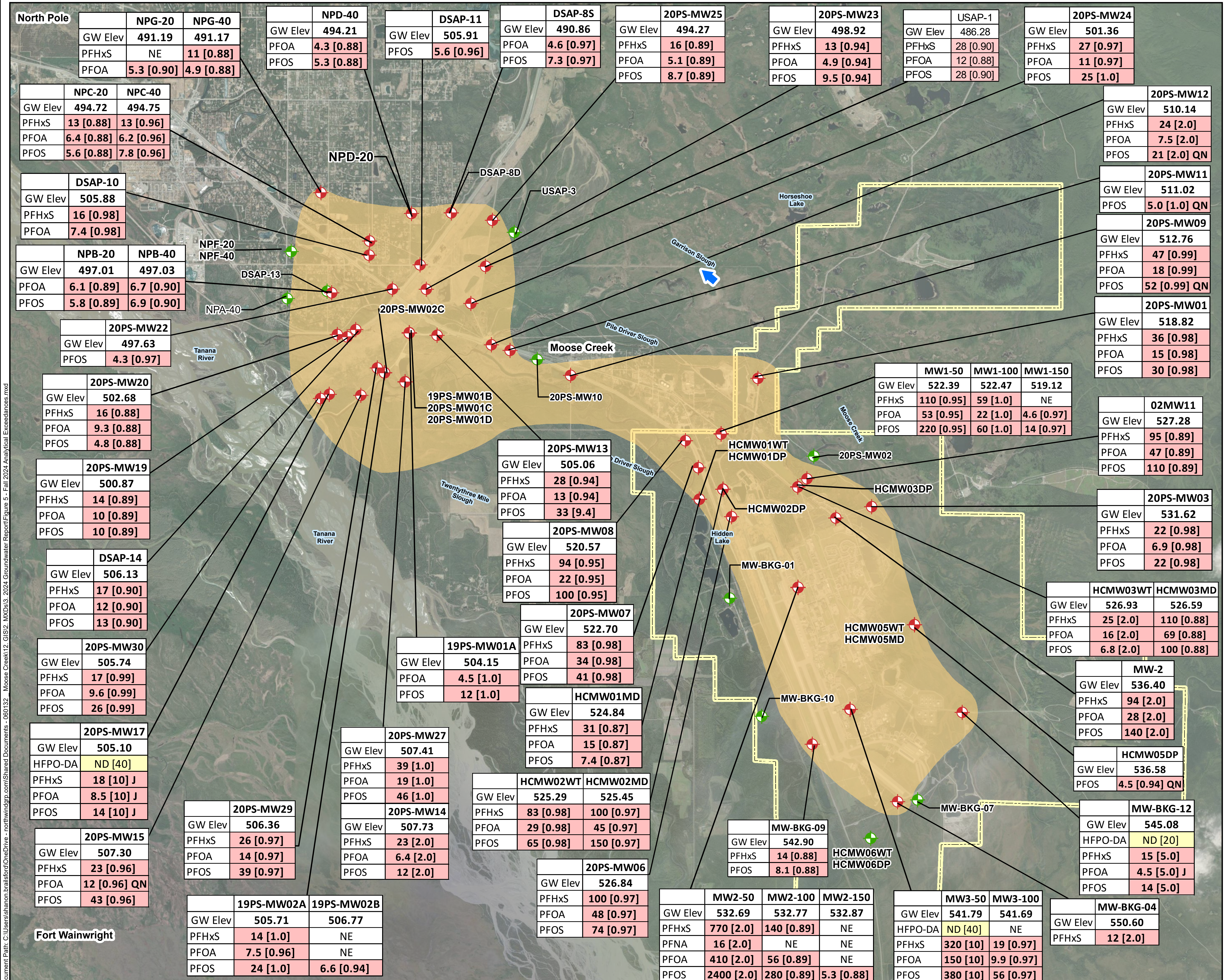
Service Layer Credits: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

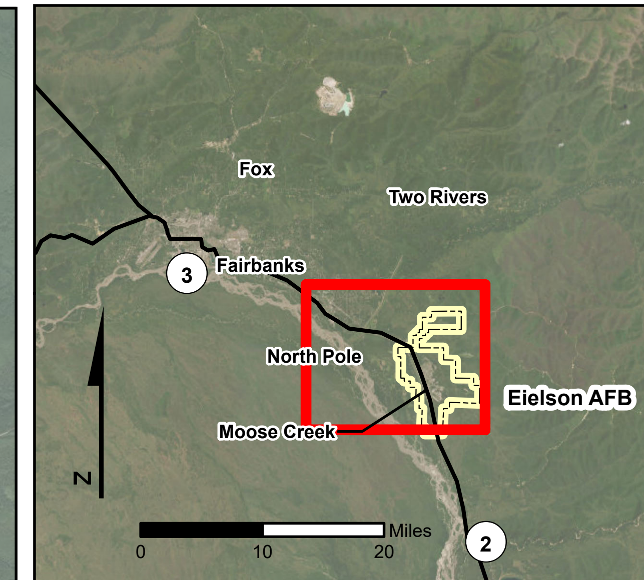
PREPARED FOR EIELSON AIR FORCE BASE, ALASKA

Projection: NAD 1983 UTM Zone 6N

DESIGNED BY:	TDF	Figure 4 Spring 2024 Analytical Exceedances Eielson AFB, Alaska	
DRAWN BY:	SJB		
CHECKED BY:	RA	SCALE: As Shown	PROJECT NUMBER: 060132
SUBMITTED BY:	RA	DATE: 3/20/2025	REVISION:
		FILE: Refer to left margin	

Document Path: C:\Users\shanon.brailsford\OneDrive - northwindgrp.com\Shared Documents - 060132 Moose Creek\12. GIS\2. MXDs\3. 2024 Groundwater Report\Figure 4 - Spring 2024 Analytical Exceedances.mxd





Legend

- Approximate Groundwater Flow
- Wells with MCL exceedances
- Wells with no MCL exceedances
- Estimated Extent of PFAS Exceeding MCLs
- Eielson Air Force Base Location

Notes:
- Only exceedances of the EPA MCLs and instances where the LOD exceeds the MCL are displayed.
- The average of the hazard index values calculated for the two sampling events is presented in Table 6.
- All analytical concentrations are presented in nanograms per liter.
- All groundwater elevations are presented in feet above mean sea level.
-The higher value in field duplicate pairs is presented.

H = Estimated value, biased low due to hold time exceedance
J = Estimated value
MCL = maximum contaminant level
ND = non-detect
NE = No MCL exceedance
QH = Estimated value biased high, due to quality control failure
QL = Estimated value biased low, due to quality control failure
QN = Estimated value, due to quality control failure
Red highlight = value exceeds MCL
Yellow highlight = value is ND, but the LOD exceeds the MCL

2024 EPA Final Rule MCLs (ng/L)	
HFPO-DA	10
PFHxS	10
PFOS	4.0
PFOA	4.0
PFNA	10

1 inch = 5,833 feet

0 2,500 5,000 7,500 10,000 Feet

Service Layer Credits: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

PREPARED FOR EIELSON AIR FORCE BASE, ALASKA

Projection: NAD 1983 UTM Zone 6N

DESIGNED BY: TDF	Figure 5 Fall 2024 Analytical Exceedances Eielson AFB, Alaska		
DRAWN BY: SJB			
CHECKED BY: RA	SCALE: As Shown	PROJECT NUMBER: 060132	
SUBMITTED BY: RA	DATE: 2/19/2025	REVISION:	
	FILE: Refer to left margin		

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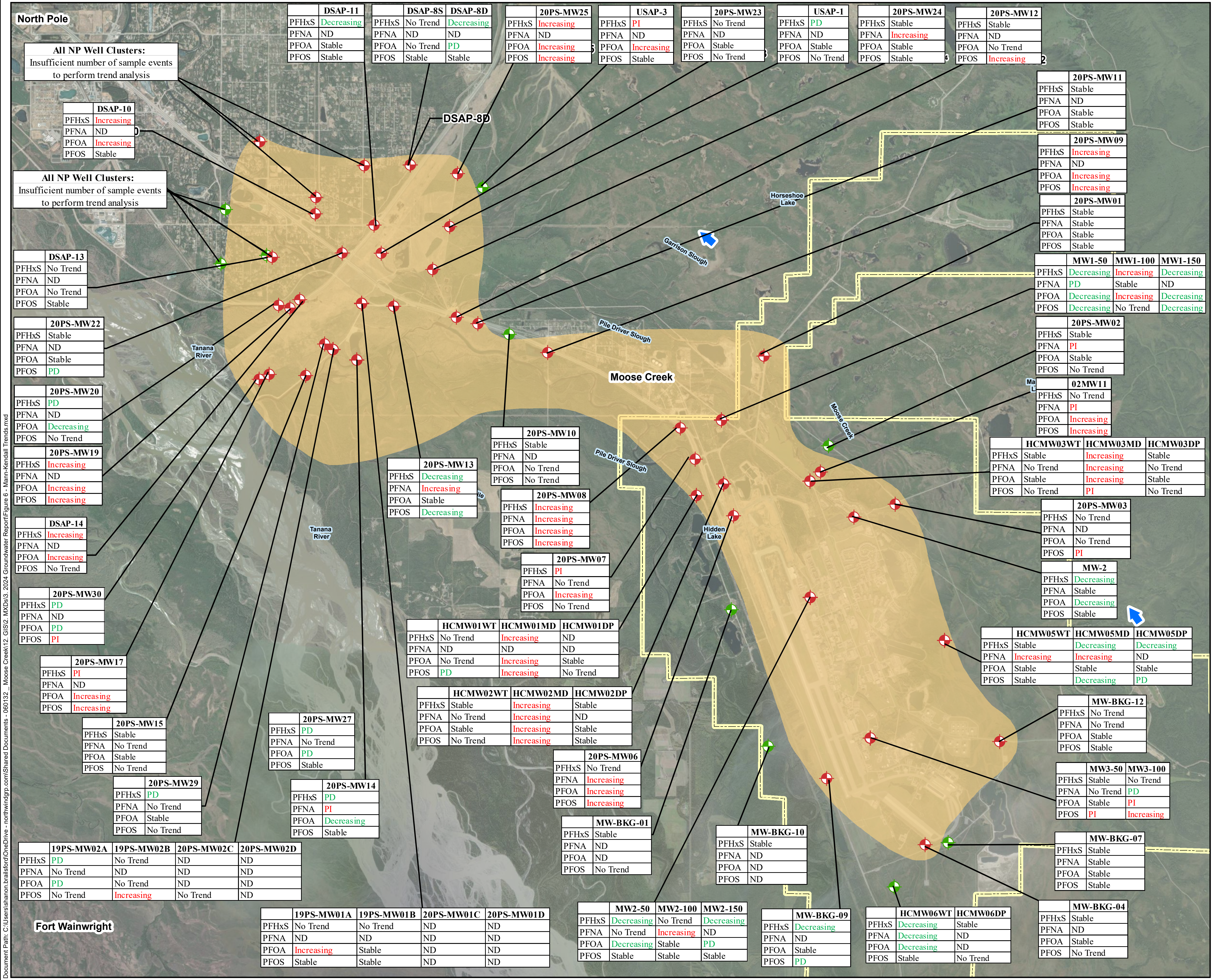

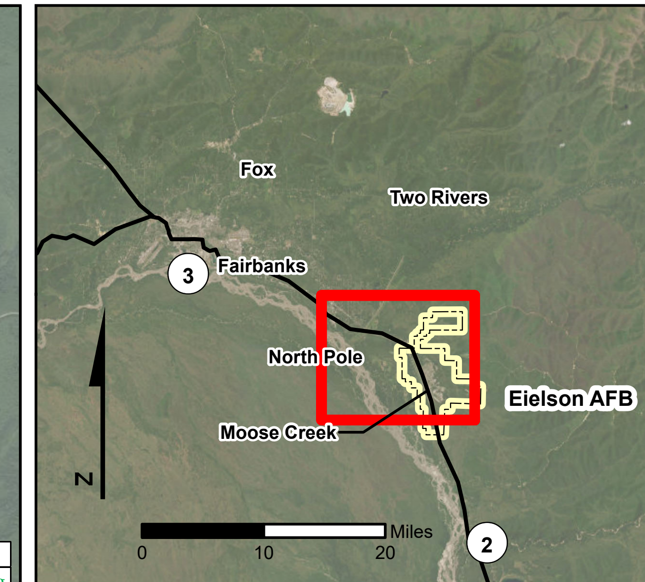

Legend

- Approximate Groundwater Flow
- Wells with MCL exceedances
- Wells with no MCL exceedances
- Estimated Extent of PFAS Exceeding MCLs
- Eielson Air Force Base Location

Notes:

- -Mann-Kendall trend analysis was performed as described in Section 6.0 of the report.
- -Plume and wells shown are from the Fall 2024 sampling event
- -Red text denotes increasing or probably increasing trend
- -Green text denotes decreasing or probably decreasing trend
- -ND = all sample events were non-detect for this analyte
- -PD = probably decreasing
- -PI = probably increasing
- -PFHxS = perfluorohexanesulfonic acid
- -PFNA = perfluorononanoic acid
- -PFOA = perfluorooctanoic acid
- -PFOS = perfluorooctanesulfonic acid

N S E W

1 inch = 5,000 feet

0 2,500 5,000 7,500 10,000 Feet

Service Layer Credits: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

PREPARED FOR EIELSON AIR FORCE BASE, ALASKA

Projection: NAD 1983 UTM Zone 6N

DESIGNED BY:	TDF	**Figure 6 Mann Kendall Trends Eielson AFB, Alaska**			
DRAWN BY:	SJB				
CHECKED BY:	RA	SCALE:	As Shown	PROJECT NUMBER:	060132
SUBMITTED BY:	RA	DATE:	2/19/2025	REVISION:	
		FILE:	Refer to left margin		

Document Path: C:\Users\shanon.brailsford\OneDrive - northwindgrp.com\Shared Documents - 060132 - Moose Creek\12. GIS\2. MXDs\3. 2024 Groundwater Report\Figure 6 - Mann-Kendall Trends.mxd

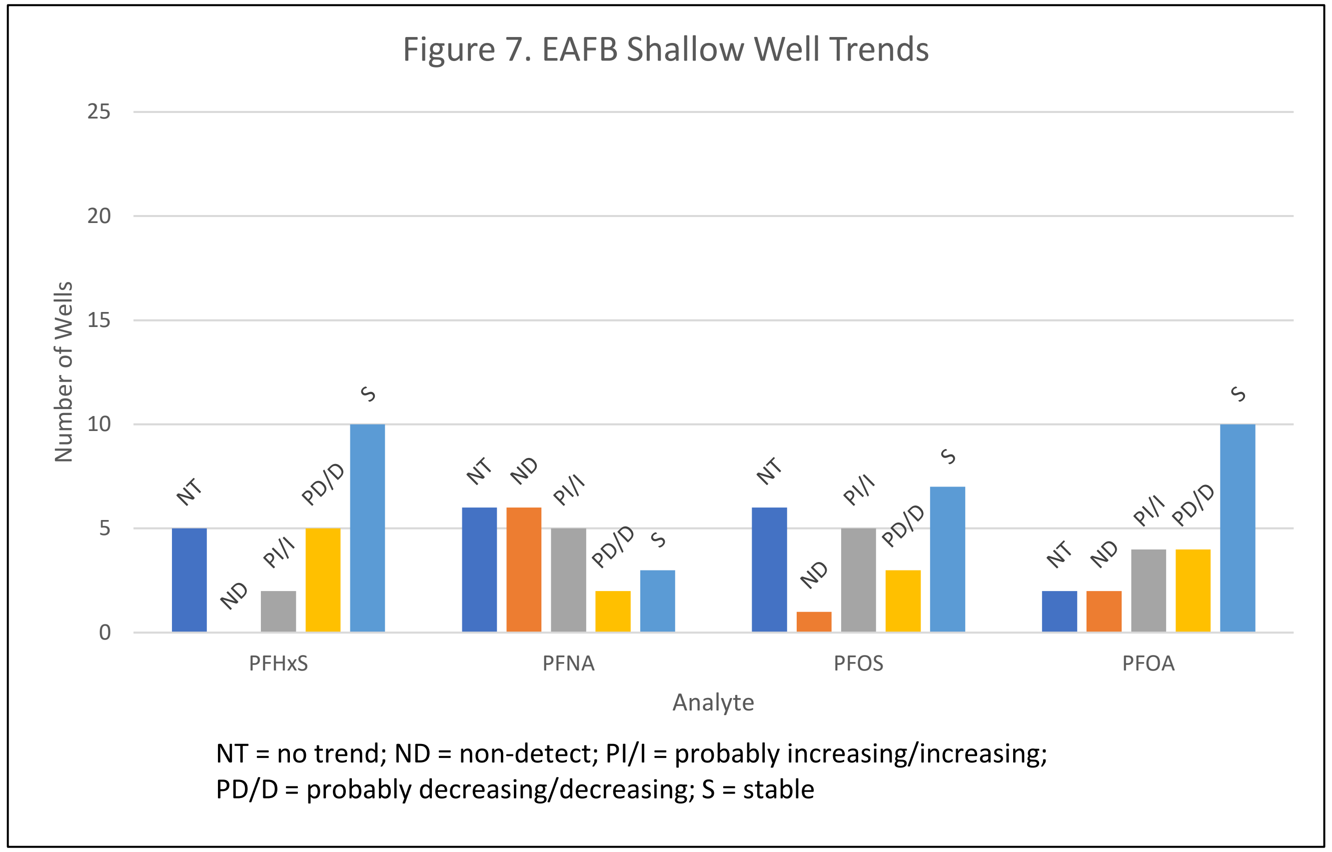
Figure 7. EAFB Shallow Well Trends
Number of Wells
25
20
15
10
5
0
NT
ND
PI/I
PD/D
S
PFHxS
PFNA
PFOS
PFOA
Analyte
NT = no trend; ND = non-detect; PI/I = probably increasing/increasing;
PD/D = probably decreasing/decreasing; S = stable

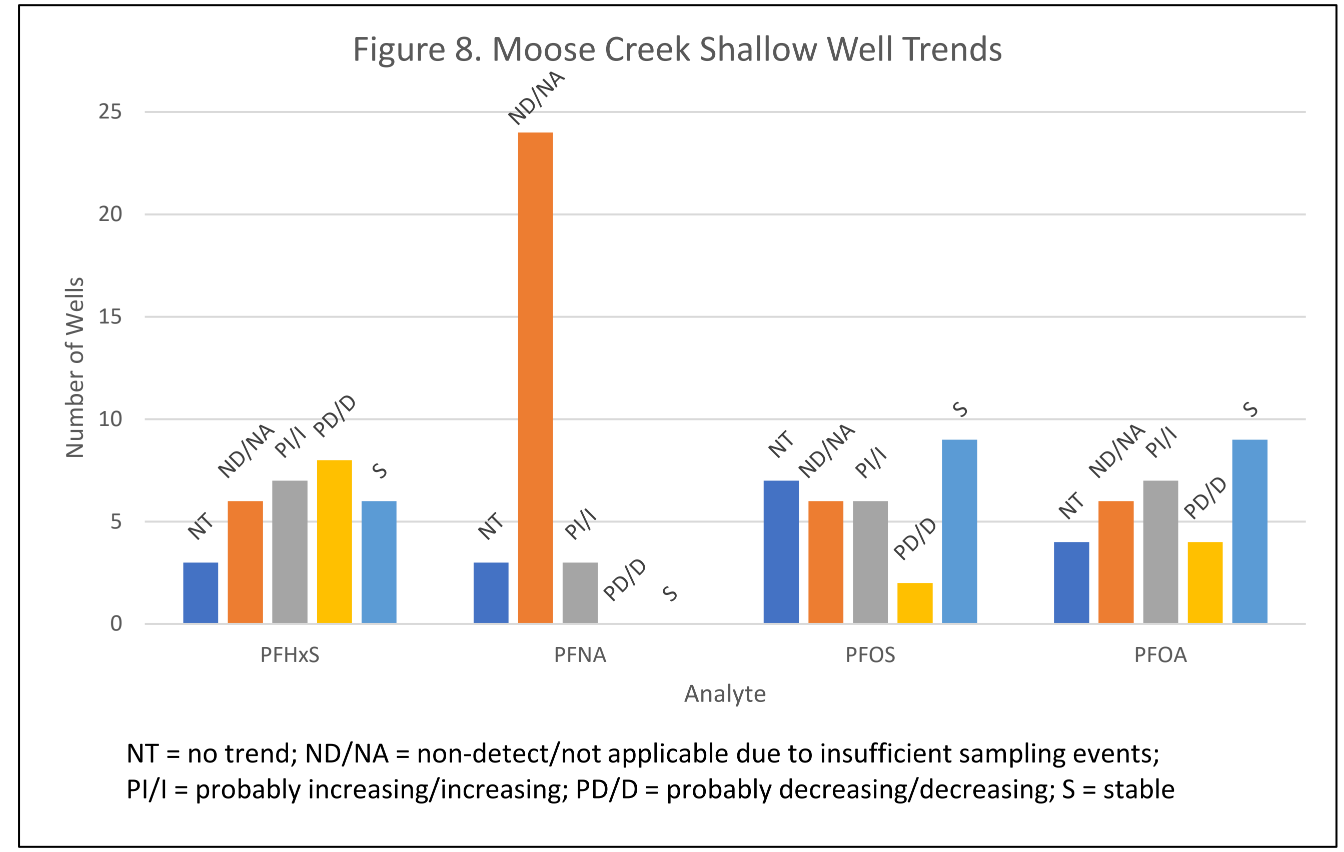
Figure 8. Moose Creek Shallow Well Trends
Number of Wells
25
20
15
10
5
0
NT
ND/NA
PI/I
PD/D
S
PFHxS
PFNA
PFOS
PFOA
Analyte
NT = no trend; ND/NA = non-detect/not applicable due to insufficient sampling events;
PI/I = probably increasing/increasing; PD/D = probably decreasing/decreasing; S = stable

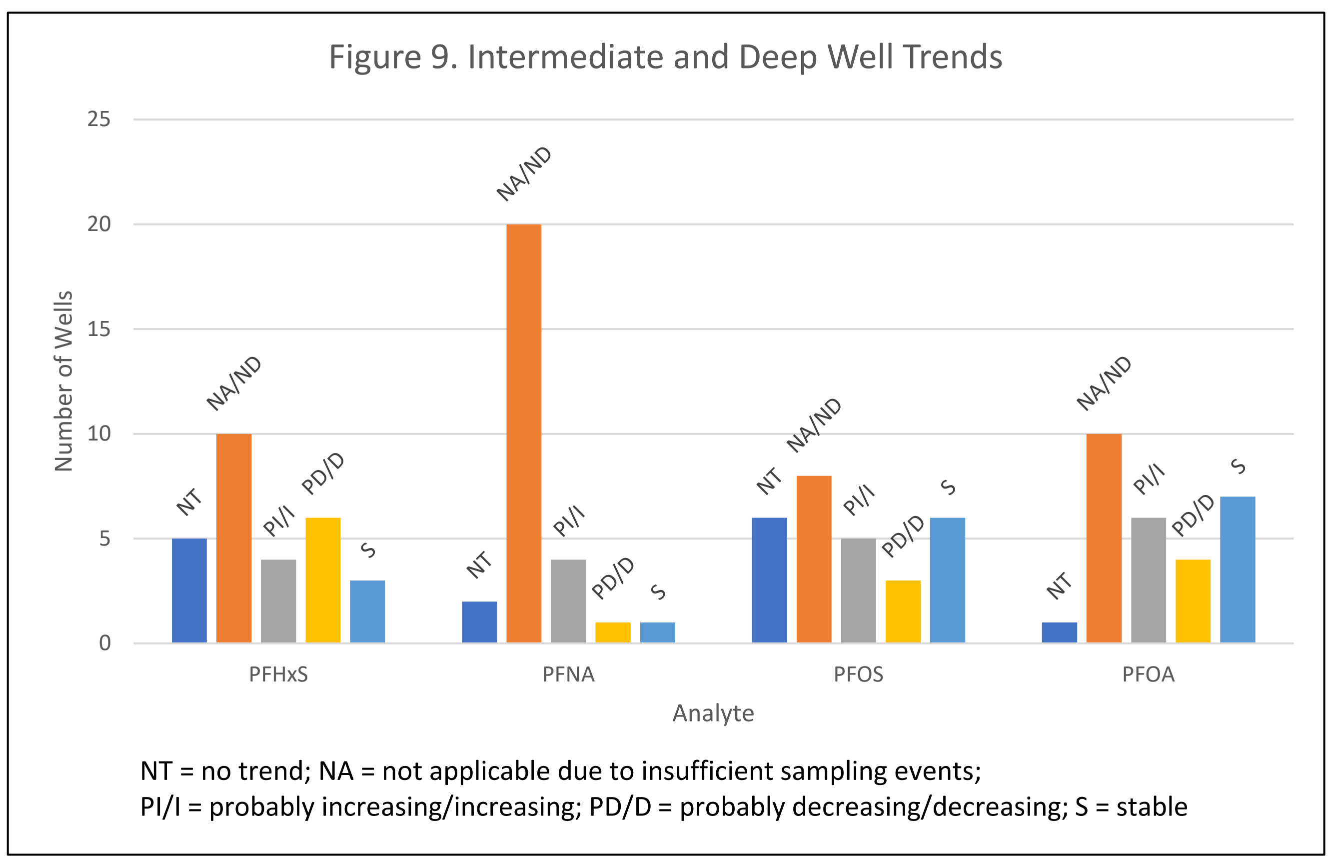
Figure 9. Intermediate and Deep Well Trends
Number of Wells
25
20
15
10
5
0
NT
NA/ND
PI/I
PD/D
S
PFHxS
PFNA
PFOS
PFOA
Analyte
NT = no trend; NA = not applicable due to insufficient sampling events;
PI/I = probably increasing/increasing; PD/D = probably decreasing/decreasing; S = stable

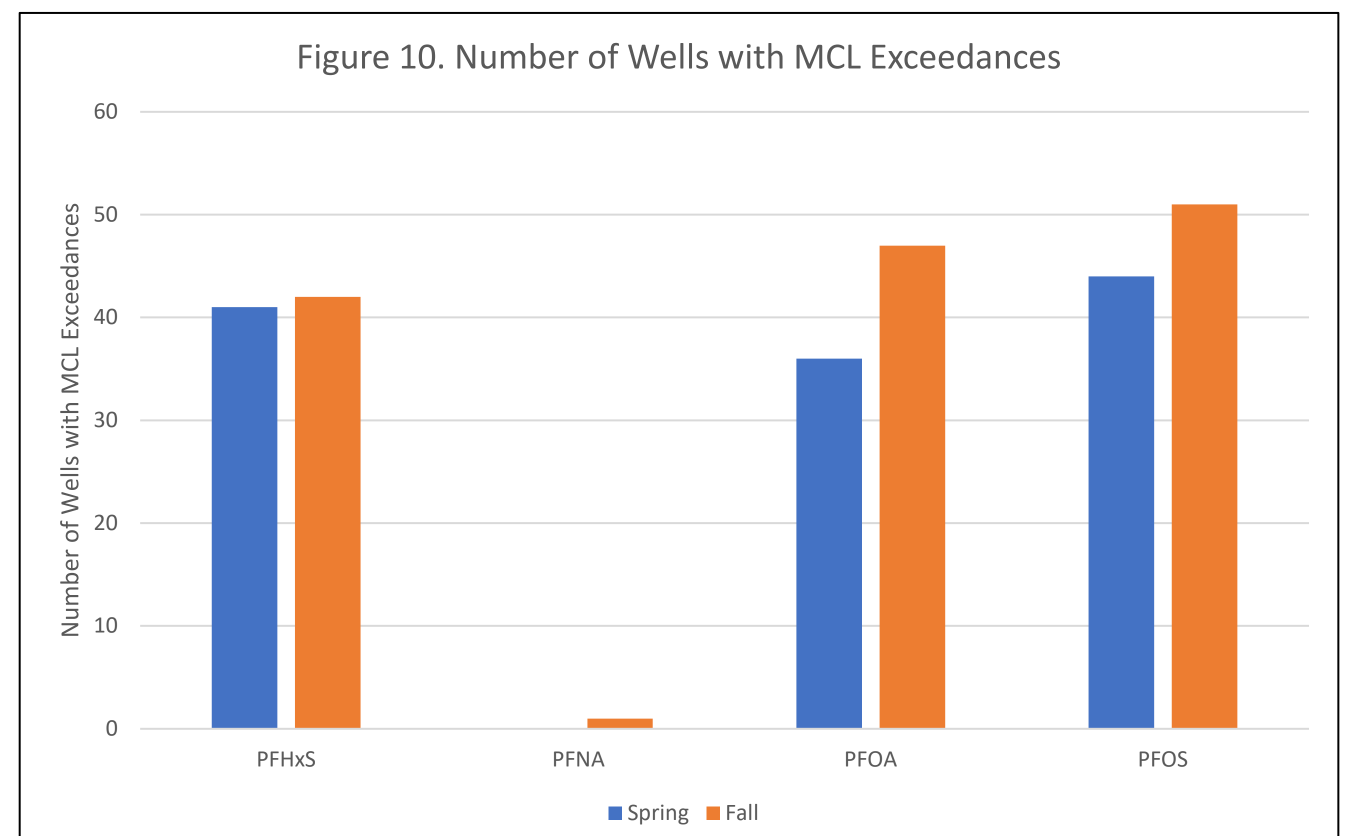
Figure 10. Number of Wells with MCL Exceedances
Number of Wells with MCL Exceedances
60
50
40
30
20
10
0
PFHxS
PFNA
PFOA
PFOS
Spring
Fall

TABLES

Table 1. 2024 Monitoring Well Details

Well ID	Northing[a]	Easting	Well Depth (feet bgs)	Screened Interval (feet bgs)
Eielson AFB Boundary - Shallow Wells (22 wells)				
20PS-MW01	7176581.112	494517.138	13	3-13
20PS-MW02	7175064.12	495610.731	12.8	2.8-12.8
20PS-MW03	7174076.359	496739.466	13	3-13
20PS-MW06	7173880.735	494001.302	15.5	5.5-15.5
20PS-MW07	7174837.889	493352.164	14	4-14
20PS-MW08	7175365.406	493100.981	13	3-13
02MW11	7174605.957	495461.909	25	12.75-22.75
MW-2*	7173857.57	496040.8003	7.85	5.0-10.0
MW-BKG-01	7172270.575	493967.392	20.3	7.5-17.5
MW-BKG-04	7168296.683	497259.9579	22.3	10.0-20.0
MW-BKG-07	7168343.042	497642.016	23.3	11.0-21.0
MW-BKG-09	7169416.557	495588.935	21.3	9.0-19.0
MW-BKG-10	7169968.528	494602.1821	20	7.5-17.5
MW-BKG-12	7170059.204	498504.402	14.8	2.5-12.5
HCMW01WT	7174222.457	493372.7252	17.02	7-17
HCMW02WT	7174419.797	493836.4586	16.33	6-16
HCMW03WT	7174467.093	495297.2695	13.5	4-13
HCMW05WT	7171772.3	497578.6464	12	3-13
HCMW06WT	7167605.278	496723.5414	15.41	5-15
MW1-50	7175504.1	493797.83	50	40-50
MW2-50	7172497	495303.1	50	40-50
MW3-50	7170121.9	496315.66	48	28-48
Off Base Wells - Shallow Wells (29 wells)				
20PS-MW09	7176639.655	490855.088	16.5	6.5-16.5
20PS-MW10	7176948.625	490203.009	13.4	3-13
20PS-MW11	7177127.788	489673.368	11.83	1.5-11.5
20PS-MW12	7177237.566	489308.677	13.4	3-13
20PS-MW13	7177423.927	488247.719	15	5-15
20PS-MW14	7176517.027	487621.596	13	3-13
20PS-MW15	7176252.153	486757.777	15	5-15
20PS-MW17	7176270.343	486138.819	13	3-13
20PS-MW19	7177438.57	486298.504	13	3-13
20PS-MW20	7177393.776	486490.384	13	3-13
20PS-MW22	7178324.143	487374.239	20	10-20
20PS-MW23	7178321.01	488036.391	13	3-13
20PS-MW24	7178045.163	488908.57	24	4.5-14.5
20PS-MW25	7179667	489329.811	20.91	4-14
20PS-MW27	7176512.106	487623.321	20.8	10.8-20.8
20PS-MW29	7176784.518	487078.246	17	7-17
20PS-MW30	7176189.208	485968.943	20	10-20
DSAP-8S	7179793.913	488525.0869	19.2	13.9-18.9
DSAP-10	7178964.522	486921.3055	15.4	10.2-15.2
DSAP-11	7178774.634	487925.9264	22	9.2-19.2
DSAP-13	7178256.085	486111.1094	13	7.8-12.8
DSAP-14*	7177502.894	486697.5219	21.5	15.1-20.1

Table 1. 2024 Monitoring Well Details

Well ID	Northing[a]	Easting	Well Depth (feet bgs)	Screened Interval (feet bgs)
USAP-1	7178769.886	489195.9624	24.5	14.0-19.0
USAP-3	7179418.065	489753.7729	21.5	12.1-17.1
NPB-20	7178232.59	486191.40	22.4	12.4-22.4
NPC-20	7179240.81	486926.74	20.5	10.5-20.5
NPD-20	7179802.69	487751.14	19.7	9.7-19.7
NPF-20	7179036.16	485406.40	20.5	10.5-20.5
NPG-20	7180198.18	485985.67	20.5	10.5-20.5
Intermediate and Deep Wells (29 wells)				
19PS-MW01A	7177465.413	487703.261	63.33	51.31-61.31
19PS-MW01B	7177471.42	487703.958	110.58	99.92-109.58
20PS-MW01C	7177474.325	487704.137	160.5	150.3-160.3
20PS-MW01D	7177468.345	487703.556	209.53	199-209
19PS-MW02A	7176688.866	487215.0573	63.33	49-59
19PS-MW02B	7176691.293	487220.1053	110	101.8-111.8
20PS-MW02C	7176691.614	487222.494	161.24	151-161
20PS-MW02D	7176689.902	487219.028	210	199.8-209.8
DSAP-8D	7179793.913	488525.0869	66.5	59.2-64.2
HCMW01MD	7174223.415	493373.5451	72.8	68-73
HCMW01DP	7174224.796	493374.8071	203.03	198-203
HCMW02MD	7174419.078	493833.9795	72.93	68-73
HCMW02DP	7174417.66	493832.0518	198.5	193-198
HCMW03MD	7174464.486	495297.0459	72	67-72
HCMW03DP	7174462.106	495297.0253	199.2	194-199
HCMW05MD	7171774.318	497575.7014	72.64	67-72
HCMW05DP	7171773.183	497577.2049	203	197-202
HCMW06DP	7167605.882	496721.7433	201.63	196-201
MW1-100	7175501	493798.31	98	88-98
MW1-150	7175495	493799.09	150	140-150
MW2-100	7172500.5	495301.26	100	90-100
MW2-150	7172503.9	495300.75	150	140-150
MW3-100	7170122.7	496320.99	100	80-100
NPA-40	7178138.96	485318.87	39.3	29.3-39.3
NPB-40	7178234.09	486190.55	41.0	31-41
NPC-40	7179239.17	486926.77	40.0	30-40
NPD-40	7179802.80	487753.06	39.7	29.7-39.7
NPF-40	7179041.95	485405.92	40.0	30-40
NPG-40	7180198.40	485983.90	40.5	30.5-40.5

*Final Environmental Restoration Atlas (USACE 2024a)

[a] Coordinate System: WGS 84 UTM Zone 6 North, in Meters.

Sample frequency: 2 times per year (spring and fall)

Sampling method: low flow

Table 2. 2024 Water Level Data

Well ID	Well Depth (ft bgs)	TOC Elevation (ft ASML)	Screened Interval (ft bgs)	Casing Diameter (in)	Casing Material	Sample Date	Measured Water Level (ft BTOC)	Water Level Elevation (ft AMSL)	Measured Total Depth (ft BTOC)
02MW11	25	542.81	12.8-22.8	2	PVC	7/16/2024	15.55	527.26	25.00
	25	542.81	12.8-22.8	2	PVC	9/7/2024	15.53	527.28	25.68
19PS-MW01A	63.33	508.8	51.3-61.3	2	PVC	7/26/2024	4.47	504.33	62.19
	63.33	508.8	51.3-61.3	2	PVC	9/8/2024	4.65	504.15	61.95
19PS-MW01B	110.58	509.2	99.9-109.6	2	PVC	7/26/2024	4.05	505.15	113.41
	110.58	509.2	99.9-109.6	2	PVC	9/8/2024	4.31	504.89	113.40
20PS-MW01C	160.5	509.5	150.3-160.3	2	PVC	7/27/2024	3.45	506.05	164.39
	160.5	509.5	150.3-160.3	2	PVC	9/8/2024	3.96	505.54	163.91
20PS-MW01D	209.53	508.95	199.0-209.0	2	PVC	7/28/2024	3.43	505.52	200.00
	209.53	508.95	199.0-209.0	2	PVC	9/10/2024	4.18	504.77	200.00
19PS-MW02A	63.33	511.86	49.0-59.0	2	PVC	7/28/2024	4.81	507.05	61.84
	63.33	511.86	49.0-59.0	2	PVC	9/9/2024	6.15	505.71	61.85
19PS-MW02B	110	512.38	101.8-111.8	2	PVC	7/29/2024	4.4	507.98	113.93
	110	512.38	101.8-111.8	2	PVC	9/9/2024	5.61	506.77	113.96
20PS-MW02C	161.24	512.43	154.0-164.0	2	PVC	7/28/2024	4.01	508.42	163.99
	161.24	512.43	154.0-164.0	2	PVC	9/9/2024	5.39	507.04	164.50
20PS-MW02D	210	512.15	201.8-211.8	2	PVC	7/28/2024	3.74	508.41	200.00
	210	512.15	201.8-211.8	2	PVC	9/10/2024	5.19	506.96	200.00
20PS-MW01	13	528.31	3.0-13.0	2	PVC	7/23/2024	10.09	518.22	16.62
	13	528.31	3.0-13.0	2	PVC	9/5/2024	9.49	518.82	16.45
20PS-MW02	12.8	532.84	2.8-12.8	2	PVC	7/29/2024	5.53	527.31	15.84
	12.8	532.84	2.8-12.8	2	PVC	9/10/2024	5.23	527.61	15.79
20PS-MW03	13	536.61	3.0-13.0	2	PVC	7/29/2024	4.98	531.63	8.56
	13	536.61	3.0-13.0	2	PVC	9/10/2024	4.99	531.62	8.38
20PS-MW06	15.5	532.81	5.5-15.5	2	PVC	7/27/2024	6.15	526.66	15.00
	15.5	532.81	5.5-15.5	2	PVC	9/9/2024	5.97	526.84	14.90
20PS-MW07	14	532.72	4.0-14.0	2	PVC	7/28/2024	9.82	522.90	17.57
	14	532.72	4.0-14.0	2	PVC	9/9/2024	10.02	522.70	17.40
20PS-MW08	13	529.63	3.0-13.0	2	PVC	7/27/2024	9.03	520.60	16.74
	13	529.63	3.0-13.0	2	PVC	9/9/2024	9.06	520.57	16.57

Table 2. 2024 Water Level Data

Well ID	Well Depth (ft bgs)	TOC Elevation (ft ASML)	Screened Interval (ft bgs)	Casing Diameter (in)	Casing Material	Sample Date	Measured Water Level (ft BTOC)	Water Level Elevation (ft AMSL)	Measured Total Depth (ft BTOC)
20PS-MW09	16.5	525.37	6.5-16.5	2	PVC	7/25/2024	12.44	512.93	19.69
	16.5	525.37	6.5-16.5	2	PVC	9/7/2024	12.61	512.76	19.48
20PS-MW10	13.4	521.62	3.0-13.0	2	PVC	7/27/2024	9.06	512.56	16.34
	13.4	521.62	3.0-13.0	2	PVC	9/8/2024	9.54	512.08	16.23
20PS-MW11	11.83	518.66	1.5-11.5	2	PVC	7/27/2024	6.99	511.67	14.78
	11.83	518.66	1.5-11.5	2	PVC	9/8/2024	7.64	511.02	14.61
20PS-MW12	13.4	519.17	3.0-13.0	2	PVC	7/23/2024	8.78	510.39	16.23
	13.4	519.17	3.0-13.0	2	PVC	9/4/2024	9.03	510.14	16.03
20PS-MW13	15	516.43	5.0-15.0	2	PVC	7/24/2024	11.29	505.14	18.20
	15	516.43	5.0-15.0	2	PVC	9/6/2024	11.37	505.06	18.02
20PS-MW14	13	514.65	3.0-13.0	2	PVC	NS	NS	NS	NS
	13	514.65	3.0-13.0	2	PVC	9/10/2024	6.92	507.73	16.45
20PS-MW15	15	520.38	5.0-15.0	2	PVC	7/24/2024	12.56	507.82	18.53
	15	520.38	5.0-15.0	2	PVC	9/6/2024	13.08	507.30	18.65
20PS-MW17	13	510.84	6.0-16.0	2	PVC	7/26/2024	4.76	506.08	15.79
	13	510.84	6.0-16.0	2	PVC	9/7/2024	5.74	505.10	15.61
20PS-MW19	13	510.21	6.0-16.0	2	PVC	7/19/2024	9.21	501.00	13.00
	13	510.21	6.0-16.0	2	PVC	9/8/2024	9.34	500.87	13.40
20PS-MW20	13	512.33	6.0-16.0	2	PVC	7/19/2024	9.84	502.49	13.00
	13	512.33	6.0-16.0	2	PVC	9/8/2024	9.65	502.68	13.04
20PS-MW22	20	505.7	8.0-18.0	2	PVC	7/29/2024	8.26	497.44	24.02
	20	505.7	8.0-18.0	2	PVC	9/10/2024	8.07	497.63	23.84
20PS-MW23	13	502.7	3.0-13.0	2	PVC	7/27/2024	4.4	498.30	12.70
	13	502.7	3.0-13.0	2	PVC	9/8/2024	3.78	498.92	12.64
20PS-MW24	24	514.4	6.5-16.5	2	PVC	7/18/2024	13.68	500.72	24.00
	24	514.4	6.5-16.5	2	PVC	9/4/2024	13.04	501.36	17.05
20PS-MW25	20.91	506.86	6.3-16.3	2	PVC	7/18/2024	13.87	492.99	20.90
	20.91	506.86	6.3-16.3	2	PVC	9/8/2024	12.59	494.27	20.93
20PS-MW27	20.8	514.67	10.8-20.8	2	PVC	NS	NS	NS	NS
	20.8	514.67	10.8-20.8	2	PVC	9/10/2024	7.26	507.41	23.80

Table 2. 2024 Water Level Data

Well ID	Well Depth (ft bgs)	TOC Elevation (ft ASML)	Screened Interval (ft bgs)	Casing Diameter (in)	Casing Material	Sample Date	Measured Water Level (ft BTOC)	Water Level Elevation (ft AMSL)	Measured Total Depth (ft BTOC)
20PS-MW29	17	506.99	7.0-17.0	2	PVC	7/26/2024	-0.2	507.19	16.83
	17	506.99	7.0-17.0	2	PVC	9/7/2024	0.63	506.36	16.68
20PS-MW30	20	510.89	13.0-23.0	2	PVC	7/26/2024	4.2	506.69	23.80
	20	510.89	13.0-23.0	2	PVC	9/7/2024	5.15	505.74	23.70
DSAP-10	15.4	517	12.2-17.2	2	PVC	7/21/2024	11.56	505.44	15.40
	15.4	517	12.2-17.2	2	PVC	9/9/2024	11.12	505.88	15.40
DSAP-11	22	520	11.2-21.2	2	PVC	7/25/2024	14.75	505.25	21.12
	22	520	11.2-21.2	2	PVC	9/5/2024	14.09	505.91	20.98
DSAP-13	13	499.86	7.8-12.8	2	PVC	7/19/2024	8.47	491.39	13.00
	13	499.86	7.8-12.8	2	PVC	9/8/2024	8.41	491.45	13.08
DSAP-14	21.5	519	15.1-20.1	2	PVC	7/19/2024	12.66	506.34	21.50
	21.5	519	15.1-20.1	2	PVC	9/8/2024	12.87	506.13	21.54
DSAP-8D	66.5	504.85	59.2-64.2	2	PVC	7/21/2024	14.9	489.95	66.50
	66.5	504.85	59.2-64.2	2	PVC	9/9/2024	13.89	490.96	66.50
DSAP-8S	19.2	504.74	15.9-20.9	2	PVC	7/21/2024	14.84	489.90	19.20
	19.2	504.74	15.9-20.9	2	PVC	9/9/2024	13.88	490.86	19.20
HCMW01DP	203.03	535.32	198.0-203.0	2	PVC	7/18/2024	10.24	525.08	203.03
	203.03	535.32	198.0-203.0	2	PVC	9/7/2024	10.45	524.87	203.30
HCMW01MD	72.8	534.74	70.0-75.0	2	PVC	7/18/2024	9.76	524.98	72.80
	72.8	534.74	70.0-75.0	2	PVC	9/7/2024	9.9	524.84	72.87
HCMW01WT	17.02	534.83	7.0-17.0	2	PVC	7/18/2024	9.69	525.14	17.02
	17.02	534.83	7.0-17.0	2	PVC	9/7/2024	9.78	525.05	17.02
HCMW02DP	198.5	534.19	195.0-200.0	2	PVC	7/28/2024	8.81	525.38	200.00
	198.5	534.19	195.0-200.0	2	PVC	9/10/2024	8.76	525.43	200.00
HCMW02MD	72.93	534.64	70.0-75.0	2	PVC	7/24/2024	9.5	525.14	75.62
	72.93	534.64	70.0-75.0	2	PVC	9/5/2024	9.19	525.45	75.62
HCMW02WT	16.33	534.04	4.0-14.0	2	PVC	7/24/2024	9.04	525.00	18.51
	16.33	534.04	4.0-14.0	2	PVC	9/5/2024	8.75	525.29	18.35
HCMW03DP	199.2	530.48	194.0-199.0	2	PVC	7/17/2024	2.95	527.53	199.00
	199.2	530.48	194.0-199.0	2	PVC	9/7/2024	2.59	527.89	199.00

Table 2. 2024 Water Level Data

Well ID	Well Depth (ft bgs)	TOC Elevation (ft ASML)	Screened Interval (ft bgs)	Casing Diameter (in)	Casing Material	Sample Date	Measured Water Level (ft BTOC)	Water Level Elevation (ft AMSL)	Measured Total Depth (ft BTOC)
HCMW03MD	72	530.73	67.0-72.0	2	PVC	7/17/2024	3.95	526.78	72.00
	72	530.73	67.0-72.0	2	PVC	9/7/2024	4.14	526.59	72.40
HCMW03WT	13.5	530.6	3.5-13.5	2	PVC	7/17/2024	3.92	526.68	13.50
	13.5	530.6	3.5-13.5	2	PVC	9/7/2024	3.67	526.93	13.52
HCMW05DP	203	541.71	197.0-202.0	2	PVC	7/25/2024	5.32	536.39	200.00
	203	541.71	197.0-202.0	2	PVC	9/6/2024	5.13	536.58	200.00
HCMW05MD	72.64	541.56	67.0-72.0	2	PVC	7/25/2024	4.4	537.16	75.00
	72.64	541.56	67.0-72.0	2	PVC	9/6/2024	4.24	537.32	74.75
HCMW05WT	12	541.56	3.0-13.0	2	PVC	7/25/2024	5.52	536.04	13.44
	12	541.56	3.0-13.0	2	PVC	9/6/2024	5.41	536.15	13.44
HCMW06DP	201.63	559.2	199.0-204.0	2	PVC	7/15/2024	6.35	552.85	201.63
	201.63	559.2	199.0-204.0	2	PVC	9/6/2024	6.82	552.38	201.63
HCMW06WT	15.41	558.59	8.0-18.0	2	PVC	7/15/2024	6.41	552.18	17.70
	15.41	558.59	8.0-18.0	2	PVC	9/6/2024	7.57	551.02	17.78
MW-2	7.85	-	5.0-10.0	2	PVC	7/16/2024	4.54	-	10.45
	7.85	-	5.0-10.0	2	PVC	9/7/2024	4.6	-	10.45
MW-BKG-01	20.3	543.59	10.5-20.5	2	PVC	7/18/2024	12.24	531.35	20.20
	20.3	543.59	10.5-20.5	2	PVC	9/7/2024	12.44	531.15	20.24
MW-BKG-04	22.3	561.17	12.0-22.0	2	PVC	7/16/2024	10.26	550.91	24.55
	22.3	561.17	12.0-22.0	2	PVC	9/6/2024	10.57	550.60	24.56
MW-BKG-07	23.3	563.37	11.0-21.0	2	PVC	7/16/2024	12.67	550.70	23.01
	23.3	563.37	11.0-21.0	2	PVC	9/6/2024	13	550.37	23.07
MW-BKG-09	21.3	551.9	9.0-19.0	2	PVC	7/17/2024	8.49	543.41	21.30
	21.3	551.9	9.0-19.0	2	PVC	9/7/2024	9	542.90	21.36
MW-BKG-10	20	557.33	10.5-20.5	2	PVC	7/17/2024	13.5	543.83	20.00
	20	557.33	10.5-20.5	2	PVC	9/7/2024	13.88	543.45	20.00
MW-BKG-12	14.8	548.7	2.5-12.5	2	PVC	7/16/2024	3.57	545.13	14.80
	14.8	548.7	2.5-12.5	2	PVC	9/6/2024	3.62	545.08	14.84
MW1-100	98	529.52	85.0-95.0	2	PVC	7/28/2024	7.27	522.25	100.19
	98	529.52	85.0-95.0	2	PVC	9/9/2024	7.05	522.47	100.16

Table 2. 2024 Water Level Data

Well ID	Well Depth (ft bgs)	TOC Elevation (ft ASML)	Screened Interval (ft bgs)	Casing Diameter (in)	Casing Material	Sample Date	Measured Water Level (ft BTOC)	Water Level Elevation (ft AMSL)	Measured Total Depth (ft BTOC)
MW1-150	150	526.9	140.0-150.0	2	PVC	7/28/2024	8	518.90	153.09
	150	526.9	140.0-150.0	2	PVC	9/9/2024	7.78	519.12	153.07
MW1-50	50	529.86	37.0-47.0	2	PVC	7/28/2024	7.65	522.21	52.79
	50	529.86	37.0-47.0	2	PVC	9/9/2024	7.47	522.39	52.64
MW2-100	100	542.39	90.0-100.0	2	PVC	7/16/2024	9.4	532.99	100.00
	100	542.39	90.0-100.0	2	PVC	9/6/2024	9.62	532.77	100.20
MW2-150	150	542.27	140.0-150.0	2	PVC	7/16/2024	9.19	533.08	150.00
	150	542.27	140.0-150.0	2	PVC	9/6/2024	9.4	532.87	150.60
MW2-50	50	542.72	40.0-50.0	2	PVC	7/16/2024	9.84	532.88	50.00
	50	542.72	40.0-50.0	2	PVC	9/6/2024	10.03	532.69	50.17
MW3-100	100	552.74	88.0-98.0	2	PVC	7/23/2024	11.11	541.63	100.00
	100	552.74	88.0-98.0	2	PVC	9/4/2024	11.05	541.69	101.80
MW3-50	48	552.96	31.0-51.0	2	PVC	7/23/2024	11.21	541.75	49.96
	48	552.96	31.0-51.0	2	PVC	9/4/2024	11.17	541.79	49.82
NPA-40	39.3	505.28	29.3-39.3	2	PVC	7/19/2024	7.9	497.38	40.04
	39.3	505.28	29.3-39.3	2	PVC	9/8/2024	8.13	497.15	40.04
NPB-20*	22.4	508.06	12.4-22.4	2	PVC	7/19/2024	11.1	496.96	25.20
	22.4	508.06	12.4-22.4	2	PVC	9/8/2024	11.05	497.01	25.20
NPB-40	41	508.15	31.0-41.0	2	PVC	7/19/2024	11.16	496.99	41.95
	41	508.15	31.0-41.0	2	PVC	9/8/2024	11.12	497.03	41.95
NPC-20	20.5	504.83	10.5-20.5	2	PVC	7/20/2024	10.55	494.28	23.05
	20.5	504.83	10.5-20.5	2	PVC	9/9/2024	10.11	494.72	23.05
NPC-40	40.0	505.00	30.0-40.0	2	PVC	7/20/2024	10.69	494.31	43.10
	40.0	505.00	30.0-40.0	2	PVC	9/9/2024	10.25	494.75	43.10
NPD-20	19.7	506.64	9.7-19.7	2	PVC	7/20/2024	13.16	493.48	22.10
	19.7	506.64	9.7-19.7	2	PVC	9/9/2024	12.43	494.21	22.10
NPD-40	39.7	506.39	29.7-39.7	2	PVC	7/20/2024	12.93	493.46	41.29
	39.7	506.39	29.7-39.7	2	PVC	9/9/2024	12.18	494.21	41.29
NPF-20	20.5	499.83	10.5-20.5	2	PVC	7/20/2024	5.41	494.42	19.70
	20.5	499.83	10.5-20.5	2	PVC	9/9/2024	5.36	494.47	19.70

Table 2. 2024 Water Level Data

Well ID	Well Depth (ft bgs)	TOC Elevation (ft ASML)	Screened Interval (ft bgs)	Casing Diameter (in)	Casing Material	Sample Date	Measured Water Level (ft BTOC)	Water Level Elevation (ft AMSL)	Measured Total Depth (ft BTOC)
NPF-40	40.0	499.63	30.0-40.0	2	PVC	7/20/2024	5.19	494.44	39.20
	40.0	499.63	30.0-40.0	2	PVC	9/9/2024	5.15	494.48	39.20
NPG-20	20.5	500.96	10.5-20.5	2	PVC	7/20/2024	10.04	490.92	23.17
	20.5	500.96	10.5-20.5	2	PVC	9/9/2024	9.77	491.19	23.17
NPG-40	40.5	500.72	30.5-40.5	2	PVC	7/20/2024	9.8	490.92	39.40
	40.5	500.72	30.5-40.5	2	PVC	9/9/2024	9.55	491.17	39.40
USAP-1	24.5	505.02	20.0-25.0	2	PVC	7/18/2024	19.78	485.24	24.50
	24.5	505.02	20.0-25.0	2	PVC	9/8/2024	18.74	486.28	24.56
USAP-3	21.5	503.04	18.1-23.1	2	PVC	7/18/2024	16.74	486.30	21.50
	21.5	503.04	18.1-23.1	2	PVC	9/8/2024	15.42	487.62	21.54

Notes

* Well NPB-20 was recorded as NPB-22 on field documentation and sample IDs

- = Information not found

AMSL = above mean sea level

bgs = below ground surface

BTOC = below top of casing

ft = feet

ID = identification

in = inches

NS = not sampled due to flooding in well vicinity

PVC = polyvinyl chloride

Table 3. 2024 Water Quality Parameters

Well ID	Sample Date	Conductivity (µs/cm)	Dissolved oxygen (mg/L)	Oxidation reduction potential (mV)	pH	Temperature (°C)	Turbidity (NTU)
02MW11	7/16/2024	427	1	-104.6	6.9	8.29	5.38
	9/7/2024	402	3.8	7.7	6.8	6.37	3.14
19PS-MW01A	7/26/2024	250	1.25	159	7.09	6.76	26.29
	9/8/2024	241	1.23	57	6.93	5.28	4.65
19PS-MW01B	7/26/2024	189	1.14	70.8	6.94	6.45	7.43
	9/8/2024	179	0.34	-15.8	6.94	6.1	8.17
20PS-MW01C	7/27/2024	199	3.38	14.4	6.74	7.46	7.81
	9/8/2024	173	0.94	20.2	6.85	5.75	3.91
20PS-MW01D	7/28/2024	196	2.75	13	7.17	7.28	4.89
	9/10/2024	186	0.42	19	6.72	6.56	1.78
19PS-MW02A	7/28/2024	241	1.37	166.8	7.01	6.11	1.93
	9/9/2024	222	2.35	66.2	7.07	5.44	0.48
19PS-MW02B	7/29/2024	234	0.44	35.5	7.59	6.25	15.83
	9/9/2024	218	0.87	-76.8	7.24	5.45	13.1
20PS-MW02C	7/28/2024	198	0.23	-58.8	7.99	6.85	2.09
	9/9/2024	184	1.81	-145	7.34	5.81	2.24
20PS-MW02D	7/28/2024	182	3.25	-25.2	9.05	5.59	89.99
	9/10/2024	180	2.39	4.4	7.32	6.19	0.71
20PS-MW01	7/23/2024	225	0.89	-41.4	7.11	4.58	9.7
	9/5/2024	220	1.42	-95.6	6.74	5.98	6.99
20PS-MW02	7/29/2024	183	0.61	10.2	7.61	3.94	6.39
	9/10/2024	206	0.23	1.7	6.51	6.15	18.44
20PS-MW03	7/29/2024	242	0.31	29.7	7.83	5.01	18.5
	9/10/2024	242	1.99	-69.5	7.13	6.74	6.53
20PS-MW06	7/27/2024	284	0.45	40.4	7.75	5.9	7.69
	9/9/2024	278	0.33	-32.5	6.97	7.29	2.92
20PS-MW07	7/28/2024	293	7.67	66.9	8.3	4.35	2.39
	9/9/2024	308	4.84	72.6	6.9	5.84	3.98
20PS-MW08	7/27/2024	366	2.78	94.5	7.91	5.23	4.29
	9/9/2024	393	2	56.4	6.62	7.01	2.58
20PS-MW09	7/25/2024	380	1.12	52.1	7.01	5.32	9.93
	9/7/2024	324	1.94	-27.8	6.96	5.49	6.3
20PS-MW10	7/27/2024	302	2.05	89.3	7.78	6.38	9.64
	9/8/2024	292	1.63	36.1	7.24	7.23	3.79

Table 3. 2024 Water Quality Parameters

Well ID	Sample Date	Conductivity (µs/cm)	Dissolved oxygen (mg/L)	Oxidation reduction potential (mV)	pH	Temperature (°C)	Turbidity (NTU)
20PS-MW11	7/27/2024	468	0.71	73	6.99	7.25	349.7
	9/8/2024	459	7.45	30.6	6.75	8.05	7.52
20PS-MW12	7/23/2024	324	1.43	-53.4	7.04	8.5	7.56
	9/4/2024	305	0.47	13.4	7.26	7.8	9.69
20PS-MW13	7/24/2024	279	2.91	95	6.95	4.53	6.19
	9/6/2024	289	1.08	23.4	6.74	5.1	11.99
20PS-MW14	NS	NS	NS	NS	NS	NS	NS
	9/10/2024	421	1	7.7	6.77	9.12	2.11
20PS-MW15	7/24/2024	194	1.32	58.7	6.91	5.95	20.34
	9/6/2024	225	1.75	10.9	6.72	8.87	6.06
20PS-MW17	7/26/2024	232	1.3	97.1	6.82	7.03	35.13
	9/7/2024	225	0.38	3.8	7.06	5.98	138.6
20PS-MW19	7/19/2024	239	1.49	49.4	7.23	3.87	62.15
	9/8/2024	287	6.4	55	6.91	4.43	35.41
20PS-MW20	7/19/2024	323	1.25	76.8	7.19	5.73	2.63
	9/8/2024	407	29.7	59.6	7.04	6.19	0.12
20PS-MW22	7/29/2024	368	0.35	79.9	7.43	6.96	6.99
	9/10/2024	385	10.98	42.2	6.66	7.46	9.98
20PS-MW23	7/27/2024	313	0.79	43.5	6.43	9.59	0.39
	9/8/2024	278	3.53	25.7	6.82	10.68	3.81
20PS-MW24	7/18/2024	234	5.47	56.2	7.18	5.92	0.09
	9/4/2024	237	8.27	29.4	6.99	6.17	39.09
20PS-MW25	7/18/2024	193	0.74	30.2	7.06	3.7	0.5
	9/8/2024	224	17.6	45.3	6.89	4.95	25.39
20PS-MW27	NS	NS	NS	NS	NS	NS	NS
	9/10/2024	277	1.67	-90.8	7.04	6.81	4.8
20PS-MW29	7/26/2024	291	0.25	51.5	6.89	8.47	13.98
	9/7/2024	283	8.66	10.4	7	8.18	5.13
20PS-MW30	7/26/2024	249	0.77	35.7	6.8	5.66	6.39
	9/7/2024	238	2.65	-57.8	7.18	4.97	31.78
DSAP-10	7/21/2024	321	0.79	30.4	7.08	4.3	2.65
	9/9/2024	365	5.6	41.2	6.97	4.48	12.3
DSAP-11	7/24/2024	335	4.65	169	6.75	7.8	6.02
	9/5/2024	308	3.94	88.2	6.61	7.86	8.17

Table 3. 2024 Water Quality Parameters

Well ID	Sample Date	Conductivity (µs/cm)	Dissolved oxygen (mg/L)	Oxidation reduction potential (mV)	pH	Temperature (°C)	Turbidity (NTU)
DSAP-13	7/19/2024	257	6.14	67.5	7.08	4.99	1.29
	9/8/2024	308	28.6	68.3	6.92	5.48	6.54
DSAP-14	7/19/2024	293	0.75	64.6	6.97	8.22	2.59
	9/8/2024	333	2	55.2	6.91	8.38	4.16
DSAP-8D	7/21/2024	228	1.11	74.4	7.04	4.61	0.00
	9/9/2024	265	48.1	43.4	6.93	4.97	0.00
DSAP-8S	7/21/2024	162	1.84	90.4	6.97	4.95	16.07
	9/9/2024	207	8.5	37.9	6.82	5.86	219.4
HCMW01DP	7/18/2024	169	0.5	43.7	7.37	7.99	0.01
	9/7/2024	179	1.5	12.4	7.34	5.36	0.95
HCMW01MD	7/18/2024	217	0.39	73.2	7.29	3.49	0.00
	9/7/2024	248	3.2	31.9	7.22	4.05	0.19
HCMW01WT	7/18/2024	347	6.47	92.3	7.11	2.7	16.01
	9/7/2024	425	60.6	36.6	7.02	4.92	9.47
HCMW02DP	7/28/2024	180	0.61	-3.3	8.01	5.83	8.4
	9/10/2024	169	2.14	40.2	6.87	5.03	7.52
HCMW02MD	7/24/2024	263	10.8	-37.4	7.36	7.07	5.84
	9/5/2024	249	0.96	-142.3	6.91	5.77	8.71
HCMW02WT	7/24/2024	275	10.59	135.6	6.77	6.44	3.64
	9/5/2024	244	1.46	48.3	6.92	6.98	5.75
HCMW03DP	7/17/2024	290	0.75	78	6.68	7.34	34.04
	9/7/2024	209	2.3	15.4	6.61	8.94	9.92
HCMW03MD	7/17/2024	239	0.68	68.6	7	7.23	2.29
	9/7/2024	247	2	-67.2	7.01	7.2	1.77
HCMW03WT	7/17/2024	350	1.58	106.4	6.74	6.08	4.98
	9/7/2024	521	4.7	-86.9	6.82	8.37	7.38
HCMW05DP	7/25/2024	575	11.53	70.2	11.25	6.41	8.53
	9/6/2024	568	-0.07	-184.6	11.61	5.62	3.96
HCMW05MD	7/25/2024	185	4.47	-43.7	6.95	6.04	1.68
	9/6/2024	177	0.46	-117.7	6.72	5.48	1.8
HCMW05WT	7/25/2024	223	7.7	-14.9	6.51	9.61	3.77
	9/6/2024	181	1.31	-85.6	6.45	8.09	1.87
HCMW06DP	7/15/2024	185	0.46	-60	7.24	1.73	2.48
	9/6/2024	77	23.9	47.2	7.31	4.07	0.38

Table 3. 2024 Water Quality Parameters

Well ID	Sample Date	Conductivity (µs/cm)	Dissolved oxygen (mg/L)	Oxidation reduction potential (mV)	pH	Temperature (°C)	Turbidity (NTU)
HCMW06WT	7/15/2024	275	2.82	220.1	6.73	1.59	5.57
	9/6/2024	222	1.6	102.7	7.06	3.3	3.73
MW-2	7/16/2024	316	1.54	-127.6	7.19	8.12	0.00
	9/7/2024	294	2.8	37.3	6.99	8.63	1.63
MW-BKG-01	7/18/2024	232	1.3	86.8	7.02	4	0.00
	9/7/2024	296	2.3	26.2	6.97	6.15	8.94
MW-BKG-04	7/16/2024	207	3.22	36.7	7.12	2.59	15.87
	9/6/2024	264	2.9	19.4	6.92	4.46	85.26
MW-BKG-07	7/16/2024	131	2.96	58.5	6.62	3.46	0.00
	9/6/2024	113	10.2	37.1	6.32	4.3	0.00
MW-BKG-09	7/17/2024	231	1.27	24.7	7.07	5.84	0.09
	9/7/2024	256	5.7	11.1	6.98	6.66	13.89
MW-BKG-10	7/17/2024	212	1.86	21.8	6.88	3.96	1.14
	9/7/2024	257	10.7	24.45	6.67	4.51	12.96
MW-BKG-12	7/16/2024	239	3.54	57	6.58	7.47	41.24
	9/6/2024	206	11.4	22.8	6.51	6.42	100.8
MW1-100	7/28/2024	202	0.45	25.7	7.2	6.09	3.88
	9/9/2024	210	0.97	-96.2	7.18	6.84	5.71
MW1-150	7/28/2024	182	2.19	-55.3	8.83	5.98	0.00
	9/9/2024	175	2.9	-76.9	7.41	7.24	1.01
MW1-50	7/28/2024	238	0.35	-69.1	8.89	5.04	1.12
	9/9/2024	227	2.24	-85.6	7.41	6.1	0.12
MW2-100	7/16/2024	270	0.35	-116	7.3	9.41	0.00
	9/6/2024	249	1.2	-111	7.18	9.68	0.00
MW2-150	7/16/2024	218	0.47	-138.4	7.44	9.33	3.15
	9/6/2024	203	2	-117.4	7.26	9.92	7.02
MW2-50	7/16/2024	329	1.03	-87	7.16	10.55	0.27
	9/6/2024	301	25.8	-94.2	7.06	10.54	0.00
MW3-100	7/23/2024	185	1.05	-61.4	7.29	5.66	0.00
	9/4/2024	173	11.57	12.7	7.36	6.33	0.83
MW3-50	7/23/2024	231	1.01	-64.2	7.27	5.61	1.07
	9/4/2024	212	2.27	17.3	7.22	6.01	6.57
NPA-40	7/19/2024	304	0.54	23.9	7.34	4.81	0.00
	9/8/2024	332	2.2	49.9	7.25	4.2	4.17

Table 3. 2024 Water Quality Parameters

Well ID	Sample Date	Conductivity (µs/cm)	Dissolved oxygen (mg/L)	Oxidation reduction potential (mV)	pH	Temperature (°C)	Turbidity (NTU)
NPB-20*	7/19/2024	267	0.42	54.3	7.25	5.57	0.00
	9/8/2024	303	1	60.3	7.1	5.19	0.00
NPB-40	7/19/2024	244	0.75	45.4	7.26	6.21	2.51
	9/8/2024	260	1.4	52.9	7.14	4.7	0.00
NPC-20	7/20/2024	345	0.34	-35.9	7.02	5.31	13.52
	9/9/2024	377	2.5	39.5	6.91	5.54	0.00
NPC-40	7/20/2024	255	0.14	8.7	7.16	5.62	9.7
	9/9/2024	278	1	33.9	7.05	4.91	0.00
NPD-20	7/20/2024	376	0.4	-17.1	6.95	5.85	32.45
	9/9/2024	782	6.4	59.7	6.45	6.98	2.84
NPD-40	7/20/2024	294	0.19	19.5	7.09	5.87	6.47
	9/9/2024	347	1.2	46.2	6.96	5.34	3.48
NPF-20	7/20/2024	430	1.51	19	6.95	2.98	21.53
	9/9/2024	554	2.6	73.2	6.8	4.47	3.3
NPF-40	7/20/2024	222	0.19	11	7.38	4.16	0.00
	9/9/2024	248	1.1	36.8	7.27	4.19	0.00
NPG-20	7/20/2024	282	0.59	7	6.91	4.6	10.04
	9/9/2024	326	9.1	55.2	6.83	5.79	0.00
NPG-40	7/20/2024	240	0.4	-70.2	7.29	4.37	45.16
	9/9/2024	272	0.9	38.9	7.13	4.98	0.00
USAP-1	7/18/2024	234	0.88	50.8	7.12	3.84	0.26
	9/8/2024	263	4.6	68.1	6.99	3.98	12.94
USAP-3	7/18/2024	209	0.57	22.4	7.16	3.92	0.00
	9/8/2024	234	2.1	43.1	7.09	3.41	4.26

Notes:

*Well NPB-20 is recorded as NPB-22 on the field documentation and sample IDs

° C = degrees Celsius

ID = Identification

NS = not sampled due to flooding in well vicinity

NTU = Nephelometric Unit

mg/L = milligrams per liter

mV = millivolts

µS/cm = microsiemens per centimeter

Table 4. 2024 Groundwater Sample Summary

Well ID	Sample Depth (ft btoc)	Field Sample ID	QC	SDG	Laboratory ID	Sample Collection Date	Sample Collection Time	Matrix	Container Type/Volume	Analytical Methods	Field Preservation	Cooler Name	NPDL Number	Turnaround Time	Laboratory	Sampler Initials
02MW11	17.75	24-02MW11-0716	N	320-113932-1	320-113932-11	07/16/2024	16:27	WG	2x 250 mL HDPE	E1633	None	RED	22-056	10 Days	Eurofins TA-SAC	JB/KR
02MW11	17.75	24-02MW11-0907	N	320-115197-1	320-115197-1	09/07/2024	09:47	WG	2x 250 mL HDPE	E1633	None	HALIBUT	22-056	10 Days	Eurofins TA-SAC	JB/KR
02MW11	17.75	24-DUP01-0907	FD	320-115197-1	320-115197-2	09/07/2024	09:50	WG	2x 250 mL HDPE	E1633	None	HALIBUT	22-056	10 Days	Eurofins TA-SAC	JB/KR
19PS-MW01A	56.31	24-19PS-MW01A-0726	N	320-114280-1	320-114280-2	07/26/2024	16:32	WG	2x 250 mL HDPE	E1633	None	Spr24-02	22-056	10 Days	Eurofins TA-SAC	SA/BL
19PS-MW01A	56.31	24-19PS-MW01A-0908	N	320-115216-1	320-115216-1	09/08/2024	12:13	WG	2x 250 mL HDPE	E1633	None	Fall24-03	22-056	10 Days	Eurofins TA-SAC	SA/HM/BL
19PS-MW01B	104.75	24-19PS-MW01B-0726	N	320-114280-1	320-114280-3	07/26/2024	16:22	WG	2x 250 mL HDPE	E1633	None	Spr24-02	22-056	10 Days	Eurofins TA-SAC	SA/BL
19PS-MW01B	104.75	24-19PS-MW01B-0908	N	320-115216-1	320-115216-2	09/08/2024	12:15	WG	2x 250 mL HDPE	E1633	None	Fall24-03	22-056	10 Days	Eurofins TA-SAC	SA/HM/BL
19PS-MW01B	104.75	24-DUP01-0908	FD	320-115216-1	320-115216-3	09/08/2024	12:25	WG	2x 250 mL HDPE	E1633	None	Fall24-03	22-056	10 Days	Eurofins TA-SAC	SA/HM/BL
19PS-MW02A	54	24-19PS-MW02A-0728	N	320-114280-1	320-114280-9	07/28/2024	11:38	WG	2x 250 mL HDPE	E1633	None	Spr24-02	22-056	10 Days	Eurofins TA-SAC	SA/BL
19PS-MW02A	54	24-DUP01-0728	FD	320-114280-1	320-114280-4	07/28/2024	12:00	WG	2x 250 mL HDPE	E1633	None	Spr24-02	22-056	10 Days	Eurofins TA-SAC	SA/BL
19PS-MW02A	54	24-19PS-MW02A-0909	N	320-115264-1	320-115264-5	09/09/2024	10:58	WG	2x 250 mL HDPE	E1633	None	Fall24-04	22-056	10 Days	Eurofins TA-SAC	SA/HM/BL
19PS-MW02A	54	24-DUP01-0909	FD	320-115264-1	320-115264-6	09/09/2024	11:08	WG	2x 250 mL HDPE	E1633	None	Fall24-04	22-056	10 Days	Eurofins TA-SAC	SA/HM/BL
19PS-MW02B	106.8	24-19PS-MW02B-0729	N	320-114270-1	320-114270-4	07/29/2024	12:01	WG	2x 250 mL HDPE	E1633	None	Spr24-04	22-056	10 Days	Eurofins TA-SAC	SA/BL
19PS-MW02B	106.8	24-19PS-MW02B-0909	N	320-115264-1	320-115264-7	09/09/2024	11:28	WG	2x 250 mL HDPE	E1633	None	Fall24-04	22-056	10 Days	Eurofins TA-SAC	SA/HM/BL
20PS-MW01	8	24-20PS-MW01-0723	N	320-114960-1	320-114960-5	07/23/2024	16:25	WG	2x 250 mL HDPE	E1633	None	Spr24-01	22-056	10 Days	Eurofins TA-SAC	SA/BL
20PS-MW01	8	24-20PS-MW01-0905	N	320-115217-1	320-115217-3	09/05/2024	14:35	WG	2x 250 mL HDPE	E1633	None	Fall24-02	22-056	10 Days	Eurofins TA-SAC	BL/HM
20PS-MW01C	155.3	24-DUP01-0727	FD	320-114322-1	320-114322-1	07/27/2024	12:00	WG	2x 250 mL HDPE	E1633	None	Spr24-02	22-056	10 Days	Eurofins TA-SAC	SA/BL
20PS-MW01C	155.3	24-20PS-MW01C-0727	N	320-114280-1	320-114280-10	07/27/2024	13:16	WG	2x 250 mL HDPE	E1633	None	Spr24-02	22-056	10 Days	Eurofins TA-SAC	SA/BL
20PS-MW01C	155.3	24-20PS-MW01C-0727	MS	320-114280-1	320-114280-10	07/27/2024	13:16	WG	2x 250 mL HDPE	E1633	None	Spr24-02	22-056	10 Days	Eurofins TA-SAC	SA/BL
20PS-MW01C	155.3	24-20PS-MW01C-0727	MSD	320-114280-1	320-114280-10	07/27/2024	13:16	WG	2x 250 mL HDPE	E1633	None	Spr24-02	22-056	10 Days	Eurofins TA-SAC	SA/BL
20PS-MW01C	155.3	24-20PS-MW01C-0908	N	320-115216-1	320-115216-4	09/08/2024	13:01	WG	2x 250 mL HDPE	E1633	None	Fall24-03	22-056	10 Days	Eurofins TA-SAC	SA/HM/BL
20PS-MW01D	204	24-20PS-MW01D-0728	N	320-114298-1	320-114298-5	07/28/2024	14:10	WG	2x 250 mL HDPE	E1633	None	Spr24-03	22-056	10 Days	Eurofins TA-SAC	SA/BL
20PS-MW01D	204	24-20PS-MW01D-0910	N	320-115324-1	320-115324-1	09/10/2024	12:43	WG	2x 250 mL HDPE	E1633	None	Fall24-06	22-056	10 Days	Eurofins TA-SAC	SA/HM/BL
20PS-MW02	7.8	24-20PS-MW02-0729	N	320-114270-1	320-114270-2	07/29/2024	14:50	WG	2x 250 mL HDPE	E1633	None	Spr24-04	22-056	10 Days	Eurofins TA-SAC	SA/BL
20PS-MW02	7.8	24-DUP01-0729	FD	320-114270-1	320-114270-1	07/29/2024	15:00	WG	2x 250 mL HDPE	E1633	None	Spr24-04	22-056	10 Days	Eurofins TA-SAC	SA/BL
20PS-MW02	7.8	24-20PS-MW02-0910	N	320-115324-1	320-115324-5	09/10/2024	16:30	WG	2x 250 mL HDPE	E1633	None	Fall24-06	22-056	10 Days	Eurofins TA-SAC	SA/HM/BL
20PS-MW02C	156	24-20PS-MW02C-0728	N	320-114270-1	320-114270-9	07/28/2024	12:34	WG	2x 250 mL HDPE	E1633	None	Spr24-04	22-056	10 Days	Eurofins TA-SAC	SA/HM/BL
20PS-MW02C	156	24-20PS-MW02C-0909	N	320-115264-1	320-115264-4	09/09/2024	10:40	WG	2x 250 mL HDPE	E1633	None	Fall24-04	22-056	10 Days	Eurofins TA-SAC	SA/HM/BL
20PS-MW02C	156	24-20PS-MW02C-0909	MS	320-115264-1	320-115264-4	09/09/2024	10:40	WG	2x 250 mL HDPE	E1633	None	Fall24-04	22-056	10 Days	Eurofins TA-SAC	SA/HM/BL
20PS-MW02C	156	24-20PS-MW02C-0909	MSD	320-115264-1	320-115264-4	09/09/2024	10:40	WG	2x 250 mL HDPE	E1633	None	Fall24-04	22-056	10 Days	Eurofins TA-SAC	SA/HM/BL
20PS-MW02D	204.8	24-20PS-MW02D-0728	N	320-114298-1	320-114298-7	07/28/2024	11:47	WG	2x 250 mL HDPE	E1633	None	Spr24-03	22-056	10 Days	Eurofins TA-SAC	SA/BL
20PS-MW02D	204.8	24-20PS-MW02D-0910	N	320-115324-1	320-115324-4	09/10/2024	15:12	WG	2x 250 mL HDPE	E1633	None	Fall24-06	22-056	10 Days	Eurofins TA-SAC	SA/HM/BL
20PS-MW03	8	24-20PS-MW03-0729	N	320-114270-1	320-114270-3	07/29/2024	13:55	WG	2x 250 mL HDPE	E1633	None	Spr24-04	22-056	10 Days	Eurofins TA-SAC	SA/BL
20PS-MW03	8	24-20PS-MW03-0910	N	320-115324-1	320-115324-6	09/10/2024	16:51	WG	2x 250 mL HDPE	E1633	None	Fall24-06	22-056	10 Days	Eurofins TA-SAC	SA/HM/BL
20PS-MW06*	10.5	24-20PS-MW06-0727	N	320-114270-1	320-114270-8*	07/27/2024	19:47	WG	2x 250 mL HDPE	E1633	None	Spr24-04	22-056	10 Days	Eurofins TA-SAC	SA/BL
20PS-MW06	10.5	24-20PS-MW06-0909	N	320-115263-1	320-115263-2	09/09/2024	15:57	WG	2x 250 mL HDPE	E1633	None	Fall24-05	22-056	10 Days	Eurofins TA-SAC	SA/HM
20PS-MW07	9	24-20PS-MW07-0728	N	320-114298-1	320-114298-6	07/28/2024	16:23	WG	2x 250 mL HDPE	E1633	None	Spr24-03	22-056	10 Days	Eurofins TA-SAC	SA/BL
20PS-MW07	9	24-20PS-MW07-0909	N	320-115263-1	320-115263-1	09/09/2024	15:03	WG	2x 250 mL HDPE	E1633	None	Fall24-05	22-056	10 Days	Eurofins TA-SAC	SA/HM
20PS-MW08	8	24-20PS-MW08-0727	N	320-114270-1	320-114270-11	07/27/2024	18:34	WG	2x 250 mL HDPE	E1633	None	Spr24-04	22-056	10 Days	Eurofins TA-SAC	SA/BL
20PS-MW08	8	24-20PS-MW08-0909	N	320-115264-1	320-115264-8	09/09/2024	14:19	WG	2x 250 mL HDPE	E1633	None	Fall24-04	22-056	10 Days	Eurofins TA-SAC	SA/HM/BL
20PS-MW09	11.5	24-20PS-MW09-0725	N	320-114298-1	320-114298-10	07/25/2024	17:21	WG	2x 250 mL HDPE	E1633	None	Spr24-03	22-056	10 Days	Eurofins TA-SAC	SA/BL
20PS-MW09	11.5	24-20PS-MW09-0907	N	320-115218-1	320-115218-7	09/07/2024	11:36	WG	2x 250 mL HDPE	E1633	None	Fall24-01	22-056	10 Days	Eurofins TA-SAC	SA/HM
20PS-MW10	8	24-20PS-MW10-0727	N	320-114322-1	320-114322-2	07/27/2024	17:44	WG	2x 250 mL HDPE	E1633	None	Spr24-05	22-056	10 Days	Eurofins TA-SAC	SA/BL
20PS-MW10	8	24-20PS-MW10-0908	N	320-115264-1	320-115264-3	09/08/2024	17:39	WG	2x 250 mL HDPE	E1633	None	Fall24-04	22-056	10 Days	Eurofins TA-SAC	SA/HM/BL
20PS-MW11	6.5	24-20PS-MW11-0727	N	320-114270-1	320-114270-10	07/27/2024	16:55	WG	2x 250 mL HDPE	E1633	None	Spr24-04	22-056	10 Days	Eurofins TA-SAC	SA/BL
20PS-MW11	6.5	24-20PS-MW11-0908	N	320-115264-1	320-115264-2	09/08/2024	16:24	WG	2x 250 mL HDPE	E1633	None	Fall24-04	22-056	10 Days	Eurofins TA-SAC	SA/HM/BL
20PS-MW12	8	24-20PS-MW12-0723	N	320-114960-1	320-114960-1	07/23/2024	11:27	WG	2x 250 mL HDPE	E1633	None	Spr24-01	22-056	10 Days	Eurofins TA-SAC	SA/BL
20PS-MW12	8	24-DUP01-0723	FD	320-114960-1	320-114960-2	07/23/2024	11:30	WG	2x 250 mL HDPE	E1633	None	Spr24-01	22-056	10 Days	Eurofins TA-SAC	SA/BL
20PS-MW12	8	24-20PS-MW12-0723	MS	320-114960-1	320-114960-1	07/23/2024	11:27	WG	2x 250 mL HDPE	E1633	None	Spr24-01	22-056	10 Days	Eurofins TA-SAC	SA/BL
20PS-MW12	8	24-20PS-MW12-0723	MSD	320-114960-1	320-114960-1	07/23/2024	11:27	WG	2x 250 mL HDPE	E1633	None	Spr24-01	22-056	10 Days	Eurofins TA-SAC	SA/BL
20PS-MW12	8	24-20PS-MW12-0904	N	320-115218-1	320-115218-3	09/04/2024	14:29	WG	2x 250 mL HDPE	E1633	None	Fall24-01	22-056	10 Days	Eurofins TA-SAC	BL/HM
20PS-MW13	10	24-20PS-MW13-0724	N	320-114960-1	320-114960-9	07/24/2024	14:15	WG	2x 250 mL HDPE	E1633	None	Spr24-01	22-056	10 Days	Eurofins TA-SAC	SA/BL
20PS-MW13	10	24-20PS-MW13-0906	N	320-115216-1	320-115216-5	09/06/2024	18:45	WG	2x 250 mL HDPE	E1633	None	Fall24-03	22-056	10 Days	Eurofins TA-SAC	SA/HM/BL
20PS-MW14	8	24-20PS-MW14-0910	N	320-115324-1	320-115324-3	09/10/2024	14:10	WG	2x 250 mL HDPE	E1633	None	Fall24-06	22-056	10 Days	Eurofins TA-SAC	SA/HM/BL
20PS-MW15	10	24-20PS-MW15-0724	N	320-114960-1	320-114960-8	07/24/2024	13:11	WG	2x 250 mL HDPE	E1633	None	Spr24-01	22-056	10 Days	Eurofins TA-SAC	SA/BL
20PS-MW15	10	24-20PS-MW15-0906	N	320-115217-1	320-115217-6	09/06/2024	12:53	WG	2x 250 mL HDPE	E1633	None	Fall24-02	22-056	10 Days	Eurofins TA-SAC	SA/HM/BL
20PS-MW15	10	24-DUP01-0906	FD	320-115217-1	320-115217-7	09/06/2024	13:03	WG	2x 250 mL HDPE	E1633	None	Fall24-02	22-056	10 Days	Eurofins TA-SAC	SA/HM/BL

Table 4. 2024 Groundwater Sample Summary

Well ID	Sample Depth (ft btoc)	Field Sample ID	QC	SDG	Laboratory ID	Sample Collection Date	Sample Collection Time	Matrix	Container Type/Volume	Analytical Methods	Field Preservation	Cooler Name	NPDL Number	Turnaround Time	Laboratory	Sampler Initials
20PS-MW17	8	24-20PS-MW17-0726	N	320-114280-1	320-114280-6	07/26/2024	13:27	WG	2x 250 mL HDPE	E1633	None	Spr24-02	22-056	10 Days	Eurofins TA-SAC	SA/BL
20PS-MW17	8	24-20PS-MW17-0907	N	320-115218-1	320-115218-9	09/07/2024	15:15	WG	2x 250 mL HDPE	E1633	None	Fall24-01	22-056	10 Days	Eurofins TA-SAC	SA/HM
20PS-MW19	8	24-20PS-MW19-0719	N	320-114018-1	320-114018-2	07/19/2024	11:41	WG	2x 250 mL HDPE	E1633	None	COHO	22-056	10 Days	Eurofins TA-SAC	JB/KR
20PS-MW19	8	24-20PS-MW19-0908	N	320-115187-1	320-115187-9	09/08/2024	12:00	WG	2x 250 mL HDPE	E1633	None	GRAYLING	22-056	10 Days	Eurofins TA-SAC	JB/KR
20PS-MW20	8	24-20PS-MW20-0719	N	320-114018-1	320-114018-1	07/19/2024	10:38	WG	2x 250 mL HDPE	E1633	None	COHO	22-056	10 Days	Eurofins TA-SAC	JB/KR
20PS-MW20	8	24-20PS-MW20-0908	N	320-115190-1	320-115190-1	09/08/2024	13:07	WG	2x 250 mL HDPE	E1633	None	PIKE	22-056	10 Days	Eurofins TA-SAC	JB/KR
20PS-MW22	15	24-20PS-MW22-0729	N	320-114270-1	320-114270-6	07/29/2024	10:55	WG	2x 250 mL HDPE	E1633	None	Spr24-04	22-056	10 Days	Eurofins TA-SAC	SA/BL
20PS-MW22	15	24-20PS-MW22-0910	N	320-115263-1	320-115263-8	09/10/2024	11:43	WG	2x 250 mL HDPE	E1633	None	Fall24-05	22-056	10 Days	Eurofins TA-SAC	SA/HM/BL
20PS-MW23	8	24-20PS-MW23-0727	N	320-114298-1	320-114298-9	07/27/2024	14:55	WG	2x 250 mL HDPE	E1633	None	Spr24-03	22-056	10 Days	Eurofins TA-SAC	SA/BL
20PS-MW23	8	24-20PS-MW23-0908	N	320-115264-1	320-115264-1	09/08/2024	13:55	WG	2x 250 mL HDPE	E1633	None	Fall24-04	22-056	10 Days	Eurofins TA-SAC	SA/HM/BL
20PS-MW24	9.5	24-20PS-MW24-0718	N	320-114037-1	320-114037-5	07/18/2024	13:26	WG	2x 250 mL HDPE	E1633	None	SOCKEYE	22-056	10 Days	Eurofins TA-SAC	JB/KR
20PS-MW24	9.5	24-20PS-MW24-0904	N	320-115218-1	320-115218-1	09/04/2024	11:56	WG	2x 250 mL HDPE	E1633	None	Fall24-01	22-056	10 Days	Eurofins TA-SAC	BL/HM
20PS-MW24	9.5	24-DUP01-0904	FD	320-115218-1	320-115218-2	09/04/2024	12:06	WG	2x 250 mL HDPE	E1633	None	Fall24-01	22-056	10 Days	Eurofins TA-SAC	BL/HM
20PS-MW25	9	24-20PS-MW25-0718	N	320-114037-1	320-114037-9	07/18/2024	16:30	WG	2x 250 mL HDPE	E1633	None	SOCKEYE	22-056	10 Days	Eurofins TA-SAC	JB/KR
20PS-MW25	9	24-20PS-MW25-0718	MS	320-114037-1	320-114037-9	07/18/2024	16:33	WG	2x 250 mL HDPE	E1633	None	SOCKEYE	22-056	10 Days	Eurofins TA-SAC	JB/KR
20PS-MW25	9	24-20PS-MW25-0718	MSD	320-114037-1	320-114037-9	07/18/2024	16:33	WG	2x 250 mL HDPE	E1633	None	SOCKEYE	22-056	10 Days	Eurofins TA-SAC	JB/KR
20PS-MW25	9	24-20PS-MW25-0908	N	320-115187-1	320-115187-8	09/08/2024	10:45	WG	2x 250 mL HDPE	E1633	None	GRAYLING	22-056	10 Days	Eurofins TA-SAC	JB/KR
20PS-MW27	15.8	24-20PS-MW27-0910	N	320-115324-1	320-115324-2	09/10/2024	14:07	WG	2x 250 mL HDPE	E1633	None	Fall24-06	22-056	10 Days	Eurofins TA-SAC	SA/HM/BL
20PS-MW29	12	24-20PS-MW029-0726	N	320-114280-1	320-114280-1	07/26/2024	14:45	WG	2x 250 mL HDPE	E1633	None	Spr24-02	22-056	10 Days	Eurofins TA-SAC	SA/BL
20PS-MW29	12	24-20PS-MW29-0907	N	320-115218-1	320-115218-8	09/07/2024	14:17	WG	2x 250 mL HDPE	E1633	None	Fall24-01	22-056	10 Days	Eurofins TA-SAC	SA/HM
20PS-MW30	15	24-20PS-MW30-0726	N	320-114280-1	320-114280-5	07/26/2024	12:18	WG	2x 250 mL HDPE	E1633	None	Spr24-02	22-056	10 Days	Eurofins TA-SAC	SA/BL
20PS-MW30	15	24-20PS-MW30-0907	N	320-115218-1	320-115218-10	09/07/2024	15:50	WG	2x 250 mL HDPE	E1633	None	Fall24-01	22-056	10 Days	Eurofins TA-SAC	SA/HM
DSAP-10	12.7	24-DSAP-10-0721	N	320-114049-1	320-114049-1	07/21/2024	11:50	WG	2x 250 mL HDPE	E1633	None	CHUM	22-056	10 Days	Eurofins TA-SAC	JB/KR
DSAP-10	12.7	24-DUP05-0721	FD	320-114049-1	320-114049-2	07/21/2024	11:55	WG	2x 250 mL HDPE	E1633	None	CHUM	22-056	10 Days	Eurofins TA-SAC	JB/KR
DSAP-10	12.7	24-DSAP-10-0721	MS	320-114049-1	320-114049-1	07/21/2024	12:00	WG	2x 250 mL HDPE	E1633	None	CHUM	22-056	10 Days	Eurofins TA-SAC	JB/KR
DSAP-10	12.7	24-DSAP-10-0721	MSD	320-114049-1	320-114049-1	07/21/2024	12:00	WG	2x 250 mL HDPE	E1633	None	CHUM	22-056	10 Days	Eurofins TA-SAC	JB/KR
DSAP-10	12.7	24-DSAP-10-0909	N	320-115290-1	320-115290-5	09/09/2024	19:20	WG	2x 250 mL HDPE	E1633	None	ROCKFISH	22-056	10 Days	Eurofins TA-SAC	JB/KR
DSAP-10	12.7	24-DUP04-0909	FD	320-115290-1	320-115290-6	09/09/2024	19:27	WG	2x 250 mL HDPE	E1633	None	ROCKFISH	22-056	10 Days	Eurofins TA-SAC	JB/KR
DSAP-11	14.2	24-DSAP-11-0724	N	320-114960-1	320-114960-7	07/24/2024	11:57	WG	2x 250 mL HDPE	E1633	None	Spr24-01	22-056	10 Days	Eurofins TA-SAC	SA/BL
DSAP-11	14.2	24-DSAP-11-0905	N	320-115217-1	320-115217-1	09/05/2024	12:03	WG	2x 250 mL HDPE	E1633	None	Fall24-02	22-056	10 Days	Eurofins TA-SAC	BL/HM
DSAP-11	14.2	24-DUP01-0905	FD	320-115217-1	320-115217-2	09/05/2024	12:12	WG	2x 250 mL HDPE	E1633	None	Fall24-02	22-056	10 Days	Eurofins TA-SAC	BL/HM
DSAP-14	17.6	24-DSAP-14-0719	N	320-114044-1	320-114044-1	07/19/2024	09:08	WG	2x 250 mL HDPE	E1633	None	KING	22-056	10 Days	Eurofins TA-SAC	JB/KR
DSAP-14	17.6	24-DSAP-14-0908	N	320-115190-1	320-115190-2	09/08/2024	14:18	WG	2x 250 mL HDPE	E1633	None	PIKE	22-056	10 Days	Eurofins TA-SAC	JB/KR
DSAP13	10.3	24-DSAP-13-0719	N	320-114018-1	320-114018-3	07/19/2024	13:09	WG	2x 250 mL HDPE	E1633	None	COHO	22-056	10 Days	Eurofins TA-SAC	JB/KR
DSAP13	10.3	24-DSAP-13-0908	N	320-115190-1	320-115190-3	09/08/2024	15:08	WG	2x 250 mL HDPE	E1633	None	PIKE	22-056	10 Days	Eurofins TA-SAC	JB/KR
DSAP8D	61.7	24-DSAP-8D-0721	N	320-114044-1	320-114044-10	07/21/2024	10:19	WG	2x 250 mL HDPE	E1633	None	SOCKEYE	22-056	10 Days	Eurofins TA-SAC	JB/KR
DSAP8D	61.7	24-DSAP-8D-0909	N	320-115290-1	320-115290-3	09/09/2024	17:58	WG	2x 250 mL HDPE	E1633	None	ROCKFISH	22-056	10 Days	Eurofins TA-SAC	JB/KR
DSAP8S	16.4	24-DSAP-8S-0722	N	320-114044-1	320-114044-9	07/21/2024	09:39	WG	2x 250 mL HDPE	E1633	None	KING	22-056	10 Days	Eurofins TA-SAC	JB/KR
DSAP8S	16.4	24-DSAP-8S-0909	N	320-115290-1	320-115290-4	09/09/2024	18:27	WG	2x 250 mL HDPE	E1633	None	ROCKFISH	22-056	10 Days	Eurofins TA-SAC	JB/KR
HCMW01DP	200.5	24-HCMW01DP-0718	N	320-114037-1	320-114037-4	07/18/2024	11:20	WG	2x 250 mL HDPE	E1633	None	SOCKEYE	22-056	10 Days	Eurofins TA-SAC	JB/KR
HCMW01DP	200.5	24-HCMW01DP-0907	N	320-115187-1	320-115187-4	09/07/2024	17:25	WG	2x 250 mL HDPE	E1633	None	GRAYLING	22-056	10 Days	Eurofins TA-SAC	JB/KR
HCMW01MD	70.5	24-HCMW01MD-0718	N	320-114037-1	320-114037-3	07/18/2024	10:24	WG	2x 250 mL HDPE	E1633	None	SOCKEYE	22-056	10 Days	Eurofins TA-SAC	JB/KR
HCMW01MD	70.5	24-HCMW01MD-0907	N	320-115187-1	320-115187-3	09/07/2024	16:48	WG	2x 250 mL HDPE	E1633	None	GRAYLING	22-056	10 Days	Eurofins TA-SAC	JB/KR
HCMW01WT	12	24-HCMW01WT-0718	N	320-114037-1	320-114037-2	07/18/2024	09:48	WG	2x 250 mL HDPE	E1633	None	SOCKEYE	22-056	10 Days	Eurofins TA-SAC	JB/KR
HCMW01WT	12	24-HCMW01WT-0907	N	320-115187-1	320-115187-1	09/07/2024	16:20	WG	2x 250 mL HDPE	E1633	None	GRAYLING	22-056	10 Days	Eurofins TA-SAC	JB/KR
HCMW02DP	195.5	24-HCMW02DP-0728	N	320-114298-1	320-114298-4	07/28/2024	18:03	WG	2x 250 mL HDPE	E1633	None	Spr24-03	22-056	10 Days	Eurofins TA-SAC	SA/BL
HCMW02DP	195.5	24-HCMW02DP-0910	N	320-115263-1	320-115263-6	09/10/2024	10:35	WG	2x 250 mL HDPE	E1633	None	Fall24-05	22-056	10 Days	Eurofins TA-SAC	SA/HM/BL
HCMW02DP	195.5	24-DUP01-0910	FD	320-115263-1	320-115263-7	09/10/2024	10:45	WG	2x 250 mL HDPE	E1633	None	Fall24-05	22-056	10 Days	Eurofins TA-SAC	SA/HM/BL
HCMW02MD	70.5	24-HCMW02MD-0724	N	320-114960-1	320-114960-12	07/24/2024	16:25	WG	2x 250 mL HDPE	E1633	None	Spr24-01	22-056	10 Days	Eurofins TA-SAC	SA/BL
HCMW02MD	70.5	24-HCMW02MD-0905	N	320-115217-1	320-115217-4	09/05/2024	16:18	WG	2x 250 mL HDPE	E1633	None	Fall24-02	22-056	10 Days	Eurofins TA-SAC	BL/HM
HCMW02WT	11	24-HCMW02WT-0724	N	320-114960-1	320-114960-10	07/24/2024	16:07	WG	2x 250 mL HDPE	E1633	None	Spr24-01	22-056	10 Days	Eurofins TA-SAC	SA/BL
HCMW02WT	11	24-DUP01-0724	FD	320-114960-1	320-114960-11	07/24/2024	16:10	WG	2x 250 mL HDPE	E1633	None	Spr24-01	22-056	10 Days	Eurofins TA-SAC	SA/BL
HCMW02WT	11	24-HCMW02WT-0905	N	320-115217-1	320-115217-5	09/05/2024	16:38	WG	2x 250 mL HDPE	E1633	None	Fall24-02	22-056	10 Days	Eurofins TA-SAC	BL/HM
HCMW03DP	196.5	24-HCMW03DP-0717	N	320-113925-1	320-113925-3	07/17/2024	11:46	WG	2x 250 mL HDPE	E1633	None	BLUE	22-056	10 Days	Eurofins TA-SAC	JB/KR
HCMW03DP	196.5	24-HCMW03DP-0907	N	320-115197-1	320-115197-5	09/07/2024	12:04	WG	2x 250 mL HDPE	E1633	None	HALIBUT	22-056	10 Days	Eurofins TA-SAC	JB/KR
HCMW03MD	69.5	24-HCMW03MD-0717	N	320-113925-1	320-113925-2	07/17/2024	10:10	WG	2x 250 mL HDPE	E1633	None	BLUE	22-056	10 Days	Eurofins TA-SAC	JB/KR
HCMW03MD	69.5	24-HCMW03MD-0907	N	320-115197-1	320-115197-4	09/07/2024	11:16	WG	2x 250 mL HDPE	E1633	None	HALIBUT	22-056	10 Days	Eurofins TA-SAC	JB/KR

Table 4. 2024 Groundwater Sample Summary

Well ID	Sample Depth (ft btoc)	Field Sample ID	QC	SDG	Laboratory ID	Sample Collection Date	Sample Collection Time	Matrix	Container Type/Volume	Analytical Methods	Field Preservation	Cooler Name	NPDL Number	Turnaround Time	Laboratory	Sampler Initials
HCMW03WT	8.5	24-HCMW03WT-0717	N	320-113925-1	320-113925-1	07/17/2024	09:25	WG	2x 250 mL HDPE	E1633	None	BLUE	22-056	10 Days	Eurofins TA-SAC	JB/KR
HCMW03WT	8.5	24-HCMW03WT-0907	N	320-115197-1	320-115197-3	09/07/2024	10:44	WG	2x 250 mL HDPE	E1633	None	HALIBUT	22-056	10 Days	Eurofins TA-SAC	JB/KR
HCMW05DP	199.5	24-HCMW05DP-0725	N	320-114298-1	320-114298-8	07/25/2024	13:07	WG	2x 250 mL HDPE	E1633	None	Spr24-03	22-056	10 Days	Eurofins TA-SAC	SA/BL
HCMW05DP	199.5	24-HCMW05DP-0906	N	320-115217-1	320-115217-10	09/06/2024	16:51	WG	2x 250 mL HDPE	E1633	None	Fall24-02	22-056	10 Days	Eurofins TA-SAC	SA/HM/BL
HCMW05MD	69.5	24-HCMW05MD-0725	N	320-114270-1	320-114270-5	07/25/2024	14:09	WG	2x 250 mL HDPE	E1633	None	Spr24-04	22-056	10 Days	Eurofins TA-SAC	SA/BL
HCMW05MD	69.5	24-HCMW05MD-0906	N	320-115217-1	320-115217-9	09/06/2024	15:19	WG	2x 250 mL HDPE	E1633	None	Fall24-02	22-056	10 Days	Eurofins TA-SAC	SA/HM/BL
HCMW05WT	8	24-HCMW05WT-0725	N	320-114298-1	320-114298-11	07/25/2024	13:13	WG	2x 250 mL HDPE	E1633	None	Spr24-03	22-056	10 Days	Eurofins TA-SAC	SA/BL
HCMW05WT	8	24-HCMW05WT-0906	N	320-115217-1	320-115217-8	09/06/2024	15:14	WG	2x 250 mL HDPE	E1633	None	Fall24-02	22-056	10 Days	Eurofins TA-SAC	SA/HM/BL
HCMW06DP	198.5	24-HCMW06DP-0715	N	320-113932-1	320-113932-2	07/15/2024	18:27	WG	2x 250 mL HDPE	E1633	None	RED	22-056	10 Days	Eurofins TA-SAC	JB/KR
HCMW06DP	198.5	24-HCMW06DP-0906	N	320-115193-1	320-115193-2	09/06/2024	11:55	WG	2x 250 mL HDPE	E1633	None	YELLOW EYE	22-056	10 Days	Eurofins TA-SAC	JB/KR
HCMW06WT	10	24-HCMW06WT-0715	N	320-113932-1	320-113932-1	07/15/2024	16:53	WG	2x 250 mL HDPE	E1633	None	RED	22-056	10 Days	Eurofins TA-SAC	JB/KR
HCMW06WT	10	24-HCMW06WT-0906	N	320-115193-1	320-115193-1	09/06/2024	11:05	WG	2x 250 mL HDPE	E1633	None	YELLOW EYE	22-056	10 Days	Eurofins TA-SAC	JB/KR
MW-2	7.5	24-MW2-0716	N	320-113932-1	320-113932-10	07/16/2024	15:22	WG	2x 250 mL HDPE	E1633	None	RED	22-056	10 Days	Eurofins TA-SAC	JB/KR
MW-2	7.8	24-MW-2-0907	N	320-115193-1	320-115193-9	09/07/2024	09:07	WG	2x 250 mL HDPE	E1633	None	YELLOW EYE	22-056	10 Days	Eurofins TA-SAC	JB/KR
MW-BKG-01	12.5	24-MW-BKG-01-0718	N	320-114037-1	320-114037-1	07/18/2024	08:40	WG	2x 250 mL HDPE	E1633	None	SOCKEYE	22-056	10 Days	Eurofins TA-SAC	JB/KR
MW-BKG-01	12.5	24-MW-BKG-01-0907	N	320-115197-1	320-115197-9	09/07/2024	15:20	WG	2x 250 mL HDPE	E1633	None	HALIBUT	22-056	10 Days	Eurofins TA-SAC	JB/KR
MW-BKG-01	12.5	24-MW-BKG-01-0907	MS	320-115197-1	320-115197-9	09/07/2024	15:24	WG	2x 250 mL HDPE	E1633	None	HALIBUT	22-056	10 Days	Eurofins TA-SAC	JB/KR
MW-BKG-01	12.5	24-MW-BKG-01-0907	MSD	320-115197-1	320-115197-9	09/07/2024	15:24	WG	2x 250 mL HDPE	E1633	None	HALIBUT	22-056	10 Days	Eurofins TA-SAC	JB/KR
MW-BKG-04	15	24-MW-BKG-04-0716	N	320-113932-1	320-113932-3	07/16/2024	09:29	WG	2x 250 mL HDPE	E1633	None	RED	22-056	10 Days	Eurofins TA-SAC	JB/KR
MW-BKG-04	15	24-MW-BKG-04-0906	N	320-115193-1	320-115193-3	09/06/2024	13:00	WG	2x 250 mL HDPE	E1633	None	YELLOW EYE	22-056	10 Days	Eurofins TA-SAC	JB/KR
MW-BKG-07	16	24-DUP01-0716	FD	320-113932-1	320-113932-5	07/16/2024	10:22	WG	2x 250 mL HDPE	E1633	None	RED	22-056	10 Days	Eurofins TA-SAC	JB/KR
MW-BKG-07	16	24-MW-BKG-07-0716	N	320-113932-1	320-113932-4	07/16/2024	10:22	WG	2x 250 mL HDPE	E1633	None	RED	22-056	10 Days	Eurofins TA-SAC	JB/KR
MW-BKG-07	16	24-MW-BKG-07-0906	N	320-115193-1	320-115193-4	09/06/2024	14:20	WG	2x 250 mL HDPE	E1633	None	YELLOW EYE	22-056	10 Days	Eurofins TA-SAC	JB/KR
MW-BKG-09	14	24-MW-BKG-09-0717	N	320-113925-1	320-113925-5	07/17/2024	13:37	WG	2x 250 mL HDPE	E1633	None	BLUE	22-056	10 Days	Eurofins TA-SAC	JB/KR
MW-BKG-09	14	24-MW-BKG-09-0907	N	320-115197-1	320-115197-7	09/07/2024	13:42	WG	2x 250 mL HDPE	E1633	None	HALIBUT	22-056	10 Days	Eurofins TA-SAC	JB/KR
MW-BKG-10	12.5	24-MW-BKG-10-0717	N	320-113925-1	320-113925-7	07/17/2024	14:36	WG	2x 250 mL HDPE	E1633	None	BLUE	22-056	10 Days	Eurofins TA-SAC	JB/KR
MW-BKG-10	12.5	24-MW-BKG-10-0717	MS	320-113925-1	320-113925-7	07/17/2024	14:36	WG	2x 250 mL HDPE	E1633	None	BLUE	22-056	10 Days	Eurofins TA-SAC	JB/KR
MW-BKG-10	12.5	24-MW-BKG-10-0717	MSD	320-113925-1	320-113925-7	07/17/2024	14:36	WG	2x 250 mL HDPE	E1633	None	BLUE	22-056	10 Days	Eurofins TA-SAC	JB/KR
MW-BKG-10	12.5	24-MW-BKG-10-0907	N	320-115197-1	320-115197-8	09/07/2024	14:29	WG	2x 250 mL HDPE	E1633	None	HALIBUT	22-056	10 Days	Eurofins TA-SAC	JB/KR
MW-BKG-12	7.5	24-MW-BKG-12-0716	N	320-113932-1	320-113932-6	07/16/2024	11:30	WG	2x 250 mL HDPE	E1633	None	RED	22-056	10 Days	Eurofins TA-SAC	JB/KR
MW-BKG-12	7.5	24-MW-BKG-12-0906	N	320-115193-1	320-115193-5	09/06/2024	15:07	WG	2x 250 mL HDPE	E1633	None	YELLOW EYE	22-056	10 Days	Eurofins TA-SAC	JB/KR
MW1-100	93	24-MW1-100-0728	N	320-114298-1	320-114298-2	07/28/2024	19:40	WG	2x 250 mL HDPE	E1633	None	Spr24-03	22-056	10 Days	Eurofins TA-SAC	SA/BL
MW1-100	93	24-MW1-100-0909	N	320-115263-1	320-115263-4	09/09/2024	16:56	WG	2x 250 mL HDPE	E1633	None	Fall24-05	22-056	10 Days	Eurofins TA-SAC	SA/HM
MW1-150	145	24-MW1-150-0728	N	320-114298-1	320-114298-1	07/28/2024	19:30	WG	2x 250 mL HDPE	E1633	None	Spr24-03	22-056	10 Days	Eurofins TA-SAC	SA/BL
MW1-150	145	24-MW1-150-0909	N	320-115263-1	320-115263-3	09/09/2024	16:52	WG	2x 250 mL HDPE	E1633	None	Fall24-05	22-056	10 Days	Eurofins TA-SAC	SA/HM
MW1-50	45	24-MW1-50-0728	N	320-114298-1	320-114298-3	07/28/2024	20:05	WG	2x 250 mL HDPE	E1633	None	Spr24-03	22-056	10 Days	Eurofins TA-SAC	SA/BL
MW1-50	45	24-MW1-50-0909	N	320-115263-1	320-115263-5	09/09/2024	17:31	WG	2x 250 mL HDPE	E1633	None	Fall24-05	22-056	10 Days	Eurofins TA-SAC	SA/HM
MW2-100	95	24-MW2-100-0716	N	320-113932-1	320-113932-8	07/16/2024	13:36	WG	2x 250 mL HDPE	E1633	None	RED	22-056	10 Days	Eurofins TA-SAC	JB/KR
MW2-100	95	24-MW2-100-0906	N	320-115193-1	320-115193-7	09/06/2024	16:24	WG	2x 250 mL HDPE	E1633	None	YELLOW EYE	22-056	10 Days	Eurofins TA-SAC	JB/KR
MW2-150	145	24-MW2-150-0716	N	320-113932-1	320-113932-9	07/16/2024	14:13	WG	2x 250 mL HDPE	E1633	None	RED	22-056	10 Days	Eurofins TA-SAC	JB/KR
MW2-150	145	24-MW2-150-0906	N	320-115193-1	320-115193-8	09/06/2024	16:55	WG	2x 250 mL HDPE	E1633	None	YELLOW EYE	22-056	10 Days	Eurofins TA-SAC	JB/KR
MW2-50	45	24-MW2-50-0716	N	320-113932-1	320-113932-7	07/16/2024	12:48	WG	2x 250 mL HDPE	E1633	None	RED	22-056	10 Days	Eurofins TA-SAC	JB/KR
MW2-50	45	24-MW2-50-0906	N	320-115193-1	320-115193-6	09/06/2024	15:55	WG	2x 250 mL HDPE	E1633	None	YELLOW EYE	22-056	10 Days	Eurofins TA-SAC	JB/KR
MW3-100	90	24-MW3-100-0723	N	320-114960-1	320-114960-3	07/23/2024	14:00	WG	2x 250 mL HDPE	E1633	None	Spr24-01	22-056	10 Days	Eurofins TA-SAC	SA/BL
MW3-100	90	24-MW3-100-0904	N	320-115218-1	320-115218-5	09/04/2024	15:45	WG	2x 250 mL HDPE	E1633	None	Fall24-01	22-056	10 Days	Eurofins TA-SAC	BL/HM
MW3-100	90	24-MW3-100-0904	MS	320-115218-1	320-115218-5	09/04/2024	15:45	WG	2x 250 mL HDPE	E1633	None	Fall24-01	22-056	10 Days	Eurofins TA-SAC	BL/HM
MW3-100	90	24-MW3-100-0904	MSD	320-115218-1	320-115218-5	09/04/2024	15:45	WG	2x 250 mL HDPE	E1633	None	Fall24-01	22-056	10 Days	Eurofins TA-SAC	BL/HM
MW3-50	38	24-MW3-50-0723	N	320-114960-1	320-114960-4	07/23/2024	14:50	WG	2x 250 mL HDPE	E1633	None	Spr24-01	22-056	10 Days	Eurofins TA-SAC	SA/BL
MW3-50	38	24-MW3-50-0904	N	320-115218-1	320-115218-6	09/04/2024	16:46	WG	2x 250 mL HDPE	E1633	None	Fall24-01	22-056	10 Days	Eurofins TA-SAC	BL/HM
NPA-40	35	24-NPA-40-0719	N	320-114018-1	320-114018-8	07/19/2024	16:36	WG	2x 250 mL HDPE	E1633	None	COHO	22-056	10 Days	Eurofins TA-SAC	JB/KR
NPA-40	35	24-NPA-40-0908	N	320-115190-1	320-115190-6	09/08/2024	17:02	WG	2x 250 mL HDPE	E1633	None	PIKE	22-056	10 Days	Eurofins TA-SAC	JB/KR
NPB-20**	16.5	24-NPB-22-0719	N	320-114018-1	320-114018-5	07/19/2024	14:24	WG	2x 250 mL HDPE	E1633	None	COHO	22-056	10 Days	Eurofins TA-SAC	JB/KR
NPB-20**	16.5	24-DUP03-0719	FD	320-114018-1	320-114018-6	07/19/2024	14:29	WG	2x 250 mL HDPE	E1633	None	COHO	22-056	10 Days	Eurofins TA-SAC	JB/KR
NPB-20**	16.5	24-NPB-22-0908	N	320-115190-1	320-115190-4	09/08/2024	15:50	WG	2x 250 mL HDPE	E1633	None	PIKE	22-056	10 Days	Eurofins TA-SAC	JB/KR
NPB-40	35	24-NPB-40-0719	N	320-114018-1	320-114018-7	07/19/2024	15:12	WG	2x 250 mL HDPE	E1633	None	COHO	22-056	10 Days	Eurofins TA-SAC	JB/KR
NPB-40	35	24-NPB-40-0908	N	320-115190-1	320-115190-5	09/08/2024	16:15	WG	2x 250 mL HDPE	E1633	None	PIKE	22-056	10 Days	Eurofins TA-SAC	JB/KR
NPC-20	15	24-NPC-20-0720	N	320-114044-1	320-114044-8	07/20/2024	15:59	WG	2x 250 mL HDPE	E1633	None	KING	22-056	10 Days	Eurofins TA-SAC	JB/KR

Table 4. 2024 Groundwater Sample Summary

Well ID	Sample Depth (ft btoc)	Field Sample ID	QC	SDG	Laboratory ID	Sample Collection Date	Sample Collection Time	Matrix	Container Type/Volume	Analytical Methods	Field Preservation	Cooler Name	NPDL Number	Turnaround Time	Laboratory	Sampler Initials
NPC-20	15	24-NPC-20-0909	N	320-115292-1	320-115292-8	09/09/2024	16:32	WG	2x 250 mL HDPE	E1633	None	TROUT	22-056	10 Days	Eurofins TA-SAC	JB/KR
NPC-20	NA	24-NPC-20-0909	MS	320-115292-1	320-115292-8	09/09/2024	16:34	WG	2x 250 mL HDPE	E1633	None	TROUT	22-056	10 Days	Eurofins TA-SAC	JB/KR
NPC-20	NA	24-NPC-20-0909	MSD	320-115292-1	320-115292-8	09/09/2024	16:34	WG	2x 250 mL HDPE	E1633	None	TROUT	22-056	10 Days	Eurofins TA-SAC	JB/KR
NPC-40	35	24-NPC-40-0720	N	320-114044-1	320-114044-7	07/20/2024	15:19	WG	2x 250 mL HDPE	E1633	None	KING	22-056	10 Days	Eurofins TA-SAC	JB/KR
NPC-40	35	24-NPC-40-0909	N	320-115290-1	320-115290-1	09/09/2024	17:00	WG	2x 250 mL HDPE	E1633	None	ROCKFISH	22-056	10 Days	Eurofins TA-SAC	JB/KR
NPD-20	15	24-NPD-20-0720	N	320-114044-1	320-114044-6	07/20/2024	14:22	WG	2x 250 mL HDPE	E1633	None	KING	22-056	10 Days	Eurofins TA-SAC	JB/KR
NPD-20	15	24-NPD-20-0909	N	320-115292-1	320-115292-6	09/09/2024	15:15	WG	2x 250 mL HDPE	E1633	None	TROUT	22-056	10 Days	Eurofins TA-SAC	JB/KR
NPD-40	35	24-NPD-40-0720	N	320-114044-1	320-114044-5	07/20/2024	13:43	WG	2x 250 mL HDPE	E1633	None	KING	22-056	10 Days	Eurofins TA-SAC	JB/KR
NPD-40	35	24-NPD-40-0909	N	320-115292-1	320-115292-7	09/09/2024	15:43	WG	2x 250 mL HDPE	E1633	None	TROUT	22-056	10 Days	Eurofins TA-SAC	JB/KR
NPF-20	15	24-NPF-20-0720	N	320-114018-1	320-114018-9	07/20/2024	08:33	WG	2x 250 mL HDPE	E1633	None	COHO	22-056	10 Days	Eurofins TA-SAC	JB/KR
NPF-20	15	24-NPF-20-0909	N	320-115292-1	320-115292-1	09/09/2024	12:12	WG	2x 250 mL HDPE	E1633	None	TROUT	22-056	10 Days	Eurofins TA-SAC	JB/KR
NPF-20	15	24-DUP03-0909	FD	320-115292-1	320-115292-2	09/09/2024	12:18	WG	2x 250 mL HDPE	E1633	None	TROUT	22-056	10 Days	Eurofins TA-SAC	JB/KR
NPF-40	35	24-DUP04-0720	FD	320-114044-1	320-114044-2	07/20/2024	09:37	WG	2x 250 mL HDPE	E1633	None	COHO	22-056	10 Days	Eurofins TA-SAC	JB/KR
NPF-40	35	24-NPF-40-0720	N	320-114018-1	320-114018-10	07/20/2024	09:37	WG	2x 250 mL HDPE	E1633	None	COHO	22-056	10 Days	Eurofins TA-SAC	JB/KR
NPF-40	35	24-NPF-40-0909	N	320-115292-1	320-115292-3	09/09/2024	12:45	WG	2x 250 mL HDPE	E1633	None	TROUT	22-056	10 Days	Eurofins TA-SAC	JB/KR
NPG-20	15	24-NPG-20-0720	N	320-114044-1	320-114044-3	07/20/2024	10:34	WG	2x 250 mL HDPE	E1633	None	KING	22-056	10 Days	Eurofins TA-SAC	JB/KR
NPG-20	15	24-NPG-20-0909	N	320-115292-1	320-115292-4	09/09/2024	13:38	WG	2x 250 mL HDPE	E1633	None	TROUT	22-056	10 Days	Eurofins TA-SAC	JB/KR
NPG-40	35	24-NPG-40-0720	N	320-114044-1	320-114044-4	07/20/2024	11:19	WG	2x 250 mL HDPE	E1633	None	KING	22-056	10 Days	Eurofins TA-SAC	JB/KR
NPG-40	35	24-NPG-40-0909	N	320-115292-1	320-115292-5	09/09/2024	14:06	WG	2x 250 mL HDPE	E1633	None	TROUT	22-056	10 Days	Eurofins TA-SAC	JB/KR
USAP-1	16.5	24-USAP-1-0718	N	320-114037-1	320-114037-6	07/18/2024	14:15	WG	2x 250 mL HDPE	E1633	None	SOCKEYE	22-056	10 Days	Eurofins TA-SAC	JB/KR
USAP-1	16.5	24-USAP-1-0908	N	320-115187-1	320-115187-5	09/08/2024	09:09	WG	2x 250 mL HDPE	E1633	None	GRAYLING	22-056	10 Days	Eurofins TA-SAC	JB/KR
USAP-1	16.5	24-DUP02-0908	FD	320-115187-1	320-115187-6	09/08/2024	09:12	WG	2x 250 mL HDPE	E1633	None	GRAYLING	22-056	10 Days	Eurofins TA-SAC	JB/KR
USAP-3	14.6	24-USAP-3-0718	N	320-114037-1	320-114037-7	07/18/2024	15:20	WG	2x 250 mL HDPE	E1633	None	SOCKEYE	22-056	10 Days	Eurofins TA-SAC	JB/KR
USAP-3	14.6	24-DUP02-0718	FD	320-114037-1	320-114037-8	07/18/2024	15:23	WG	2x 250 mL HDPE	E1633	None	SOCKEYE	22-056	10 Days	Eurofins TA-SAC	JB/KR
USAP-3	14.6	24-USAP-3-0908	N	320-115187-1	320-115187-7	09/08/2024	09:59	WG	2x 250 mL HDPE	E1633	None	GRAYLING	22-056	10 Days	Eurofins TA-SAC	JB/KR
FIELDQC	NA	FB01-071724	FB	320-113925-1	320-113925-6	07/17/2024	13:40	WQ	2x 250 mL HDPE	E1633	None	BLUE	22-056	10 Days	Eurofins TA-SAC	JB/KR
FIELDQC	NA	FB02-071924	FB	320-114018-1	320-114018-4	07/19/2024	13:14	WQ	2x 250 mL HDPE	E1633	None	COHO	22-056	10 Days	Eurofins TA-SAC	JB/KR
FIELDQC	NA	FB03-072124	FB	320-114049-1	320-114049-3	07/21/2024	12:05	WQ	2x 250 mL HDPE	E1633	None	CHUM	22-056	10 Days	Eurofins TA-SAC	JB/KR
FIELDQC	NA	FB01-07232024	FB	320-114960-1	320-114960-6	07/23/2024	17:00	WQ	2x 250 mL HDPE	E1633	None	Spr24-01	22-056	10 Days	Eurofins TA-SAC	SA/BL
FIELDQC	NA	FB01-07282024	FB	320-114280-1	320-114280-8	07/28/2024	21:00	WQ	2x 250 mL HDPE	E1633	None	Spr24-03	22-056	10 Days	Eurofins TA-SAC	SA/BL
FIELDQC	NA	24-FB01-090724	FB	320-115187-1	320-115187-2	09/07/2024	16:22	WQ	2x 250 mL HDPE	E1633	None	GRAYLING	22-056	10 Days	Eurofins TA-SAC	JB/KR
FIELDQC	NA	24-20PS-FB01-090924	FB	320-115264-1	320-115264-9	09/09/2024	13:45	WQ	2x 250 mL HDPE	E1633	None	Fall24-04	22-056	10 Days	Eurofins TA-SAC	SA/HM/BL
FIELDQC	NA	24-FB02-090924	FB	320-115290-1	320-115290-2	09/09/2024	17:06	WQ	2x 250 mL HDPE	E1633	None	ROCKFISH	22-056	10 Days	Eurofins TA-SAC	JB/KR
FIELDQC	NA	FB01-090424	FB	320-115218-1	320-115218-4	09/04/2024	14:00	WQ	2x 250 mL HDPE	E1633	None	Fall24-01	22-056	10 Days	Eurofins TA-SAC	BL/HM
FIELDQC	NA	EB01-071724	EB	320-113925-1	320-113925-4	07/17/2024	12:10	WQ	2x 250 mL HDPE	E1633	None	BLUE	22-056	10 Days	Eurofins TA-SAC	JB/KR
FIELDQC*	NA	EB01-07252024	EB	320-114270-1	320-114270-7*	07/25/2024	17:00	WQ	2x 250 mL HDPE	E1633	None	Spr24-03	22-056	10 Days	Eurofins TA-SAC	SA/BL
FIELDQC	NA	EB01-07282024	EB	320-114280-1	320-114280-7	07/28/2024	21:05	WQ	2x 250 mL HDPE	E1633	None	Spr24-03	22-056	10 Days	Eurofins TA-SAC	SA/BL
FIELDQC	NA	EB-01-090624	EB	320-115216-1	320-115216-6	09/06/2024	19:25	WQ	2x 250 mL HDPE	E1633	None	Fall24-03	22-056	10 Days	Eurofins TA-SAC	SA/HM/BL
FIELDQC	NA	24-EB01-090724	EB	320-115197-1	320-115197-6	09/07/2024	12:08	WQ	2x 250 mL HDPE	E1633	None	HALIBUT	22-056	10 Days	Eurofins TA-SAC	JB/KR
FIELDQC	NA	EB01-091024	EB	320-115324-1	320-115324-7	09/10/2024	18:20	WQ	2x 250 mL HDPE	E1633	None	Fall24-06	22-056	10 Days	Eurofins TA-SAC	SA/HM/BL

Notes:

*These samples were reanalyzed due to a sample switch. See Section 4.0 of the report for details

**Well NPB-20 is recorded as NPB-22 on the field documentation and in sample IDs

BTOC = below top of casing
EB = equipment blank
FB = field blank
FD = field duplicate
ft = feet
HDPE = high density polyethylene
ID = identification
N = primary sample
NA = not applicable
MS = matrix spike
MSD = matrix spike duplicate
NPDL = North Pacific Division Laboratory
QC = Quality Control
SDG = Sample Delivery Group
WG = groundwater sample

Table 5. 2024 MCL Exceedances

Well ID	Type	Date	HI[1]	HFPO-DA (ng/L)	PFHxS (ng/L)	PFNA (ng/L)	PFOA (ng/L)	PFOS (ng/L)
MCL (ng/L)			**1**	**10**	**10**	**10**	**4**	**4**
Eielson Air Force Base Shallow Wells								
02MW11	N	7/16/2024	**13**	ND [3.9]	**130 [0.98]**	ND [0.98]	**39 [0.98]**	**120 [0.98]**
	N	9/7/2024	**10**	ND [8.0]	**95 [2.0]**	**1.2 [2.0] J**	**46 [2.0]**	**100 [2.0]**
	FD	9/7/2024	**10**	ND [3.5]	**95 [0.89]**	**1.2 [0.89] J**	**47 [0.89]**	**110 [0.89]**
20PS-MW01	N	7/23/2024	**5**	ND [4.2] H	**46 [1.0] H**	**0.66 [1.0] HJ**	**17 [1.0] H**	**39 [1.0] H**
	N	9/5/2024	**4**	ND [3.9]	**36 [0.98]**	**0.57 [0.98] J**	**15 [0.98]**	**30 [0.98]**
20PS-MW03	N	7/29/2024	**2**	ND [3.8]	**18 [0.95]**	ND [0.95]	**5.7 [0.95]**	**21 [0.95]**
	N	9/10/2024	**2**	ND [3.9]	**22 [0.98]**	ND [0.98]	**6.9 [0.98]**	**22 [0.98]**
20PS-MW06*	N	7/27/2024	**12**	ND [40]	**120 [10]**	ND [10]	**50 [10]**	**74 [10]**
	N	9/9/2024	**10**	ND [3.9]	**100 [0.97]**	**3.3 [0.97]**	**48 [0.97]**	**74 [0.97]**
20PS-MW07	N	7/28/2024	**9**	ND [4.3] QN	**83 [1.1] QN**	**1.6 [1.1] QNJ**	**28 [1.1] QN**	**36 [1.1] QN**
	N	9/9/2024	**9**	ND [3.9]	**83 [0.98]**	**1.9 [0.98] J**	**34 [0.98]**	**41 [0.98]**
20PS-MW08	N	7/27/2024	**10**	ND [4.4]	**99 [1.1]**	**1.2 [1.1] J**	**15 [1.1]**	**110 [1.1]**
	N	9/9/2024	**10**	ND [3.8]	**94 [0.95]**	**1.1 [0.95] J**	**22 [0.95]**	**100 [0.95]**
HCMW02WT	N	7/24/2024	**9**	ND [3.7] H	**83 [0.93] H**	**1.9 [0.93] H**	**29 [0.93] H**	**68 [0.93] H**
	FD	7/24/2024	**8**	ND [3.8] H	**81 [0.95] H**	**1.8 [0.95] H,J**	**29 [0.95] H**	**67 [0.95] H**
	N	9/5/2024	**9**	ND [3.9]	**83 [0.98]**	**2.5 [0.98] QN**	**29 [0.98]**	**65 [0.98]**
HCMW03WT	N	7/17/2024	**--**	ND [40]	**13 [10] J**	ND [10]	**6.9 [10] J**	ND [10]
	N	9/7/2024	**3**	ND [8.0] QN	**25 [2.0]**	ND [2.0]	**16 [2.0]**	**6.8 [2.0]**
MW-2	N	7/16/2024	**9**	ND [3.6]	**86 [0.89]**	**1.2 [0.89] J**	**19 [0.89]**	**120 [0.89]**
	N	9/7/2024	**10**	ND [8.0]	**94 [2.0]**	**2.2 [2.0] J**	**28 [2.0]**	**140 [2.0]**
MW1-50	N	7/28/2024	**12**	ND [4.1] QN	**120 [1.0] QN**	**2.9 [1.0] QN**	**53 [1.0] QN**	**230 [1.0] QN**
	N	9/9/2024	**11**	ND [3.8]	**110 [0.95]**	**3.6 [0.95]**	**53 [0.95]**	**220 [0.95]**
MW2-50	N	7/16/2024	**88**	ND [3.7]	**870 [0.91] QN**	**8.7 [0.91]**	**300 [0.91]**	**2300 [0.91] QN**
	N	9/6/2024	**79**	ND [8.0]	**770 [2.0]**	**16 [2.0]**	**410 [2.0]**	**2400 [2.0]**
MW3-50	N	7/23/2024	**50**	ND [4.0] H	**490 [1.0] QN,H**	**5.7 [1.0] H**	**220 [1.0] H**	**500 [1.0] QN,H**
	N	9/4/2024	**33**	ND [40]	**320 [10]**	**9.0 [10] J**	**150 [10]**	**380 [10]**
MW-BKG-04	N	7/16/2024	**0.8**	ND [3.8]	**7.9 [0.96]**	ND [0.96]	**1.7 [0.96] J**	ND [10]
	N	9/6/2024***	**1**	ND [8.0]	**12 [2.0]**	ND [2.0]	**3.6 [2.0] J**	**1.6 [2.0] J**
MW-BKG-09	N	7/17/2024	**2**	ND [3.9]	**17 [0.99]**	ND [0.99]	**2.1 [0.99]**	**6.4 [0.99]**
	N	9/7/2024	--	ND [3.5]	**14 [0.88]**	ND [0.88]	**3.3 [0.88]**	**8.1 [0.88]**
MW-BKG-12	N	7/16/202***	**2**	ND [3.7]	**15 [0.92]**	**0.72 [0.92] J**	**2.2 [0.92]**	**4.4 [0.92]**
	N	9/6/2024***	--	ND [20]	**15 [5.0]**	ND [5.0]	**4.5 [5.0] J**	**14 [5.0]**
Eielson Air Force Base Intermediate/Deep Wells								
HCMW01MD	N	7/18/2024	**3**	ND [4.1] QN	**27 [1.0] QN**	ND [1.0] QN	**9.5 [1.0] QN**	**6.1 [1.0] QN**
	N	9/7/2024	**3**	ND [3.5]	**31 [0.87]**	ND [0.87]	**15 [0.87]**	**7.4 [0.87]**
HCMW02MD	N	7/24/2024	**10**	ND [3.9] H	**93 [0.97] H**	**2.1 [0.97] H**	**37 [0.97] H**	**140 [0.97] H**
	N	9/5/2024	**10**	ND [3.9]	**100 [0.97]**	**2.8 [0.97]**	**45 [0.97]**	**150 [0.97]**
HCMW03MD	N	7/17/2024	**10**	ND [3.9]	**98 [0.99]**	**1.1 [0.99] J**	**40 [0.99]**	**65 [0.99]**
	N	9/7/2024	**11**	ND [3.5]	**110 [0.88]**	**1.2 [0.88] J**	**69 [0.88]**	**100 [0.88]**
HCMW05DP	N	7/25/2024	--	ND [4.5] QN	**9.4 [1.1] QN**	ND [1.1] QN	**2.1 [1.1] QN,J**	**3.4 [1.1] QN**
	N	9/6/2024	**0.8**	ND [3.8]	**8.1 [0.94]**	ND [0.94]	**2.4 [0.94]**	**4.5 [0.94] QN**
MW1-100	N	7/28/2024	**6**	ND [3.8] QN	**55 [0.95] QN**	**0.56 [0.95] QN,J**	**21 [0.95] QN**	**58 [0.95] QN**
	N	9/9/2024	**6**	ND [4.0]	**59 [1.0]**	**1.1 [1.0] J**	**22 [1.0]**	**60 [1.0]**
MW1-150	N	7/28/2024	**1**	ND [4.0] QN	**12 [0.99] QN**	ND [0.99] QN	**4.5 [0.99] QN**	**16 [0.99] QN**
	N	9/9/2024	**1**	ND [3.9]	**10 [0.97]**	ND [0.97]	**4.6 [0.97]**	**14 [0.97]**
MW2-100	N	7/16/2024	**18**	ND [3.5]	**180 [0.88]**	**2.3 [0.88]**	**52 [0.88]**	**340 [0.88] QN**
	N	9/6/2024	**14**	ND [3.6]	**140 [0.89]**	**3.1 [0.89]**	**56 [0.89]**	**280 [0.89]**
MW2-150	N	7/16/2024	--	ND [3.6]	**2.9 [0.91]**	ND [0.91]	**0.64 [0.91] J**	**5.1 [0.91] QH**
	N	9/6/2024	--	ND [3.5]	**2.5 [0.88]**	ND [0.88]	**0.87 [0.88] J**	**5.3 [0.88]**
MW3-100	N	7/23/2024	**2**	ND [4.0] H	**20 [1.0] H**	**0.51 [1.0] H,J**	**8.2 [1.0] H**	**53 [1.0] H**
	N	9/4/2024	**2**	ND [3.9]	**19 [0.97]**	**0.55 [0.97] J**	**9.9 [0.97]**	**56 [0.97]**
Off Base Shallow Wells								
20PS-MW09	N	7/25/2024	**5**	ND [4.4] QN	**50 [1.1] QN**	ND [1.1] QN	**15 [1.1] QN**	**50 [1.1] QN**
	N	9/7/2024	**5**	ND [4.0]	**47 [0.99]**	ND [0.99]	**18 [0.99]**	**52 [0.99] QN**
20PS-MW11	N	7/27/2024***	**0.8**	ND [3.9]	**7.5 [0.98]**	ND [0.98]	**1.7 [0.98] J**	ND [0.98]
	N	9/8/2024	**1**	ND [4.0]	**9.7 [1.0]**	ND [1.0]	**2.5 [1.0]**	**5.0 [1.0] QN**
20PS-MW12	N	7/23/2024	**3**	ND [4.1] H	**28 [1.0] H**	ND [1.0] H	**7.0 [1.0] H**	**23 [1.0] QN,H**
	FD	7/23/2024	**3**	ND [4.0] H	**29 [1.0] H**	ND [1.0] H	**7.0 [1.0] H**	**25 [1.0] QN,H**
	N	9/4/2024	**2**	ND [8.0]	**24 [2.0]**	ND [2.0]	**7.5 [2.0]**	**21 [2.0] QN**

Table 5. 2024 MCL Exceedances

Well ID	Type	Date	HI[1]	HFPO-DA (ng/L)	PFHxS (ng/L)	PFNA (ng/L)	PFOA (ng/L)	PFOS (ng/L)
MCL (ng/L)			**1**	**10**	**10**	**10**	**4**	**4**
20PS-MW13	N	7/24/2024	**3**	ND [3.8] H	**31 [0.96] H**	**0.66 [0.96] H,J**	**14 [0.96] H**	**35 [0.96] H**
	N	9/6/2024	--	ND [3.8]	**28 [0.94]**	ND [10]	**13 [0.94]**	**33 [9.4]**
20PS-MW14**	N	9/10/2024	**2**	ND [8.0]	**23 [2.0]**	ND [2.0]	**6.4 [2.0]**	**12 [2.0]**
20PS-MW15	N	7/24/2024	**3**	ND [4.1] H	**33 [1.0] H**	**0.52 [1.0] H,J**	**15 [1.0] H**	**48 [1.0] H**
	N	9/6/2024	**2**	ND [3.8]	**19 [0.95]**	ND [0.95]	**8.7 [0.95] QN**	**36 [0.95]**
	FD	9/6/2024	**2**	ND [3.8]	**23 [0.96]**	**0.66 [0.96] J**	**12 [0.96] QN**	**43 [0.96]**
20PS-MW17	N	7/26/2024***	**2**	ND [4.0] QN	**21 [1.0] QL**	ND [1.0] QN	**6.1 [1.0] QL**	**13 [1.0] QL**
	N	9/7/2024***	--	ND [40]	**18 [10] J**	ND [10]	**8.5 [10] J**	**14 [10] J**
20PS-MW19	N	7/19/2024***	**1**	ND [3.7]	**13 [0.93]**	ND [0.93]	**5.8 [0.93]**	**8.6 [0.93]**
	N	9/8/2024***	**1**	ND [3.6]	**14 [0.89]**	ND [0.89]	**10 [0.89]**	**10 [0.89]**
20PS-MW20	N	7/19/2024	**2**	ND [3.7]	**16 [0.92]**	ND [0.92]	**6.8 [0.92]**	**6.5 [0.92]**
	N	9/8/2024	**2**	ND [3.5]	**16 [0.88]**	ND [0.88]	**9.3 [0.88]**	**4.8 [0.88]**
20PS-MW22	N	7/29/2024	**0.8**	ND [3.9]	**7.5 [0.98]**	ND [0.98]	**3.6 [0.98]**	ND [0.98]
	N	9/10/2024	**0.8**	ND [3.9]	**8.0 [0.97]**	ND [0.97]	**3.3 [0.97]**	**4.3 [0.97]**
20PS-MW23	N	7/27/2024	**1**	ND [4.5] QN	**14 [1.1] QN**	ND [1.1] QN	**3.1 [1.1] QN**	**7.4 [1.1] QN**
	N	9/8/2024	**1**	ND [3.7]	**13 [0.94]**	ND [0.94]	**4.9 [0.94]**	**9.5 [0.94]**
20PS-MW24	N	7/18/2024	**3**	ND [3.9] QN	**27 [0.98] QN**	ND [0.98] QN	**7.5 [0.98] QN**	**21 [0.98] QN**
	N	9/4/2024***	**3**	ND [3.9]	**27 [0.97]**	ND [0.97]	**11 [0.97]**	**24 [0.97]**
	FD	9/4/2024***	**3**	ND [4.0]	**25 [1.0]**	ND [1.0]	**9.3 [1.0]**	**25 [1.0]**
20PS-MW25	N	7/18/2024	**2**	ND [3.9] QN	**15 [0.97] QN**	ND [0.97] QN	**4.2 [0.97] QN**	**8.4 [0.97] QN**
	N	9/8/2024	**2**	ND [3.5]	**16 [0.89]**	ND [0.89]	**5.1 [0.89]**	**8.7 [0.89]**
20PS-MW27**	N	9/10/2024	**4**	ND [4.0]	**39 [1.0]**	ND [1.0]	**19 [1.0]**	**46 [1.0]**
20PS-MW29	N	7/26/2024	**3**	ND [4.2] QN	**30 [1.1] QL**	ND [1.1] QN	**10 [1.1] QL**	**37 [1.1] QL**
	N	9/7/2024	**3**	ND [3.9]	**26 [0.97]**	**0.49 [0.97] J**	**14 [0.97]**	**39 [0.97]**
20PS-MW30	N	7/26/2024	**2**	ND [3.9] QN	**22 [0.98] QL**	ND [0.98] QN	**7.5 [0.98] QL**	**24 [0.98] QL**
	N	9/7/202***	**2**	ND [4.0]	**17 [0.99]**	ND [0.99]	**9.6 [0.99]**	**26 [0.99]**
DSAP-10	N	7/21/2024	**2**	ND [3.9] QN	**17 [0.99] QN**	ND [0.99] QN	**5.2 [0.99] QN**	**5.1 [0.99] QN**
	FD	7/21/2024	**2**	ND [4.0] QN	**19 [1.0] QN**	ND [1.0] QN	**4.5 [1.0] QN**	**4.9 [1.0] QN**
	N	9/9/2024	**2**	ND [4.0]	**16 [1.0]**	ND [1.0]	**6.1 [1.0]**	ND [1.0]
	FD	9/9/2024	**2**	ND [3.9]	**16 [0.98]**	ND [0.98]	**7.4 [0.98]**	ND [0.98]
DSAP-11	N	7/24/2024	**0.8**	ND [4.1] H	**8.2 [1.0] H**	ND [1.0] H	**2.9 [1.0] H**	**4.6 [1.0] H**
	N	9/5/2024	**0.9**	ND [3.8]	**8.7 [0.94]**	ND [0.94]	**3.0 [0.94]**	**5.3 [0.94]**
	FD	9/5/2024	**0.8**	ND [3.8]	**8.3 [0.96]**	ND [0.96]	**3.1 [0.96]**	**5.6 [0.96]**
DSAP-13	N	7/19/2024	**0.7**	ND [3.6]	**7.4 [0.91]**	ND [0.91]	**4.9 [0.91]**	**2.2 [0.91]**
	N	9/8/2024	**0.5**	ND [3.6]	**5.4 [0.90]**	ND [0.90]	**3.6 [0.90]**	**2.8 [0.90] QN**
DSAP-14	N	7/19/2024	**2**	ND [3.6] QN	**19 [0.90] QN**	ND [0.90] QN	**8.1 [0.90] QN**	**10 [0.90] QN**
	N	9/8/2024	**2**	ND [3.6]	**17 [0.90]**	ND [0.90]	**12 [0.90]**	**13 [0.90]**
DSAP-8S	N	7/21/2024	**0.5**	ND [4.0] QN	**5.2 [1.0] QN**	ND [1.0] QN	**0.89 [1.0] QNJ**	**1.3 [1.0] QNJ**
	N	9/9/2024***	**0.9**	ND [3.9]	**9.1 [0.97]**	ND [0.97]	**4.6 [0.97]**	**7.3 [0.97]**
NPB-20	N	7/19/2024	**1.0**	ND [3.6]	**9.6 [0.91]**	ND [0.91]	**4.0 [0.91]**	**4.7 [0.91]**
	FD	7/19/2024	**0.9**	ND [3.7]	**8.7 [0.91]**	ND [0.91]	**3.7 [0.91]**	**5.2 [0.91]**
	N	9/8/2024	**0.8**	ND [3.5]	**7.9 [0.89]**	ND [0.89]	**6.1 [0.89]**	**5.8 [0.89]**
NPC-20	N	7/20/2024	**0.9**	ND [3.5] QN	**9.0 [0.88] QN**	ND [0.88] QN	**2.7 [0.88] QN**	**2.9 [0.88] QN**
	N	9/9/2024	**1**	ND [3.5]	**13 [0.88]**	ND [0.88]	**6.4 [0.88]**	**5.6 [0.88]**
NPG-20	N	7/20/2024	**1**	ND [3.7] QN	**11 [0.92] QN**	ND [0.92] QN	**4.1 [0.92] QN**	**2.5 [0.92] QN**
	N	9/9/2024	**1**	ND [3.6]	**10 [0.90]**	ND [0.90]	**5.3 [0.90]**	**2.9 [0.90]**
USAP-1	N	7/18/2024	**2**	ND [4.0] QN	**24 [0.99] QN**	ND [0.99] QN	**7.9 [0.99] QN**	**26 [0.99] QN**
	N	9/8/2024	**3**	ND [3.5]	**27 [0.88]**	ND [0.88]	**12 [0.88]**	**26 [0.88]**
	FD	9/8/2024	**3**	ND [3.6]	**28 [0.90]**	ND [0.90]	**11 [0.90]**	**28 [0.90]**
Off Base Intermediate/Deep Wells								
19PS-MW01A	N	7/26/2024	--	ND [40] QN	**11 [10] QLJ**	ND [10] QN	ND [10] QN	ND [10] QN
	N	9/8/2024	**0.8**	ND [4.0]	**8.4 [1.0]**	ND [1.0]	**4.5 [1.0]**	**12 [1.0]**
19PS-MW02A	N	7/28/2024	**2**	ND [3.9] QN	**15 [0.98] QL**	ND [0.98] QN	**7.4 [0.98] QL**	**25 [0.98] QL**
	FD	7/28/2024	**2**	ND [3.9] QN	**16 [0.96] QL**	ND [0.96] QN	**5.9 [0.96] QL**	**23 [0.96] QL**
	N	9/9/2024	**1**	ND [4.0]	**14 [1.0]**	ND [1.0]	**6.9 [1.0]**	**24 [1.0]**
	FD	9/9/2024	**1**	ND [3.8]	**13 [0.96]**	ND [0.96]	**7.5 [0.96]**	**23 [0.96]**
19PS-MW02B	N	7/29/2024	**0.6**	ND [4.0]	**5.5 [1.0]**	ND [1.0]	**3.4 [1.0]**	**6.0 [1.0]**
	N	9/9/2024	**0.5**	ND [3.8]	**5.3 [0.94]**	ND [0.94]	**3.1 [0.94]**	**6.6 [0.94]**
DSAP-8D	N	7/21/2024	**1**	ND [3.9] QN	**10 [0.98] QN**	ND [0.98] QN	**2.9 [0.98] QNJ**	**5.9 [0.98] QN**
	N	9/9/2024	--	ND [8.0]	**3.6 [2.0] J**	ND [2.0]	ND [2.0] QN	ND [2.0]

Table 5. 2024 MCL Exceedances

Well ID	Type	Date	HI[1]	HFPO-DA (ng/L)	PFHxS (ng/L)	PFNA (ng/L)	PFOA (ng/L)	PFOS (ng/L)
MCL (ng/L)			**1**	**10**	**10**	**10**	**4**	**4**
NPB-40	N	7/19/2024	**1**	ND [3.6]	**11 [0.90]**	ND [0.90]	**3.9 [0.90]**	**5.3 [0.90]**
	N	9/8/2024	**1.0**	ND [3.6]	**9.5 [0.90]**	ND [0.90]	**6.7 [0.90]**	**6.9 [0.90]**
NPC-40	N	7/20/2024	**1.0**	ND [3.6] QN	**9.6 [0.89] QN**	ND [0.89] QN	**2.8 [0.89] QN**	**4.3 [0.89] QN**
	N	9/9/2024	**1**	ND [3.8]	**13 [0.96]**	ND [0.96]	**6.2 [0.96]**	**7.8 [0.96]**
NPD-40	N	7/20/2024	**1**	ND [3.7] QN	**11 [0.92] QN**	ND [0.92] QN	**3.5 [0.92] QN**	**4.7 [0.92] QN**
	N	9/9/2024	**0.9**	ND [3.5]	**9.4 [0.88]**	ND [0.88]	**4.3 [0.88]**	**5.3 [0.88]**
NPG-40	N	7/20/2024***	**0.8**	ND [3.6] QN	**7.8 [0.90] QN**	ND [0.90] QN	**2.3 [0.90] QN**	**2.1 [0.90] QN**
	N	9/9/2024	**1**	ND [3.5]	**11 [0.88]**	ND [0.88]	**4.9 [0.88]**	**3.5 [0.88]**

Notes:

[1] HI values are rounded to nearest whole number, except where less than one, when the HI is rounded to one decimal. See formula below for HI calculation. The HI presented is NOT a risk calculation.

*20PS-MW06 samples were reanalyzed out of hold to confirm that the sample had been switched with an equipment blank sample during the initial analysis. All results reported and validated are from the initial analysis.

**Well was only sampled in the fall

***Turbidity exceeded 30 NTUs

Limit of detection (LOD) provided in brackets [ ]

Highlighted = result exceeds MCL

LOD exceeds MCL

Bold = analyte detected

FD = field duplicate sample

MCL = maximum contaminant level

N = primary sample

-- = less than 2 detections of HFPO-DA, PFBS, PFNA, or PFHxS

Data Qualifiers:

H = Estimated value, biased low due to hold time exceedance

J = Estimated value

ND = non-detect

QH = Estimated value biased high, due to quality control failure

QL = Estimated value biased low, due to quality control failure

QN = Estimated value, due to quality control failure

$$Individual\ Hazard\ Index\ (1\ unitless) = \frac{HFPO-DA_{ppt}}{10\ ppt} + \frac{PFBS_{ppt}}{2000\ ppt} + \frac{PFNA_{ppt}}{10\ ppt} + \frac{PFHxS_{ppt}}{10\ ppt}$$

			LocationID	20PS-MW06	20PS-MW06	20PS-MW06	20PS-MW06	20PS-MW06	20PS-MW06	20PS-MW06	20PS-MW06	20PS-MW06**	20PS-MW06**	20PS-MW06
			ClientSampleID	21-MW06-0629	21-MW06-0906	21-MW99-0906	22-20PS-MW06-0619	22-MW06-0926	23-20PS-MW06-0601	23-20PS-MW06-1005	23-MW99-0601	24-20PS-MW06-0727	24-20PS-MW06-0727	24-20PS-MW06-0909
			LabSampleID	410-45616-9	410-54225-19	410-54225-17	410-88547-12	410-99766-8	410-129352-1	410-146307-15	410-129352-2	320-114270-8	320-114270-8-RE	320-115263-2
			CollectedDate	6/29/2021	9/6/2021	9/6/2021	6/19/2022	9/26/2022	6/1/2023	10/5/2023	6/1/2023	7/27/24 19:47	7/27/24 19:47	9/9/2024
			Matrix	WG	WG	WG	WG	WG	WG	WG	WG	WG	WG	WG
			SampleType	N	N	FD	N	N	N	N	FD	N	N	N
			Analytical Method	E537 MOD	E537 MOD	E537 MOD	E537 MOD	E537 MOD	E537 MOD	E537 MOD	E537 MOD	E1633	E1633	E1633
Short Name	Long Name	2024 MCLs	Units											
PFBA	Perfluorobutanoic Acid (PFBA)		ng/l	**13 [3.7]**	**15 [3.6]**	**15 [3.7]**	**13 [3.7]**	**16 [3.9]**	**16 [0.52] J**	**14 [4.0]**	**16 [0.48] J**	ND [40]	14 [3.8] H	**13 [3.9]**
PFPeA	Perfluoropentanoic Acid (PFPeA)		ng/l	**31 [0.93]**	**41 [0.91]**	**39 [0.92]**	**28 [0.92]**	**36 [0.96]**	**39 [0.52] J**	**32 [0.99]**	**43 [0.48] J**	**33 [20] J**	26 [1.9] H	**38 [1.9]**
PFHxA	Perfluorohexanoic Acid (PFHxA)		ng/l	**33 [0.93]**	**41 [0.91]**	**43 [0.92]**	**30 [0.92]**	**36 [0.96]**	**38 [1.6] J**	**32 [0.99]**	**39 [1.4] J**	**41 [10]**	30 [0.94] H	**30 [0.97]**
PFHpA	Perfluoroheptanoic Acid (PFHpA)		ng/l	**32 [0.93]**	**35 [0.91]**	**35 [0.92]**	**27 [0.92]**	**33 [0.96] J**	**38 [1.0] J**	**28 [0.99]**	**36 [0.95] J**	**30 [10]**	30 [0.94] H	**24 [0.97]**
PFOA	Perfluorooctanoic Acid (PFOA)	4.0	ng/l	**27 [0.93]**	**36 [0.91]**	**35 [0.92]**	**28 [0.92]**	**38 [0.96]**	**42 [1.6] J**	**33 [0.99] J**	**40 [1.4] J**	**50 [10]**	37 [0.94] H	**48 [0.97]**
PFNA	Perfluorononanoic Acid (PFNA)	10	ng/l	**1.3 [0.93]**	**1.9 [0.91]**	**1.9 [0.92]**	**1.4 [0.92] J**	**1.7 [0.96] J**	**2.2 [1.6] J**	**1.8 [0.99] J**	**2.1 [1.4] J**	ND [10]	2.3 [0.94] H	**3.3 [0.97]**
PFDA	Perfluorodecanoic Acid (PFDA)		ng/l	ND [0.93]	ND [0.91]	ND [0.92]	ND [0.92] U	ND [0.96] UJ	ND [1.0] UJ	ND [0.99] U	ND [0.95] UJ	ND [10]	ND [0.94] H	ND [0.97]
PFUnA (PFUDA)	Perfluoroundecanoic Acid (PFUnA)		ng/l	ND [0.93]	ND [0.91]	ND [0.92]	ND [0.92] U	ND [0.96] UJ	ND [1.6] U	ND [0.99] UJ	ND [1.4] U	ND [10]	ND [0.94] H	ND [0.97]
PFDoDA	Perfluorododecanoic Acid (PFDoDA)		ng/l	ND [0.93]	ND [0.91]	ND [0.92]	ND [0.92] UJ	ND [0.96] UJ	ND [1.0] UJ	ND [0.99] U	ND [0.95] UJ	ND [10]	ND [0.94] H	ND [0.97]
PFTrDA	Perfluorotridecanoic Acid (PFTrDA)		ng/l	ND [0.93]	ND [0.91]	ND [0.92]	ND [0.92] UJ	ND [0.96] UJ	ND [1.6] U	ND [0.99] U	ND [1.4] U	ND [10]	ND [0.94] H	ND [0.97]
PFTeDA	Perfluorotetradecanoic Acid (PFTeDA)		ng/l	ND [0.93]	ND [0.91]	ND [0.92]	ND [0.92] UJ	ND [0.96] R	ND [1.6] U	ND [0.99] U	ND [1.4] U	ND [10]	ND [0.94] H	ND [0.97]
PFBS	Perfluorobutanesulfonic Acid (PFBS)		ng/l	**3.8 [0.93]**	**4.5 [0.91]**	**4.4 [0.92]**	**3.6 [0.92]**	**4.6 [0.96] J**	**4.9 [1.0] J**	**3.9 [0.99]**	**4.9 [0.95] J**	ND [10]	3.4 [0.94] H	**3.4 [0.97]**
PFPeS	Perfluoropentanesulfonic Acid (PFPeS)		ng/l	**6.3 [0.93]**	**8.3 [0.91]**	**7.7 [0.92]**	**6.0 [0.92]**	**7.4 [0.96] J**	**9.2 [1.6] J**	**7.3 [0.99]**	**9.5 [1.4] J**	**7.5 [10] J**	5.8 [0.94] H	**5.5 [0.97]**
PFHxS	Perfluorohexanesulfonic Acid (PFHxS)	10	ng/l	**73 [0.93]**	**110 [0.91]**	**110 [0.92]**	**77 [0.92]**	**110 [0.96]**	**110 [1.0] J**	**97 [0.99]**	**110 [0.95] J**	**120 [10]**	100 [0.94] H	**100 [0.97]**
PFHpS	Perfluoroheptanesulfonic Acid (PFHpS)		ng/l	**1.2 [0.93]**	**1.7 [0.91]**	**1.8 [0.92]**	**1.1 [0.92] J**	**1.7 [0.96] J**	**2.1 [1.6]**	**1.6 [0.99] J**	**1.6 [1.4] J**	ND [10]	1.7 [0.94] HJ	**1.9 [0.97]**
PFOS	Perfluorooctanesulfonic Acid (PFOS)	4.0	ng/l	**55 [0.93]**	**64 [0.91]**	**63 [0.92]**	**54 [0.92]**	**68 [1.9]**	**71 [1.6]**	**67 [2.0]**	**70 [1.4]**	**74 [10]**	60 [0.94] H	**74 [0.97]**
PFNS	Perfluorononanesulfonic Acid (PFNS)		ng/l	ND [0.93]	ND [0.91]	ND [0.92]	ND [0.92] U	ND [0.96] U	ND [1.6] U	ND [0.99] U	ND [1.4] U	ND [10]	ND [0.94] H	ND [0.97]
PFDS	Perfluorodecanesulfonic Acid (PFDS)		ng/l	ND [0.93]	ND [0.91]	ND [0.92]	ND [0.92] U	ND [0.96] U	ND [1.6] U	ND [0.99] U	ND [1.4] UJ	ND [10]	ND [0.94] H	ND [0.97]
PFDoS (PFDoDS)	Perfluorododecanesulfonic Acid (PFDoS)		ng/l	ND [0.93]	ND [0.91]	ND [0.92]	ND [0.92] UJ	ND [0.96] U	ND [3.1] U	ND [0.99] UJ	ND [2.9] U	ND [10]	ND [0.94] H	ND [0.97]
4:2-FTS	4:2-Fluorotelomersulfonic Acid (4:2-FTS)		ng/l	ND [0.93]	ND [0.91]	ND [0.92]	ND [0.92] U	ND [0.96] U	ND [1.0] U	ND [0.99] U	ND [0.95] U	ND [40]	ND [3.8] H	ND [3.9]
6:2-FTS	6:2-Fluorotelomersulfonic Acid (6:2-FTS)		ng/l	**5.4 [3.7]**	**8.3 [3.6]**	**8.5 [3.7]**	**8.0 [3.7] J**	**8.9 [7.7] U**	**13 [1.0] J**	**9.6 [2.0]**	**10 [0.95] J**	ND [40]	ND [3.8] H	**12 [3.9]**
8:2 FTS	8:2 Fluorotelomersulfonic Acid (8:2 FTS)		ng/l	ND [1.9]	ND [1.8]	ND [1.8]	ND [1.8] U	ND [1.9] UJ	ND [1.6] U	ND [2.0] UJ	ND [1.4] U	ND [40]	ND [3.8] H	ND [3.9]
PFOSA (FOSA)	Perfluorooctanesulfonamide (FOSA)		ng/l	**1.3 [0.93]**	**1.5 [0.91]**	**0.85 [0.92]**	**0.63 [0.92] J**	ND [1.3] UJ	ND [1.6] U	**0.69 [1.4] J**	ND [1.4] U	ND [10]	ND [0.94] H	ND [0.97]
NMePFOSA (MeFOSA)	N-Methylperfluoro-1-octanesulfonamide (NMeFOSA)		ng/l	ND [1.9]	ND [1.8]	ND [1.8]	ND [1.8] UJ	ND [1.9] R	ND [1.6] U	ND [2.0] UJ	ND [1.4] U	ND [10]	ND [0.94] H	ND [0.97]
NEtPFOSA (EtFOSA)	N-Ethylperfluoro-1-octanesulfonamide (NEtFOSA)		ng/l	ND [1.9]	ND [1.8]	ND [1.8]	ND [1.8] UJ	ND [1.9] R	ND [1.6] U	ND [2.0] UJ	ND [1.4] U	ND [10]	ND [0.94] H	ND [0.97]
NMeFOSAA	N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)		ng/l	ND [1.1]	ND [1.1]	ND [1.1]	ND [1.1] U	ND [1.2] UJ	ND [1.0] U	ND [1.2] U	ND [0.95] U	ND [10]	ND [0.94] H	ND [0.97]
NEtFOSAA	N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)		ng/l	ND [0.93]	ND [0.91]	ND [0.92]	ND [0.92] U	ND [0.96] UJ	ND [1.0] U	ND [0.99] U	ND [0.95] U	ND [10]	ND [0.94] H	ND [0.97]
NMePFOSAE (MeFOSE)	2-(N-Methylperfluoro-1-octanesulfonamido)-Ethanol (NMeFOSE)		ng/l	ND [1.9]	ND [1.8]	ND [1.8]	ND [1.8] U	ND [1.9] R	ND [1.0] UJ	ND [2.0] UJ	ND [0.95] UJ	ND [100]	ND [9.4] H	ND [9.7]
NEtPFOSAE (EtFOSE)	2-(N-Ethylperfluoro-1-octanesulfonnnamido-)-Ethanol (NEtFOSE)		ng/l	ND [1.9]	ND [1.8]	ND [1.8]	ND [1.8] UJ	ND [1.9] R	ND [1.6] U	ND [2.0] UJ	ND [1.4] U	ND [100]	ND [9.4] H	ND [9.7]
HFPO-DA	2,3,3,3-Tetrafluoro-2-(1,1,2,2,3,3,3-heptafluoropropoxy)-Propanoic Acid	10	ng/l	ND [0.93]	ND [0.91]	ND [0.92]	ND [0.92] U	ND [0.96] U	ND [1.6] U	ND [0.99] U	ND [1.4] U	ND [40]	ND [3.8] H	ND [3.9]
DONA	4,8-Dioxa-3H-perfluorononanoic Acid (DONA)		ng/l	ND [0.93]	ND [0.91]	ND [0.92]	ND [0.92] U	ND [0.96] U	ND [1.6] U	ND [0.99] U	ND [1.4] U	ND [40]	ND [3.8] H	ND [3.9]
PFMPA	Perfluoro-3-methoxypropanoic Acid (PFMPA)		ng/l	--	--	--	--	--	--	--	--	ND [20]	ND [1.9] H	ND [1.9]
PFMBA	Perfluoro-4-methoxybutanoic Acid (PFMBA)		ng/l	--	--	--	--	--	--	--	--	ND [20]	ND [1.9] H	ND [1.9]
NFDHA	Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)		ng/l	--	--	--	--	--	--	--	--	ND [20]	ND [1.9] H	ND [1.9] R
9Cl-PF3ONS	9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic Acid (9Cl-PF3ONS)		ng/l	ND [0.93]	ND [0.91]	ND [0.92]	ND [0.92] U	ND [0.96] UJ	ND [1.0] U	ND [0.99] U	ND [0.95] U	ND [40]	ND [1.9] H	ND [3.9]
11Cl-PF3OUdS	11-Chloroeicosafluoro-3-oxaundecane-1-sufonic Acid (11Cl-PF3OUdS)		ng/l	ND [0.93]	ND [0.91]	ND [0.92]	ND [0.92] U	ND [0.96] UJ	ND [1.0] U	ND [0.99] U	ND [0.95] U	ND [40]	ND [1.9] H	ND [3.9]
PFEESA	Perfluoro(2-ethoxyethane)sulfonic acid (PFEESA)		ng/l	--	--	--	--	--	--	--	--	ND [20]	ND [1.9] H	ND [1.9]
3:3 FTCA	3:3 FTCA		ng/l	--	--	--	--	--	--	--	--	ND [50]	ND [4.7] H	ND [4.9]
5:3 FTCA	5:3 FTCA		ng/l	--	--	--	--	--	--	--	--	ND [250]	ND [24] H	ND [24]
7:3 FTCA	7:3 FTCA		ng/l	--	--	--	--	--	--	--	--	ND [250]	ND [24] H	ND [24]

Notes:

*20PS-MW06 samples were reanalyzed out of hold to confirm that the sample had been switched
with sample EB-01-07252024 during the initial analysis. All results reported and validated are from the initial analysis.
See Data Validation Report for SDG 320-114270-1 for additional details.

Grey results were not reported as usable data or considered for validation and are provided for comparative purposes only.

Highlighted = result exceeds MCL

FD = field duplicate sample

MCL = maximum contaminant level

N = primary sample

Data Qualifiers:

B = Analyte detected above the DL inblank

H = Estimated value, biased low due to hold time exceedance

J = Estimated value

ND = non-detect

QH = Estimated value biased high, due to quality control failure

QL = Estimated value biased low, due to quality control failure

QN = Estimated value, due to quality control failure

Table 7. Blank Sample Summary

SDG No.	Sample ID	QC Type	Compounds Detected
Spring 2024			
320-113925-1	EB01-071724	Equipment Blank	None Detected
320-114270-1	EB01-07252024	Equipment Blank	None Detected
320-114280-1	EB01-07282024	Equipment Blank	None Detected
320-113925-1	FB01-071724	Field Blank	None Detected
320-114018-1	FB02-071924	Field Blank	None Detected
320-114049-1	FB03-072124	Field Blank	None Detected
320-114960-1	FB01-07232024	Field Blank	None Detected
320-114280-1	FB01-07282024	Field Blank	None Detected
Fall 2024			
320-115216-1	EB-01-090624	Equipment Blank	None Detected
320-115197-1	24-EB01-090724	Equipment Blank	None Detected
320-115324-1	EB01-091024	Equipment Blank	None Detected
320-115218-1	FB01-090424	Field Blank	None Detected
320-115187-1	24-FB01-090724	Field Blank	None Detected
320-115264-1	24-20PS-FB01-090924	Field Blank	None Detected
320-115290-1	24-FB02-090924	Field Blank	None Detected
320-115190-1	NA	NA	NA
320-115193-1	NA	NA	NA
320-115217-1	NA	NA	NA
320-115263-1	NA	NA	NA
320-115292-1	NA	NA	NA

ID = Identification

NA = not applicable

No. = Number

QC = Quality Control

SDG = Sample Delivery Group

Table 8. Duplicate Sample Summary

SDG No.	Parent ID	Field Duplicate ID
Spring 2024		
320-113932-1	24-MW-BKG-07-0716	24-DUP01-0716
320-114018-1	24-NPB-22-0719	24-DUP03-0719
320-114037-1	24-USAP-3-0718	24-DUP02-0718
320-114044-1	24-NPF-40-0720	24-DUP04-0720
320-114049-1	24-DSAP-10-0721	24-DUP05-0721
320-114270-1	24-20PS-MW02-0729	24-DUP01-0729
320-114280-1	24-19PS-MW02A-0728	24-DUP01-0728
320-114322-1	24-20PS-MW01C-0727	24-DUP01-0727
320-114960-1	24-20PS-MW12-0723	24-DUP01-0723
320-114960-1	24-HCMW02WT-0724	24-DUP01-0724
Fall 2024		
320-115187-1	24-USAP-1-0908	24-DUP02-0908
320-115197-1	24-02MW11-0907	24-DUP01-0907
320-115216-1	24-19PS-MW01B-0908	24-DUP01-0908
320-115217-1	24-DSAP-11-0905	24-DUP01-0905
320-115217-1	24-20PS-MW15-0906	24-DUP01-0906
320-115218-1	24-20PS-MW24-0904	24-DUP01-0904
320-115263-1	24-HCMW02DP-0910	24-DUP01-0910
320-115264-1	24-19PS-MW02A-0909	24-DUP01-0909
320-115290-1	24-DSAP-10-0909	24-DUP04-0909
320-115292-1	24-NPF-20-0909	24-DUP03-0909

Notes:

ID = identification

No. = number

SDG = sample delivery group

Table 9. Mann Kendall Trend Analysis

Well ID	Analyte	MK	p-value	Confidence Factor (%)	COV	Mann-Kendall Trend	Number of Sample Events
Eielson Air Force Base Shallow Wells (MAROS)							
02MW11	PFHxS	5	0.28	71.90	0.19	No Trend	7
02MW11	PFNA	10	0.09	90.70	0.14	Probably Increasing	7
02MW11	PFOS	14	0.03	97.50	0.16	Increasing	7
02MW11	PFOA	14	0.03	97.50	0.29	Increasing	7
20PS-MW01	PFHxS	-3	0.42	58.00	0.39	Stable	9
20PS-MW01	PFNA	-10	0.18	82.10	0.37	Stable	9
20PS-MW01	PFOS	-2	0.46	54.00	0.18	Stable	9
20PS-MW01	PFOA	-6	0.31	69.40	0.24	Stable	9
20PS-MW02	PFHxS	-6	0.31	69.40	0.85	Stable	9
20PS-MW02	PFNA	15	0.08	92.50	0.72	Probably Increasing	9
20PS-MW02	PFOS	2	0.46	54.00	1.01	No Trend	9
20PS-MW02	PFOA	-8	0.24	76.20	0.57	Stable	9
20PS-MW03	PFHxS	10	0.18	82.10	0.58	No Trend	9
20PS-MW03	PFNA	16	0.06	94.00	0.22	ND	9
20PS-MW03	PFOS	16	0.06	94.00	0.52	Probably Increasing	9
20PS-MW03	PFOA	12	0.13	87.00	0.54	No Trend	9
20PS-MW06	PFHxS	13	0.50	89.00	0.17	No Trend	9
20PS-MW06	PFNA	24	0.01	98.80	0.99	Increasing	9
20PS-MW06	PFOS	24	0.15	99.40	0.13	Increasing	9
20PS-MW06	PFOA	23	0.15	99.10	0.24	Increasing	9
20PS-MW07	PFHxS	14	0.09	91.00	0.40	Probably Increasing	9
20PS-MW07	PFNA	11	0.15	84.60	0.29	No Trend	9
20PS-MW07	PFOS	12	0.13	87.00	0.14	No Trend	9
20PS-MW07	PFOA	17	0.05	95.10	0.38	Increasing	9
20PS-MW08	PFHxS	22	0.01	98.80	0.38	Increasing	9
20PS-MW08	PFNA	20	0.02	97.80	0.32	Increasing	9
20PS-MW08	PFOS	23	0.01	99.10	0.21	Increasing	9
20PS-MW08	PFOA	22	0.01	98.80	0.26	Increasing	9
HCMW01WT	PFHxS	7	0.19	80.90	0.29	No Trend	7
HCMW01WT	PFNA	-2	0.44	55.70	0.04	ND	7
HCMW01WT	PFOS	-11	0.07	93.20	0.33	Probably Decreasing	7
HCMW01WT	PFOA	5	0.28	71.90	0.42	No Trend	7
HCMW02WT	PFHxS	-2	0.46	54.00	0.13	Stable	9
HCMW02WT	PFNA	9	0.21	79.20	0.30	No Trend	9
HCMW02WT	PFOS	2	0.46	54.00	0.16	No Trend	9
HCMW02WT	PFOA	-10	0.18	82.10	0.20	Stable	9
HCMW03WT	PFHxS	-5	0.24	76.50	0.84	Stable	6
HCMW03WT	PFNA	7	0.14	86.40	1.36	No Trend	6
HCMW03WT	PFOS	-7	0.14	86.40	1.01	No Trend	6
HCMW03WT	PFOA	-5	0.24	76.50	0.70	Stable	6
HCMW05WT	PFHxS	-7	0.14	86.40	0.32	Stable	6
HCMW05WT	PFNA	11	0.03	97.20	0.51	Increasing	6
HCMW05WT	PFOS	-3	0.36	64.00	0.32	Stable	6
HCMW05WT	PFOA	-7	0.14	86.40	0.21	Stable	6
HCMW06WT	PFHxS	-13	0.04	96.50	0.62	Decreasing	7

Table 9. Mann Kendall Trend Analysis

Well ID	Analyte	MK	p-value	Confidence Factor (%)	COV	Mann-Kendall Trend	Number of Sample Events
HCMW06WT	PFNA	-15	0.02	98.50	0.38	Decreasing	7
HCMW06WT	PFOS	-3	0.39	61.40	0.42	Stable	7
HCMW06WT	PFOA	-17	0.01	99.50	0.59	Decreasing	7
MW1-50	PFHxS	-29	0.01	98.70	0.47	Decreasing	11
MW1-50	PFNA	-21	0.06	94.00	0.43	Probably Decreasing	11
MW1-50	PFOS	-29	0.01	98.70	0.52	Decreasing	11
MW1-50	PFOA	-29	0.03	97.40	0.41	Decreasing	12
MW-2	PFHxS	-14	0.03	97.50	0.24	Decreasing	7
MW-2	PFNA	0	0.56	43.70	0.28	Stable	7
MW-2	PFOS	0	0.56	43.70	0.28	Stable	7
MW-2	PFOA	-13	0.04	96.50	0.24	Decreasing	7
MW2-50	PFHxS	-34	0.00	99.60	0.16	Decreasing	11
MW2-50	PFNA	15	0.14	85.90	0.21	No Trend	11
MW2-50	PFOS	-1	0.50	50.00	0.10	Stable	11
MW2-50	PFOA	-31	0.02	98.10	0.16	Decreasing	12
MW3-50	PFHxS	-13	0.18	82.10	0.33	Stable	11
MW3-50	PFNA	17	0.11	89.10	0.38	No Trend	11
MW3-50	PFOS	19	0.08	91.80	0.19	Probably Increasing	11
MW3-50	PFOA	-18	0.13	87.50	0.33	Stable	12
MW-BKG-01	PFHxS	-3	0.39	61.40	0.14	Stable	7
MW-BKG-01	PFNA	-1	0.50	50.00	0.19	ND	7
MW-BKG-01	PFOS	1	0.50	50.00	0.47	No Trend	7
MW-BKG-01	PFOA	-1	0.50	50.00	0.19	ND	7
MW-BKG-04	PFHxS	-8	0.16	84.50	0.34	Stable	7
MW-BKG-04	PFNA	8	0.16	84.50	0.35	ND	7
MW-BKG-04	PFOS	-3	0.39	61.40	1.05	No Trend	7
MW-BKG-04	PFOA	-4	0.33	66.70	0.36	Stable	7
MW-BKG-07	PFHxS	-9	0.12	88.10	0.40	Stable	7
MW-BKG-07	PFNA	-7	0.19	80.90	0.22	Stable	7
MW-BKG-07	PFOS	-1	0.50	50.00	0.32	Stable	7
MW-BKG-07	PFOA	-9	0.12	88.10	0.50	Stable	7
MW-BKG-09	PFHxS	-14	0.03	97.50	0.17	Decreasing	7
MW-BKG-09	PFNA	-5	0.28	71.90	0.17	ND	7
MW-BKG-09	PFOS	-11	0.07	93.20	0.18	Probably Decreasing	7
MW-BKG-09	PFOA	-6	0.24	76.40	0.21	Stable	7
MW-BKG-10	PFHxS	-1	0.50	50.00	0.41	Stable	7
MW-BKG-10	PFNA	-1	0.50	50.00	0.21	ND	7
MW-BKG-10	PFOS	0	0.56	43.70	0.36	ND	7
MW-BKG-10	PFOA	-1	0.50	50.00	0.21	ND	7
MW-BKG-12	PFHxS	3	0.39	61.40	0.37	No Trend	7
MW-BKG-12	PFNA	7	0.19	80.90	1.04	No Trend	7
MW-BKG-12	PFOS	-9	0.12	88.10	0.58	Stable	7
MW-BKG-12	PFOA	-1	0.50	50.00	0.27	Stable	7
Off Base Shallow Wells (MAROS)							
20PS-MW09	PFHxS	21	0.02	98.30	0.21	Increasing	9
20PS-MW09	PFNA	21	0.02	98.30	0.16	ND	9

Table 9. Mann Kendall Trend Analysis

Well ID	Analyte	MK	p-value	Confidence Factor (%)	COV	Mann-Kendall Trend	Number of Sample Events
20PS-MW09	PFOS	28	0.00	99.90	0.24	Increasing	9
20PS-MW09	PFOA	22	0.01	98.80	0.26	Increasing	9
20PS-MW10	PFHxS	-12	0.13	87.00	0.43	Stable	9
20PS-MW10	PFNA	23	0.01	99.10	0.19	ND	9
20PS-MW10	PFOS	5	0.34	65.70	0.58	No Trend	9
20PS-MW10	PFOA	4	0.38	61.90	0.30	No Trend	9
20PS-MW11	PFHxS	-4	0.38	61.90	0.30	Stable	9
20PS-MW11	PFNA	20	0.02	97.80	0.20	ND	9
20PS-MW11	PFOS	-8	0.24	76.20	0.33	Stable	9
20PS-MW11	PFOA	-12	0.13	87.00	0.39	Stable	9
20PS-MW12	PFHxS	-1	0.50	50.00	0.14	Stable	9
20PS-MW12	PFNA	27	0.00	99.80	0.33	ND	9
20PS-MW12	PFOS	18	0.04	96.20	0.16	Increasing	9
20PS-MW12	PFOA	13	0.11	89.00	0.14	No Trend	9
20PS-MW13	PFHxS	-20	0.02	97.80	0.18	Decreasing	9
20PS-MW13	PFNA	19	0.03	97.00	1.58	Increasing	9
20PS-MW13	PFOS	-20	0.02	97.80	0.08	Decreasing	9
20PS-MW13	PFOA	-8	0.24	76.20	0.16	Stable	9
20PS-MW14	PFHxS	-13	0.07	92.90	0.33	Probably Decreasing	8
20PS-MW14	PFNA	14	0.05	94.60	0.36	Probably Increasing	8
20PS-MW14	PFOS	-4	0.36	64.00	0.57	Stable	8
20PS-MW14	PFOA	-16	0.03	96.90	0.49	Decreasing	8
20PS-MW15	PFHxS	-7	0.27	72.80	0.28	Stable	9
20PS-MW15	PFNA	10	0.18	82.10	0.24	No Trend	9
20PS-MW15	PFOS	5	0.34	65.70	0.13	No Trend	9
20PS-MW15	PFOA	-7	0.27	72.80	0.26	Stable	9
20PS-MW17	PFHxS	14	0.09	91.00	0.17	Probably Increasing	9
20PS-MW17	PFNA	24	0.01	99.40	1.50	ND	9
20PS-MW17	PFOS	24	0.01	99.40	0.39	Increasing	9
20PS-MW17	PFOA	21	0.02	98.30	0.28	Increasing	9
20PS-MW19	PFHxS	35	0.00	100.00	0.24	Increasing	9
20PS-MW19	PFNA	5	0.34	65.70	0.04	ND	9
20PS-MW19	PFOS	22	0.01	98.80	0.25	Increasing	9
20PS-MW19	PFOA	26	0.00	99.70	0.44	Increasing	9
20PS-MW20	PFHxS	-16	0.06	94.00	0.16	Probably Decreasing	9
20PS-MW20	PFNA	-3	0.42	58.00	0.04	ND	9
20PS-MW20	PFOS	3	0.42	58.00	0.21	No Trend	9
20PS-MW20	PFOA	-17	0.05	95.10	0.24	Decreasing	9
20PS-MW22	PFHxS	-12	0.13	87.00	0.13	Stable	9
20PS-MW22	PFNA	14	0.09	91.00	0.15	ND	9
20PS-MW22	PFOS	-15	0.08	92.50	0.34	Probably Decreasing	9
20PS-MW22	PFOA	-11	0.15	84.60	0.22	Stable	9
20PS-MW23	PFHxS	4	0.38	61.90	0.24	No Trend	9
20PS-MW23	PFNA	23	0.01	99.10	0.07	ND	9
20PS-MW23	PFOS	2	0.46	54.00	0.24	No Trend	9
20PS-MW23	PFOA	-2	0.46	54.00	0.21	Stable	9

Table 9. Mann Kendall Trend Analysis

Well ID	Analyte	MK	p-value	Confidence Factor (%)	COV	Mann-Kendall Trend	Number of Sample Events
20PS-MW24	PFHxS	-7	0.27	72.80	0.16	Stable	9
20PS-MW24	PFNA	21	0.02	98.30	0.16	Increasing	9
20PS-MW24	PFOS	-5	0.34	65.70	0.34	Stable	9
20PS-MW24	PFOA	-5	0.34	65.70	0.28	Stable	9
20PS-MW25	PFHxS	23	0.01	99.10	0.42	Increasing	9
20PS-MW25	PFNA	13	0.11	89.00	0.04	ND	9
20PS-MW25	PFOS	22	0.01	98.80	0.35	Increasing	9
20PS-MW25	PFOA	17	0.05	95.10	0.39	Increasing	9
20PS-MW27	PFHxS	-13	0.07	92.90	0.25	Probably Decreasing	8
20PS-MW27	PFNA	11	0.11	88.70	0.20	No Trend	8
20PS-MW27	PFOS	-9	0.17	83.20	0.65	Stable	8
20PS-MW27	PFOA	-13	0.07	92.90	0.32	Probably Decreasing	8
20PS-MW29	PFHxS	-11	0.07	93.20	0.13	Probably Decreasing	7
20PS-MW29	PFNA	1	0.50	50.00	0.36	No Trend	7
20PS-MW29	PFOS	3	0.39	61.40	0.06	No Trend	7
20PS-MW29	PFOA	-8	0.16	84.50	0.17	Stable	7
20PS-MW30	PFHxS	-11	0.07	93.20	0.16	Probably Decreasing	7
20PS-MW30	PFNA	7	0.19	80.90	0.20	ND	7
20PS-MW30	PFOS	10	0.09	90.70	0.16	Probably Increasing	7
20PS-MW30	PFOA	-10	0.09	90.70	0.14	Probably Decreasing	7
DSAP-10	PFHxS	17	0.01	99.50	0.20	Increasing	7
DSAP-10	PFNA	12	0.05	94.90	0.05	ND	7
DSAP-10	PFOS	-8	0.16	84.50	0.40	Stable	7
DSAP-10	PFOA	20	0.00	100.00	0.38	Increasing	7
DSAP-11	PFHxS	-20	0.02	97.80	0.28	Decreasing	9
DSAP-11	PFNA	13	0.11	89.00	0.16	ND	9
DSAP-11	PFOS	-10	0.18	82.10	0.33	Stable	9
DSAP-11	PFOA	-10	0.18	82.10	0.26	Stable	9
DSAP-13	PFHxS	1	0.50	50.00	0.37	No Trend	7
DSAP-13	PFNA	-5	0.28	71.90	0.04	ND	7
DSAP-13	PFOS	-4	0.33	66.70	0.25	Stable	7
DSAP-13	PFOA	1	0.50	50.00	0.77	No Trend	7
DSAP-14	PFHxS	15	0.02	98.50	0.29	Increasing	7
DSAP-14	PFNA	-4	0.33	66.70	0.05	ND	7
DSAP-14	PFOS	7	0.19	80.90	0.16	No Trend	7
DSAP-14	PFOA	18	0.00	99.70	0.35	Increasing	7
DSAP-8S	PFHxS	6	0.27	72.60	0.46	No Trend	8
DSAP-8S	PFNA	5	0.32	68.30	0.04	ND	8
DSAP-8S	PFOS	-2	0.45	54.80	0.88	Stable	8
DSAP-8S	PFOA	8	0.20	80.10	0.72	No Trend	8
NPB-20	PFHxS	0	1.00	0.00	0.00	N/A	3
NPB-20	PFNA	0	1.00	0.00	0.00	N/A	3
NPB-20	PFOS	0	1.00	0.00	0.00	N/A	3
NPB-20	PFOA	0	1.00	0.00	0.00	N/A	3
NPC-20	PFHxS	0	1.00	0.00	0.00	N/A	3
NPC-20	PFNA	0	1.00	0.00	0.00	N/A	3

Table 9. Mann Kendall Trend Analysis

Well ID	Analyte	MK	p-value	Confidence Factor (%)	COV	Mann-Kendall Trend	Number of Sample Events
NPC-20	PFOS	0	1.00	0.00	0.00	N/A	3
NPC-20	PFOA	0	1.00	0.00	0.00	N/A	3
NPD-20	PFHxS	0	1.00	0.00	0.00	N/A	3
NPD-20	PFNA	0	1.00	0.00	0.00	N/A	3
NPD-20	PFOS	0	1.00	0.00	0.00	N/A	3
NPD-20	PFOA	0	1.00	0.00	0.00	N/A	3
NPF-20	PFHxS	0	1.00	0.00	0.00	N/A	3
NPF-20	PFNA	0	1.00	0.00	0.00	N/A	3
NPF-20	PFOS	0	1.00	0.00	0.00	N/A	3
NPF-20	PFOA	0	1.00	0.00	0.00	N/A	3
NPG-20	PFHxS	0	1.00	0.00	0.00	N/A	3
NPG-20	PFNA	0	1.00	0.00	0.00	N/A	3
NPG-20	PFOS	0	1.00	0.00	0.00	N/A	3
NPG-20	PFOA	0	1.00	0.00	0.00	N/A	3
USAP-1	PFHxS	-18	0.07	93.40	0.17	Probably Decreasing	10
USAP-1	PFNA	7	0.30	70.00	0.05	ND	10
USAP-1	PFOS	5	0.36	63.60	0.10	No Trend	10
USAP-1	PFOA	-7	0.30	70.00	0.19	Stable	10
USAP-3	PFHxS	11	0.07	93.20	0.24	Probably Increasing	7
USAP-3	PFNA	3	0.39	61.40	0.05	ND	7
USAP-3	PFOS	-3	0.39	61.40	0.16	Stable	7
USAP-3	PFOA	15	0.02	98.50	0.34	Increasing	7
Eielson Air Force Base Intermediate and Deep Wells (ProUCL)							
HCMW01DP	PFHxS	-6	0.22	78.30	0.329	ND	7
HCMW01DP	PFNA	-6	0.22	78.30	0.359	ND	7
HCMW01DP	PFOA	-1	0.50	50.00	0.542	Stable	7
HCMW01DP	PFOS	4	0.32	67.60	0.396	No Trend	7
HCMW01MD	PFHxS	13	0.03	96.74	0.131	Increasing	7
HCMW01MD	PFNA	0	0.50	50.00	0.0644	ND	7
HCMW01MD	PFOA	13	0.04	96.42	0.307	Increasing	7
HCMW01MD	PFOS	12	0.04	95.77	0.18	Increasing	7
HCMW02DP	PFHxS	-13	0.14	85.80	0.352	Stable	10
HCMW02DP	PFNA	-2	0.46	53.60	0.296	ND	10
HCMW02DP	PFOA	-3	0.43	57.10	0.461	Stable	10
HCMW02DP	PFOS	-7	0.29	70.60	0.405	Stable	10
HCMW02MD	PFHxS	21	0.02	98.20	0.114	Increasing	9
HCMW02MD	PFNA	24	0.01	99.41	0.216	Increasing	9
HCMW02MD	PFOA	24	0.01	99.31	0.199	Increasing	9
HCMW02MD	PFOS	21	0.01	98.56	0.0872	Increasing	9
HCMW03DP	PFHxS	-4	0.32	67.60	0.583	Stable	7
HCMW03DP	PFNA	6	0.22	77.60	0.438	No Trend	7
HCMW03DP	PFOA	-4	0.32	67.60	0.528	Stable	7
HCMW03DP	PFOS	5	0.27	72.60	0.532	No Trend	7
HCMW03MD	PFHxS	15	0.02	98.23	0.299	Increasing	7
HCMW03MD	PFNA	15	0.02	98.23	0.284	Increasing	7
HCMW03MD	PFOA	14	0.02	97.93	0.706	Increasing	7

Table 9. Mann Kendall Trend Analysis

Well ID	Analyte	MK	p-value	Confidence Factor (%)	COV	Mann-Kendall Trend	Number of Sample Events
HCMW03MD	PFOS	11	0.07	93.34	0.32	Probably Increasing	7
HCMW05DP	PFHxS	-11	0.03	96.99	0.175	Decreasing	6
HCMW05DP	PFNA	-6	0.17	83.10	0.344	ND	6
HCMW05DP	PFOA	0	0.50	50.00	0.129	Stable	6
HCMW05DP	PFOS	-8	0.09	90.97	0.154	Probably Decreasing	6
HCMW05MD	PFHxS	-13	0.01	98.79	0.776	Decreasing	6
HCMW05MD	PFNA	10	0.04	95.74	0.206	Increasing	6
HCMW05MD	PFOA	-7	0.13	87.00	0.539	Stable	6
HCMW05MD	PFOS	-15	0.00	99.57	0.316	Decreasing	6
HCMW06DP	PFHxS	-7	0.18	81.60	0.453	Stable	7
HCMW06DP	PFNA	-9	0.12	88.50	0.339	ND	7
HCMW06DP	PFOA	-7	0.18	81.60	0.339	ND	7
HCMW06DP	PFOS	4	0.32	67.60	0.392	No Trend	7
MW1-100	PFHxS	26	0.03	97.45	0.379	Increasing	11
MW1-100	PFNA	-1	0.50	50.00	0.227	Stable	11
MW1-100	PFOA	29	0.03	97.29	0.403	Increasing	12
MW1-100	PFOS	15	0.14	86.20	0.257	No Trend	11
MW1-150	PFHxS	-27	0.04	96.46	0.172	Decreasing	12
MW1-150	PFNA	51	0.00	99.97	0.175	ND	12
MW1-150	PFOA	-25	0.05	95.24	0.186	Decreasing	12
MW1-150	PFOS	-28	0.03	97.00	0.191	Decreasing	12
MW2-100	PFHxS	7	0.32	68.50	0.158	No Trend	11
MW2-100	PFNA	28	0.02	98.38	0.201	Increasing	11
MW2-100	PFOA	-9	0.29	71.00	0.126	Stable	12
MW2-100	PFOS	-18	0.12	88.00	0.12	Stable	12
MW2-150	PFHxS	-43	0.00	99.95	0.279	Decreasing	11
MW2-150	PFNA	12	0.20	80.50	0.0477	ND	11
MW2-150	PFOA	-22	0.07	92.73	0.328	Probably Decreasing	12
MW2-150	PFOS	-15	0.17	83.20	0.288	Stable	12
MW3-100	PFHxS	4	0.41	59.30	0.232	No Trend	11
MW3-100	PFNA	-19	0.08	92.07	0.233	Probably Decreasing	11
MW3-100	PFOA	20	0.10	90.47	0.229	Probably Increasing	12
MW3-100	PFOS	38	0.00	99.81	0.183	Increasing	11
Off Base Intermediate and Deep Wells (ProUCL)							
19PS-MW01A	PFHxS	9	0.16	84.10	0.189	No Trend	8
19PS-MW01A	PFNA	7	0.23	77.30	1.272	ND	8
19PS-MW01A	PFOA	19	0.01	98.76	0.4	Increasing	8
19PS-MW01A	PFOS	-11	0.10	89.90	0.121	Stable	8
19PS-MW01B	PFHxS	5	0.31	69.10	0.84	No Trend	8
19PS-MW01B	PFNA	3	0.40	59.80	0.723	ND	8
19PS-MW01B	PFOA	0	0.55	45.20	0.943	Stable	8
19PS-MW01B	PFOS	-5	0.31	69.10	0.75	Stable	8
20PS-MW01C	PFHxS	17	0.01	99.30	0.0757	ND	7
20PS-MW01C	PFNA	11	0.06	93.78	0.205	ND	7
20PS-MW01C	PFOA	13	0.03	96.74	0.205	ND	7
20PS-MW01C	PFOS	7	0.18	81.60	0.344	ND	7

Table 9. Mann Kendall Trend Analysis

Well ID	Analyte	MK	p-value	Confidence Factor (%)	COV	Mann-Kendall Trend	Number of Sample Events
20PS-MW01D	PFHxS	9	0.15	84.60	0.0713	ND	8
20PS-MW01D	PFNA	9	0.15	84.60	0.172	ND	8
20PS-MW01D	PFOA	11	0.10	89.90	0.17	ND	8
20PS-MW01D	PFOS	3	0.40	60.10	0.347	ND	8
19PS-MW02A	PFHxS	-19	0.05	94.63	0.285	Probably Decreasing	10
19PS-MW02A	PFNA	6	0.33	67.30	0.778	No Trend	10
19PS-MW02A	PFOA	-19	0.05	94.63	0.271	Probably Decreasing	10
19PS-MW02A	PFOS	11	0.19	81.40	0.23	No Trend	10
19PS-MW02B	PFHxS	11	0.22	78.30	0.325	No Trend	11
19PS-MW02B	PFNA	16	0.12	88.10	0.684	ND	11
19PS-MW02B	PFOA	9	0.27	73.50	0.266	No Trend	11
19PS-MW02B	PFOS	37	0.00	99.76	0.358	Increasing	11
20PS-MW02C	PFHxS	8	0.14	85.60	0.0409	ND	7
20PS-MW02C	PFNA	6	0.22	77.60	0.21	ND	7
20PS-MW02C	PFOA	8	0.14	85.60	0.21	ND	7
20PS-MW02C	PFOS	3	0.38	61.80	0.462	No Trend	7
20PS-MW02D	PFHxS	14	0.02	97.59	1.531	ND	7
20PS-MW02D	PFNA	14	0.02	97.59	1.471	ND	7
20PS-MW02D	PFOA	16	0.01	98.87	1.471	ND	7
20PS-MW02D	PFOS	12	0.05	95.26	1.28	ND	7
DSAP-8D	PFHxS	-12	0.04	95.77	0.318	Decreasing	7
DSAP-8D	PFNA	12	0.05	95.26	0.369	ND	7
DSAP-8D	PFOA	-10	0.09	91.42	0.217	Probably Decreasing	7
DSAP-8D	PFOS	-9	0.12	88.50	0.318	Stable	7
NPA-40	PFHxS	0	1.00	0.00	0.00	N/A	3
NPA-40	PFNA	0	1.00	0.00	0.00	N/A	3
NPA-40	PFOS	0	1.00	0.00	0.00	N/A	3
NPA-40	PFOA	0	1.00	0.00	0.00	N/A	3
NPB-40	PFHxS	-1	0.50	50.00	0.19	N/A	3
NPB-40	PFNA	-2	0.27	73.00	0.72	N/A	3
NPB-40	PFOA	-3	0.15	85.20	0.38	N/A	3
NPB-40	PFOS	-1	0.50	50.00	0.13	N/A	3
NPC-40	PFHxS	-1	0.50	50.00	0.15	N/A	3
NPC-40	PFNA	-3	0.15	85.20	0.62	N/A	3
NPC-40	PFOA	-1	0.50	50.00	0.38	N/A	3
NPC-40	PFOS	-1	0.50	50.00	0.29	N/A	3
NPD-40	PFHxS	-1	0.50	50.00	0.1	N/A	3
NPD-40	PFNA	-1	0.50	50.00	0.619	N/A	3
NPD-40	PFOA	-3	0.15	85.20	0.132	N/A	3
NPD-40	PFOS	-2	0.27	73.00	0.0707	N/A	3
NPF-40	PFHxS	-1	0.50	50.00	0.25	N/A	3
NPF-40	PFNA	-3	0.15	85.20	0.641	N/A	3
NPF-40	PFOA	-1	0.50	50.00	0.22	N/A	3
NPF-40	PFOS	-3	0.15	85.20	0.142	N/A	3
NPG-40	PFHxS	-1	0.50	50.00	0.173	N/A	3
NPG-40	PFNA	-1	0.50	50.00	0.616	N/A	3

Table 9. Mann Kendall Trend Analysis

Well ID	Analyte	MK	p-value	Confidence Factor (%)	COV	Mann-Kendall Trend	Number of Sample Events
NPG-40	PFOA	-1	0.50	50.00	0.404	N/A	3
NPG-40	PFOS	-1	0.50	50.00	0.267	N/A	3

Notes:

Blue highlight indicates leading edge well

Red text denotes increasing or probably increasing trend

Green text denotes decreasing or probably decreasing trend

COV = coefficient of variation

MK = Mann-Kendall Statistic

NA = Not applicable due to insufficient dat (<4 sampling events)

ND = All samples non-detect

PFHxS = perfluorohexanesulfonic acid

PFNA = perfluorononanoic acid

PFOA = perfluorooctanoic acid

PFOS = perfluorooctanesulfonic acid

Table 10. Mann Kendall Trend Summary

Constituent	Total Wells	Number and Percentage of Wells for Each Trend Category									
		ND		PD, D		S		I, PI		NT	
		#	%	#	%	#	%	#	%	#	%
Summary of Mann-Kendall Trend Results for Individual Eielson Shallow Wells (MAROS)											
PFHxS	22	0	0.0%	5	22.7%	10	45.5%	2	9.1%	5	22.7%
PFNA	22	6	27.3%	2	9.1%	3	13.6%	5	22.7%	6	27.3%
PFOS	22	1	4.5%	3	13.6%	7	31.8%	5	22.7%	6	27.3%
PFOA	22	2	9.1%	4	18.2%	10	45.5%	4	18.2%	2	9.1%
Summary of Mann-Kendall Trend Results for Individual Off Base Shallow Wells (MAROS)											
PFHxS	30	6	20.0%	8	26.7%	6	20.0%	7	23.3%	3	10.0%
PFNA	30	24	80.0%	0	0.0%	0	0.0%	3	10.0%	3	10.0%
PFOS	30	6	20.0%	2	6.7%	9	30.0%	6	20.0%	7	23.3%
PFOA	30	6	20.0%	4	13.3%	9	30.0%	7	23.3%	4	13.3%
Summary of Mann-Kendall Trend Results for Individual Eielson AFB and Off Base Intermediate and Deep Wells (ProUCL)											
PFHxS	28	10	35.7%	6	21.4%	3	10.7%	4	14.3%	5	17.9%
PFNA	28	20	71.4%	1	3.6%	1	3.6%	4	14.3%	2	7.1%
PFOS	28	8	28.6%	3	10.7%	6	21.4%	5	17.9%	6	21.4%
PFOA	28	10	35.7%	4	14.3%	7	25.0%	6	21.4%	1	3.6%
Trend Summary Across Entire Monitoring Well Network (Totals)											
PFHxS	80	16	20.0%	19	23.8%	19	23.8%	13	16.3%	13	16.3%
PFNA	80	50	62.5%	3	3.8%	4	5.0%	12	15.0%	11	13.8%
PFOS	80	15	18.8%	8	10.0%	22	27.5%	16	20.0%	19	23.8%
PFOA	80	18	22.5%	12	15.0%	26	32.5%	17	21.3%	7	8.8%

D = Decreasing

I = Increasing

ND = non-detect

NT = No Trend

PD = Probably Decreasing

PI = Probably Increasing

S = Stable

= number of wells for each trend category

% = percent of wells for each trend category

Table 11. MAROS Plume Trends

Moment Type	Constituent	COV	MK S- Statistic	Confidence (%)	Moment Trend
Eielson Air Force Base Shallow Plume Trends					
Zeroth Moment (Total Dissolved Mass)	PFHxS	0.61	13	79.0%	No Trend
	PFNA	0.67	53	100.0%	Increasing
	PFOS	0.60	15	82.8%	No Trend
	PFOA	0.48	5	60.6%	No Trend
First Moment (Center of Mass)	PFHxS	0.21	-5	63.6%	Stable
	PFNA	0.30	-5	63.6%	Stable
	PFOS	0.20	-13	85.4%	Stable
	PFOA	0.20	-1	50.0%	Stable
Second Moment X (Spread of Plume in Direction of GW Flow)	PFHxS	0.37	37	100.0%	Increasing
	PFNA	0.34	35	100.0%	Increasing
	PFOS	0.31	29	99.5%	Increasing
	PFOA	0.27	29	99.5%	Increasing
Second Moment Y (Spread of Plume Perpendicular to Direction of GW Flow)	PFHxS	0.33	25	98.6%	Increasing
	PFNA	0.29	27	99.2%	Increasing
	PFOS	0.25	27	99.2%	Increasing
	PFOA	0.34	23	97.7%	Increasing
Off Base Shallow Plume Trends					
Zeroth Moment (Total Dissolved Mass)	PFHxS	0.50	28	98.4%	Increasing
	PFNA	0.61	48	100.0%	Increasing
	PFOS	0.51	28	98.4%	Increasing
	PFOA	0.52	18	90.5%	Probably Increasing
First Moment (Center of Mass)	PFHxS	0.04	24	99.4%	Increasing
	PFNA	0.06	22	98.8%	Increasing
	PFOS	0.04	20	97.8%	Increasing
	PFOA	0.04	26	99.7%	Increasing
Second Moment X (Spread of Plume in Direction of GW Flow)	PFHxS	0.16	26	99.7%	Increasing
	PFNA	0.20	22	98.8%	Increasing
	PFOS	0.17	28	99.9%	Increasing
	PFOA	0.14	30	100.0%	Increasing
Second Moment Y (Spread of Plume Perpendicular to Direction of GW Flow)	PFHxS	0.24	30	100.0%	Increasing
	PFNA	0.20	24	99.4%	Increasing
	PFOS	0.18	26	99.7%	Increasing
	PFOA	0.27	26	99.7%	Increasing

Notes:

Red text indicates increasing/probably increasing trend

% = percent

GW = groundwater

MK = Mann-Kendall

PFHxS = perfluorohexanesulfonic acid

PFNA = perfluoronanoic acid

PFOS = perfluorooctanesulfonic acid

PFOA = perfluorooctanoic acid

APPENDIX A
PHOTOGRAPH LOGS

Photo No.: 001	**Date/Time:** 7/15/2024 @ 1619
Direction: Southwest	**Description:** HCMW06WT setup and purging.
Photo By: J. Blankenship	

Photo No.: 002	**Date/Time:** 7/16/2024 @ 0929
Direction: North	**Description:** Sampling well MW-BKG-04.
Photo By: J. Blankenship	

Photo No.: 003	**Date/Time:** 7/16/2024 @ 0956
Direction: Southeast	**Description:** Setup for sampling well MW-BKG-07.
Photo By: J. Blankenship	

Photo No.: 004	**Date/Time:** 7/16/2024 @ 1115
Direction: East	**Description:** Sampling well MW-BKG-12.
Photo By: J. Blankenship	

Photo No.: 005	**Date/Time:** 7/16/2024 @ 1252
Direction: South	**Description:** Sampling of well MW2-50.
Photo By: J. Blankenship	

Photo No.: 006	**Date/Time:** 7/16/2024 @ 1321
Direction: West	**Description:** Sampling MW2-100.
Photo By: J. Blankenship	

Photo No.: 007	**Date/Time:** 7/16/2024 @ 1504
Direction: North	**Description:** Sampling MW-2.
Photo By: J. Blankenship	

Photo No.: 008	**Date/Time:** 7/16/2024 @ 1611
Direction: North	**Description:** Setup sampling at 02MW11.
Photo By: J. Blankenship	

Photo No.: 009	**Date/Time:** 7/17/2024 @ 1200
Direction: South	**Description:** Decon of submersible pump and cord.
Photo By: E. Jessup-McDermott (EA)	

Photo No.: 010	**Date/Time:** 7/18/2024 @ 1309
Direction: Southeast	**Description:** Sample setup at MW03.
Photo By: H. Peterson (EA)	

Photo No.: 011	**Date/Time:** 7/19/2024 @ 1040
Direction: Northwest	**Description:** Sampling 20PS-MW20.
Photo By: J. Blankenship	

Photo No.: 012	**Date/Time:** 7/19/2024 @ 1352
Direction: West	**Description:** Sampling NPB-20 (NPB-40 in background).
Photo By: J. Blankenship	

Photo No.: 013	**Date/Time:** 7/19/2024 @ 1452
Direction: West	**Description:** Sampling NPB-40.
Photo By: J. Blankenship	

Photo No.: 014	**Date/Time:** 7/19/2024 @ 1611
Direction: West	**Description:** Sampling NPA-40.
Photo By: J. Blankenship	

Photo No.: 015	**Date/Time:** 7/20/2024 @ 1112
Direction: East	**Description:** Sampling NPG -40.
Photo By: J. Blankenship	

Photo No.: 016	**Date/Time:** 7/20/2024 @ 1303
Direction: South	**Description:** Monitoring wells NPD-20 and NPD-40.
Photo By: J. Blankenship	

Photo No.: 017	**Date/Time:** 7/20/2024 @ 1442
Direction: Southwest	**Description:** Monitoring wells NPC-20 and NPC-40.
Photo By: J. Blankenship	

Photo No.: 018	**Date/Time:** 7/21/2024 @ 1247
Direction: Southwest	**Description:** Containerized IDW.
Photo By: J. Blankenship	

Photo No: 019	**Date/Time**: 7/28/24 @1500
Direction: Unknown	**Description**: Flooded access to 20PS-MW14 and 20PS-MW27
Photo by: B. Leach	

Photo No.: 001	**Date/Time:** 9/06/2024 @ 1052
Direction: South	**Description:** Set up for sampling well HCMW06WT.
Photo By: J. Blankenship	

Photo No.: 002	**Date/Time:** 9/06/2024 @ 1143
Direction: Southeast	**Description:** Setup for sampling well HCMW06DP.
Photo By: J. Blankenship	

Photo No.: 003	**Date/Time:** 9/06/2024 @ 1241
Direction: North	**Description:** Setup for sampling well MW-BKG-04.
Photo By: J. Blankenship	

Photo No.: 004	**Date/Time:** 9/06/2024 @ 1401
Direction: South-southeast	**Description:** Setup for sampling well MW-BKG-07.
Photo By: J. Blankenship	

Photo No.: 005	**Date/Time:** 9/06/2024 @ 1451
Direction: Northeast	**Description:** Setup for sampling well MW-BKG-12.
Photo By: J. Blankenship	

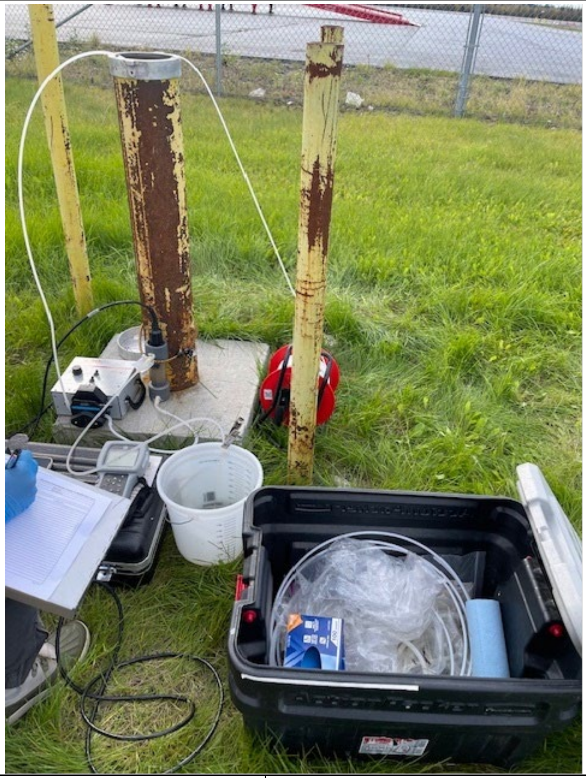

Photo No.: 006	**Date/Time:** 9/06/2024 @ 1538
Direction: South-southwest	**Description:** Setup for sampling well MW2-50.
Photo By: J. Blankenship	

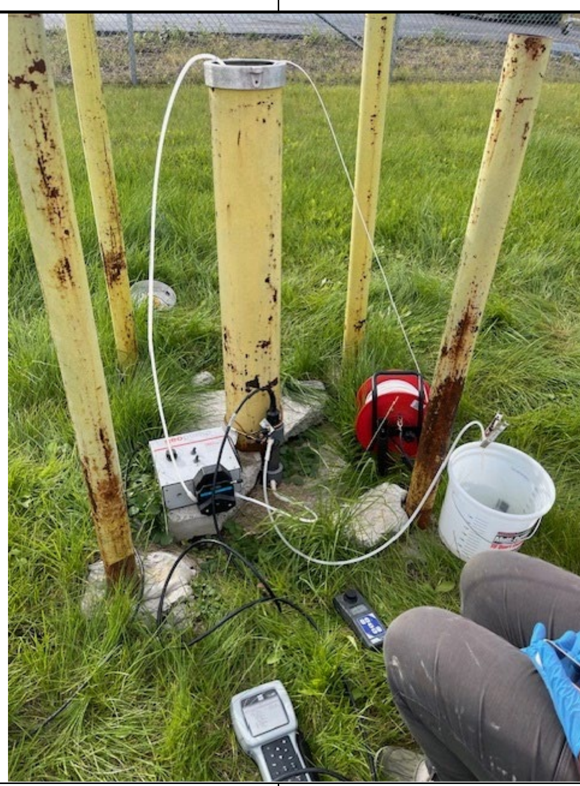

Photo No.: 007	**Date/Time:** 9/06/2024 @ 1608
Direction: West	**Description:** Setup for sampling MW2-100.
Photo By: J. Blankenship	

Photo No.: 008	**Date/Time:** 9/6/2024 @ 1636
Direction: West	**Description:** Setup for sampling MW2-150.
Photo By: J. Blankenship	

Photo No.: 009	**Date/Time:** 9/7/2024 @ 0849
Direction: North	**Description:** Setup for sampling MW-2.
Photo By: J. Blankenship	

Photo No.: 010	**Date/Time:** 9/7/2024 @ 0926
Direction: Northwest	**Description:** Sample setup at 02MW11.
Photo By: J. Blankenship	

Photo No.: 011	**Date/Time:** 9/7/2024 @ 1026
Direction: Northwest	**Description:** Sample setup at HCMW03WT.
Photo By: J. Blankenship	

Photo No.: 012	**Date/Time:** 9/7/2024 @ 1138
Direction: North	**Description:** Sample setup at HCMW03DP.
Photo By: J. Blankenship	

Photo No.: 013	**Date/Time:** 9/7/2021 @ 1138
Direction: North	**Description:** HCMW03DP sampling setup.
Photo By: J. Blankenship	

Photo No.: 014	**Date/Time:** 9/7/24 @ 1322
Direction: Southwest	**Description:** MW-BKG-09
Photo By: J. Blankenship	

Photo No.: 015	**Date/Time:** 9/7/24 @ 1409
Direction: Northwest	**Description:** MW-BKG-10.
Photo By: J. Blankenship	

Photo No.: 016	**Date/Time:** 9/7/24 @ 1501
Direction: West	**Description:** MW-BKG-01.
Photo By: J. Blankenship	

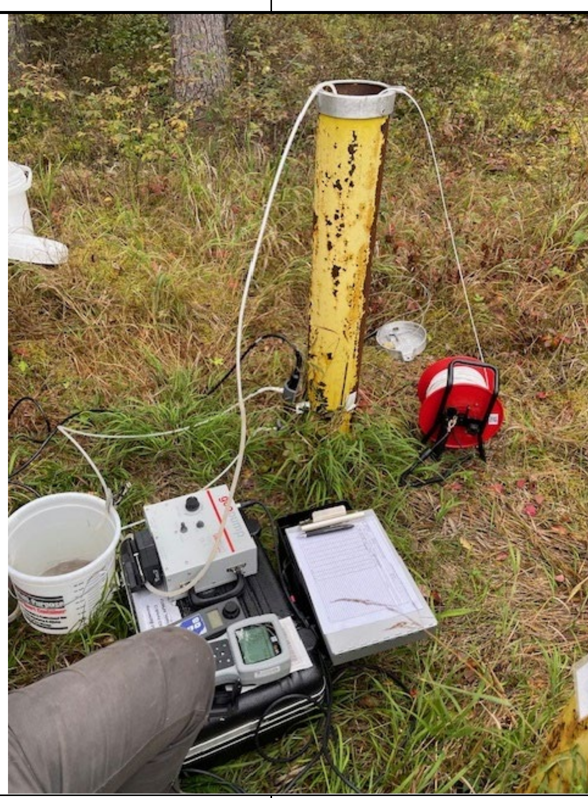

Photo No.: 017	**Date/Time:** 9/7/2024 @ 1602
Direction: South	**Description:** HCMW01WT
Photo By: J. Blankenship	

Photo No.: 018	**Date/Time:** 9/7/2024 @ 1630
Direction: Northwest	**Description:** HCMW01MD
Photo By: J. Blankenship	

Photo No.: 019	**Date/Time:** 9/8/2024 @ 0937
Direction: East	**Description:** USAP-3
Photo By: J. Blankenship	

Photo No.: 020	**Date/Time:** 9/8/2024 @ 1028
Direction: North	**Description:** 20PS-MW25
Photo By: J. Blankenship	

Photo No.: 021	**Date/Time:** 9/8/2024 @ 1142
Direction: South	**Description:** 20PS-MW19
Photo By: J. Blankenship	

Photo No.: 022	**Date/Time:** 9/8/2024 @ 1244
Direction: West	**Description:** 20PS-MW20
Photo By: J. Blankenship	

Photo No.: 023	**Date/Time:** 9/8/2024 @ 1400
Direction: East	**Description:** DSAP-14
Photo By: J. Blankenship	

Photo No.: 024	**Date/Time:** 9/8/2024 @ 1448
Direction: South	**Description:** DSAP-13
Photo By: J. Blankenship	

Photo No.: 025	**Date/Time:** 9/8/2024 @ 1532
Direction: Southwest	**Description:** NPB-20
Photo By: J. Blankenship	

Photo No.: 026	**Date/Time:** 9/8/2024 @ 1556
Direction: East	**Description:** NPB-40
Photo By: J. Blankenship	

Photo No.: 027	**Date/Time:** 9/8/2024 @ 1641
Direction: South	**Description:** NPA-40
Photo By: J. Blankenship	

Photo No.: 028	**Date/Time:** 9/9/2024 @ 1227
Direction: East	**Description:** NPF-40
Photo By: J. Blankenship	

Photo No.: 029	**Date/Time:** 9/9/2024 @ 1319
Direction: East	**Description:** NPG-20
Photo By: J. Blankenship	

Photo No.: 030	**Date/Time:** 9/9/2024 @ 1347
Direction: South	**Description:** NPG-40
Photo By: J. Blankenship	

Photo No.: 031	**Date/Time:** 9/9/2024 @ 1454
Direction: West	**Description:** NPD-20
Photo By: J. Blankenship	

Photo No.: 032	**Date/Time:** 9/9/2024 @ 1525
Direction: South	**Description:** NPD-40
Photo By: J. Blankenship	

Photo No.: 033	**Date/Time:** 9/9/2024 @ 1607
Direction: North	**Description:** NPC-20
Photo By: J. Blankenship	

Photo No.: 034	**Date/Time:** 9/9/2024 @ 1643
Direction: West	**Description:** NPC-40
Photo By: J. Blankenship	

Photo No.: 035	**Date/Time:** 9/9/2024 @ 1739
Direction: North-northeast	**Description:** DSAP-8D
Photo By: J. Blankenship	

Photo No.: 036	**Date/Time:** 9/9/2024 @ 1806
Direction: East	**Description:** DSAP-8S
Photo By: J. Blankenship	

Photo No.: 037	**Date/Time:** 9/9/2024 @ 1859
Direction: North	**Description:** DSAP-10
Photo By: J. Blankenship	