Alaska Department of Natural Resources
Division of Mining Land and Water
Water Resources Section
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CRITICAL WATER MANAGEMENT AREA
MOOSE CREEK, ALASKA

DECISION IN SUPPORT OF CWMA ORDER

Background

On November 26, 2019, the United States Air Force (USAF) petitioned the Department of Natural Resources (DNR) to initiate proceedings to designate a Critical Water Management Area (CWMA) under 11 AAC 93.500(2) for the geographic and hydrologic area underlying the community of Moose Creek, Alaska. Attachment A. USAF amended the petition on February 19, 2020 by submitting a map that would expand the CWMA boundary based on further groundwater sampling results.[1]

USAF submitted the CWMA petition in response to perfluorooctane sulfonate (PFOS) and perfluorooctanoic acid (PFOA) contamination in the groundwater underlying the community of Moose Creek. USAF attributes the contamination to releases on Eielson Air Force Base (EAFB) that migrated off base to the community of Moose Creek. In January 2015, EPA requested that EAFB test the drinking water wells on base to determine if contamination was present. The requested sampling confirmed contamination of drinking water wells on base. In April 2015, USAF tested groundwater beyond the northwestern boundary of the base and identified contamination in private, off base water wells. Subsequent testing in the summer of 2020 found that surface water throughout the area was contaminated with PFOS and PFOA as well.[2] The surface water contamination was expected because the depth to groundwater in and around the community of Moose Creek is between 0 feet and 10 feet below ground surface (bgs), with very permeable soils consisting primarily of gravely sands and sandy gravels.[3]

PFOS and PFOA are fluorinated organic chemicals that are part of a larger group of chemicals referred to as perfluoroalkyl substances (PFAS). Studies indicate that PFAS can cause reproductive and developmental, liver and kidney, and immunological effects and tumors in laboratory animals.[4] Studies also demonstrate that in humans, PFAS can cause increased cholesterol levels, low infant birth weights, effects on the immune system, cancer, and thyroid hormone disruption.[5] The United States Environmental Protection Agency (EPA) has set the human lifetime health advisory (HA) level for PFAS

[1] That map, which is included in Attachment A, became the basis for the map of the of the CWMA boundaries shown in Attachment B.
[2] Boese, Michael. 2020. Air Force Civil Engineer Center, Expanded SI Update (PowerPoint). Presented August 25, 2020, Eielson RPM meeting.
[3] Sundance-EA II, LLC.2019.Expanded Perfluorooctanoic (PFOA) Acid and Perfluorooctane Sulfonate (PFOS) Site Inspection, Eielson Air Force Base and Moose Creek, Alaska, Uniform Federal Policy-Quality Assurance Project Plan Work Plan. Prepared for AFCEC CZOP. October 2019. Page 29.
[4] https://www.epa.gov/pfas/basic-information-pfas#health
[5] https://www.epa.gov/pfas/basic-information-pfas#health

exposure from drinking water at 70 parts per trillion (0.07µg/L).[6] EAFB's testing has found PFAS contamination above the EPA lifetime HA in 173 private wells and surface water sources within the community of Moose Creek.[7] Of the contaminated wells, 29 are authorized by water right certificates. This accounts for 100% of the water right certificates within the proposed CWMA.

USAF's CWMA petition asked DNR to impose restrictions on the use of groundwater below and surrounding the community of Moose Creek, Alaska. The petition requests DNR take the following actions in designating a CWMA: 1) prevent the use of groundwater; 2) designate all uses of water as significant, effectively setting the significant use of water quantity at 0 gallons per day; and 3) immediately deny the acceptance of any new appropriations or application for additional quantities for existing appropriators of record. Due to the direct hydraulic continuity between ground and surface water in this area and the subsequent contamination of surface water, DNR is considering surface water as part of this petition, which has been discussed and agreed to by the petitioner. The objective of this request is to cut off exposure pathways to PFAS to protect human health, safety, and welfare. Including surface water will further this objective.

USAF's Interim Record of Decision (IROD) for Community of Moose Creek, Alaska Long-Term Water Supply was provided to DNR with the CWMA petition. This document outlines the additional actions that USAF is undertaking to ensure that human health, safety, and welfare are protected. These actions include providing access to the City of North Pole water service, well decommissioning, and other land use controls.

Statutory/Regulatory Authority to Designate CWMA

Under Alaska's Water Use Act, specifically AS 46.15.020(a), DNR's Commissioner "shall exercise all those powers and do all those acts necessary to carry out the provisions and objectives of this chapter." Pursuant to 46.15.020(b)(3), the Commissioner shall cooperate with, assist, advise, and coordinate plans with federal, state, and local agencies in matters relating to the appropriation, use, conservation, quality, disposal, or control of waters of the state.

The Commissioner's authority to designate CWMAs under the Water Use Act is described in the Alaska Administrative Code, 11 AAC 93.500 – 11 AAC 93.530. Pursuant to 11 AAC 93.500(2), the Commissioner will, in his or her discretion, initiate proceedings to designate a particular geographic or hydrologic area, including surface and groundwater, as a CWMA where:

> an agency or political subdivision of the state, or an agency of the United States, petitions for the designation of the area as a critical water management area and demonstrates that a condition in (1) of this section exists.[8]

11 AAC 93.500(1) describes the conditions that may warrant the Commissioner's establishment of a CWMA. These conditions include "an imminent water shortage…affecting a substantial number of permittees or certificate holders of record so that their ability to reasonably acquire water has been or will be affected by... and "chemical or toxic contamination rendering the water source and usable." The

[6] EPA. 2016. Fact Sheet PFOA & PFOS Drinking Water Health Advisories. EPA800-F-16-003

[7] USAF.2019. Interim Record of Decision for Community of Moose Creek, Alaska, Long-Term Water Supply. Eielson Air Force Base, Alaska. Page 2-2.

[8] 11 AAC 93.500(3) describes a third circumstance where the Commissioner may initiate proceedings to designate a CWMA, however that provision does not apply here.

USAF, which is an agency of the United States, made a petition under 11 AAC 93.500(2). The criteria under 11 AAC 93.500(1) are met because: 1) chemical or toxic contamination has rendered the water source unusable, and 2) a substantial number of permittees or certificate holders of record are affected by this contamination.

The fact that either a water shortage or chemical or toxic contamination, in combination or separately, may warrant a CWMA designation upon government agency petition is reflected in 11 AAC 93.520(3), which directs the Commissioner to "predict the likelihood of an imminent or continued water shortage or contamination problem". The DNR Commissioner has relied upon AS 46.15.020(a) and AS 46.15.020(b)(3), and has applied 11 AAC 93.500 – 11 AAC 93.530, in evaluating the propriety of a CWMA designation to restrict water use in the Moose Creek area.

The Commissioner notes that while 11 AAC 93.530(b)(1) empowers DNR to restrict or deny applications for additional quantities for existing appropriators of record, the regulations governing CWMA designations do not empower the Commissioner to reduce use quantities with respect to current uses that are subject to a valid, existing permit or certificate. This Decision and the Department Order that this Decision supports, do not impose reductions on such uses. However, a property owner within the CWMA who continues to consume or use water pursuant to a valid permit or certificate, does so at the risk of exposure to harmful contamination as described below.

The Commissioner is aware that USAF has agreed to compensate property owners who relinquish or abandon their existing water use permits, certificates, or applications in exchange for access to North Pole water. USAF has also agreed to compensate property owners who currently use well water without the need for a permit, and who agree to decommission their water wells and accept North Pole water. DNR understands that these actions are part of USAF's IROD and is designed to guard against contamination exposure while maximizing protection of public health, safety, and welfare.

Public Notice and Consultation

Pursuant to 11 AAC 93.510, DNR published public notice of the proposed CWMA in the Fairbanks News Miner on June 15, June 22, June 29, and July 6, 2020. The notice included a description of the proposal and affected area, a request for comments, and the date, time, and location of a public hearing. The affidavit of publication is Attachment C to this Decision.

DNR reviewed water right records and property ownership records made available through the Fairbanks North Star Borough Assessor's Office to notify appropriators and property owners within the proposed CWMA. Additionally, notices were sent to Department of Fish and Game, Department of Environmental Conservation (DEC), US Bureau of Land Management, the Army Corps of Engineers, USAF, and Fairbanks North Star Borough. The notices described the proposed CWMA, solicited comments, and advertised the date, time, and location of a public hearing. The notice letters were sent on June 12, 2020 via certified mail with electronic return receipts.

DNR held a public hearing on July 14, 2020 at 6:00 pm at the Hotel North Pole. The meeting included a presentation followed by a question and answer session and an opportunity to provide oral comment. Oral comments were recorded, and comment forms were also provided to collect written comments. A total of 16 individuals attended the meeting.

The comment period ended August 13, 2020. Five comments were received during the comment period. A record of comments received and DNR's responses are provided in Attachment D.

DNR Analysis of Moose Creek CWMA Petition

DNR evaluated USAF's CWMA petition. Additionally, DNR reviewed information provided in the USAF's IROD and water quality sampling data provided by the USAF. DNR's objectives were to: a) assess the USAF's characterization of the level and extent of contamination and the requested boundaries; b) evaluated the basis for the CWMA designation in accordance with 11 AAC 93.520; and c) prepare an Order that describes the conditions of the CWMA designation in accordance with 11 AAC 93.530.

A. Assessment of USAF's Characterization of Contamination Levels, Geographic Extent, and Affected Water Bodies.

The current EPA lifetime HA level for exposure to PFOS and PFOA from drinking water is 0.07µg/L. All water wells within the Moose Creek subdivision were sampled for contamination. Of those 174 wells, 170 had contamination that exceeded 0.07µg/L.[9] Based on June 2016 data the maximum concentration levels for PFOS and PFOA within these community wells were 1.5 µg/L and 0.14 µg/L respectively.[10] Sampling found contamination was present above the HA at a depth of approximately 180 feet bgs.[11]

The contamination occurs in the alluvial aquifer below EAFB and the community of Moose Creek. The aquifer is confined on the north, east, and south by permafrost and unconfined to the west. The Tanana River lies to the southwest and the City of North Pole is northwest of the known area of contamination.

Groundwater flow within the Moose Creek and EAFB area approximates the Piledriver Slough flow direction, with water moving from the southeast to the northwest.[12] The USAF has not yet developed a fate and transport model for the Moose Creek PFAS plume, so they are unable to predict the long-term geographic extent of contamination at this time.

In addition to groundwater sampling, USAF conducted surface water sampling within the affected area during 2020 to determine if surface water has been contaminated. Preliminary results indicate that several surface waterbodies within the proposed CWMA have PFAS contamination that exceeds the lifetime HA. This was anticipated given the direct hydraulic continuity between surface and groundwater in this location.

B. Explanation of Decision to Designate CWMA:

USAF, working in conjunction with EPA and DEC, has identified chemical or toxic contamination in the form of PFOS and PFOA in the groundwater and surface water within the proposed Moose Creek CWMA. USAF has petitioned DNR to create a CWMA for groundwater. 11 AAC 93.500(2). DNR is required by law to cooperate with, assist, and coordinate plans with USAF, EPA, and DEC in matters relating to water appropriation, use, and quality. AS 46.15.020(b)(3). In this instance, cooperation, assistance, and coordination with these agencies warrant the inclusion of the Moose Creek community's

[9] USAF.2019. IROD for Community of Moose Creek, Alaska, Long-Term Water Supply. Eielson Air Force Base, Alaska. Page 2-5.
[10] USAF.2019. IROD for Community of Moose Creek, Alaska, Long-Term Water Supply. Eielson Air Force Base, Alaska. Page 2-5.
[11] USAF.2019. IROD for Community of Moose Creek, Alaska, Long-Term Water Supply. Eielson Air Force Base, Alaska. Page 2-5.
[12] USAF.2019. IROD for Community of Moose Creek, Alaska, Long-Term Water Supply. Eielson Air Force Base, Alaska. Page 2-5.

surface waters in the CWMA designation. The creation of the Moose Creek CWMA with respect to groundwater and surface water is appropriate under the circumstances.

Pursuant to 11 AAC 93.520(1), the Commissioner's decision to designate a CWMA will, as appropriate, "state the reasons for the designation..."

- As previously explained in this Decision, the purpose for the Moose Creek CWMA is to protect public health, safety and welfare, by placing restrictions on water use contaminated by PFOS and PFOA. This contamination exceeds lifetime HA levels set by the EPA, and ingestion of and exposure to this water could negatively affect the health of those exposed. Designation of the CWMA would limit ingestion of and exposure to these chemicals.
- The contamination has rendered the water source unusable. The water within the proposed CWMA boundary is unsafe to drink or use for household use. This water is also unsuitable for land application or other uses that could lead to contact with the soil because of the risk of spreading the contamination.
- All permittees and certificate holders of record within the proposed boundary are affected by this contamination, as well as 141 well owners that use water without a permit or certificate.
- USAF will supply an alternate source of water to impacted water users.
- Although the USAF's application specifies groundwater, surface water contamination in the proposed CWMA, identified by USAF in 2020 shows the need to include surface waters in the Moose Creek CWMA designation. The inclusion of surface waters in the designation will enhance cooperation between DNR, DEC, USAF, and EPA with respect to ongoing monitoring, testing, and characterization.

Pursuant to 11 AAC 93.520(2), the Commissioner's decision will, as appropriate, "define the boundaries of the area..."

- The CWMA boundaries are defined in Attachment B, the map of the CWMA. Attachment B is based on the map that USAF submitted to DNR in support of its CWMA petition amendment on February 19, 2020, included in Attachment A.
- Utilizing Attachment A, DNR has verified the legal description of the CWMA boundaries. The legal description is included in the CWMA order.

Under 11 AAC 93.520(3), the Commissioner's Decision will, as appropriate, predict the likelihood of an "imminent or continued… contamination problem."

- The USAF's CWMA petition, IROD, and water quality sampling data, discussed above, indicate a present and imminent danger caused by water contamination. The data demonstrate that the hazard will not abate or be otherwise resolved anytime in the foreseeable future.
- PFASs are persistent chemicals, which do not readily break down in the environment. While USAF is developing a long-term remediation plan under CERCLA, contamination will likely persist in the waters within the proposed CWMA for the foreseeable future.

Under 11 AAC 93.520(4), the Commissioner's decision to designate a CWMA will, as appropriate, "state how additional appropriations would affect the rights of permittees or certificate holders of record, or the public interest under AS 46.15.080."

- The proposed CWMA will prohibit, rather than create, additional water use permits and certificates. The objective is to restrict the use of contaminated water.
- Because the CWMA designation will prohibit the issuance of new water use permits and certificates, a public interest determination of the type described in AS 46.15.080 is not appropriate to this Decision. Nevertheless, the Commissioner notes that, as described above, the CWMA will benefit the public by protecting public health and preventing the further spread of contamination.

Under 11 AAC 93.520(5), the Commissioner's decision to designate a CWMA will, as appropriate, "state whether, after a specific date, applications for water rights will be accepted or adjudicated.

- Because of the persistence of these chemicals in the environment, DNR is unable to determine a specific date that applications will be accepted or adjudicated.
- The efforts to investigate and cleanup PFAS contamination at EAFB will be overseen by EPA and DEC under CERCLA. The CERCLA process will ensure long-term clean-up. However, the timeline for clean-up of source sites has not been identified at this time, nor has the impact of this clean-up on water quality.
- The CWMA will remain in effect until contamination is reduced to an acceptable level under EPA lifetime HA or as determined by the State of Alaska.

Moose Creek CWMA Petition Decision

Findings of Fact: The groundwater under and the surface water within the community of Moose Creek is contaminated with PFOS and PFOA at levels that exceed the EPA lifetime HA. Use of this water would likely contribute to the spread of contamination and could negatively affect public health. The designation of a CWMA is in the public interest. The requirements in accordance with 11 AAC 93.500 – 11 AAC 93.530 have been followed in order to designate the CWMA proposed in USAF's petition.

Decision: DNR hereby determines that the area generally described as Moose Creek, Alaska is a CWMA.

The boundaries of the CWMA are described as a critical water management area known as Moose Creek, located near North Pole, Alaska, and more particularly described as follows:

Township 2 South, Range 2 East, Fairbanks Meridian

Section 23: That portion of the E1/2 located Southerly of the ordinary high-water line on the Southerly bank of Chena Slough and Southeasterly of the Southerly railroad right-of-way line;

Section 24: E1/2,

That portion of the W1/2 located Southerly and Easterly of the following described line:

Beginning at the intersection of the west boundary of Section 24 with the ordinary high-water line on the Southerly bank of Chena Slough; thence Easterly along the ordinary high-water line on the Southerly bank of Chena Slough to its intersection with the Southerly railroad right-of-way line; thence Southeasterly along the Southerly railroad right-of-way line to its intersection with the Northwesterly edge of the Chena River Lakes Flood Control Dike; thence Northeasterly along the Northwesterly edge of the Chena River Lakes Flood Control Dike to its intersection with the Southwesterly right-of-way line of the Richardson Highway; thence

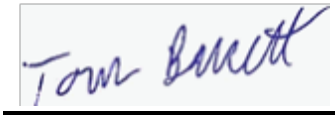
Northwesterly along the Southwesterly right-of-way line of the Richardson Highway to the Northwest corner of Fairbanks North Star Borough (FNSB) Tax Lot TL-2429, identical with the Northeast corner of Tax Lot TL-2423 as shown in the FNSB GIS, and described in Document No. 2017-018002-0, Fairbanks Recording District; thence Northeasterly across the right-of-way of the Richardson Highway to the former Southwest corner of Lot 10, Block A, Easy Living Estates Phase Three Subdivision, Plat No. 2002-45 Fairbanks Recording District (FRD), which is now a corner on the Southerly boundary of Lot 10A, Block A, Easy Living Estates Phase Three, as shown on Plat No. 2007-26 FRD; thence Easterly along the Southerly boundaries of Lots 10A, 11, 13, 14, and 15, Block A, Easy Living Estates Phase Three Subdivision, to the Southeast corner of Lot 15, Block A, Easy Living Estates Phase Three Subdivision; thence Easterly along the Southerly boundary of Tax Lot 2413 as shown in the FNSB GIS to the North-South centerline of Section 24.

Section 25: All;
Section 26: That portion located Easterly of the ordinary high-water line on the right bank of the Tanana River;
Section 27: That portion of the SE1/4 located Easterly of the ordinary high-water line on the right bank of the Tanana River.

Township 2 South, Range 3 East, Fairbanks Meridian
Sections 19, 20, 21, 28, 29, and 30: All;
Section 22: W1/2, W1/2E1/2;
Section 27: W1/2.

A map is provided in Attachment B.

Pursuant to Chapter 46.15.020 Alaska Statutes and 11 AAC 93.520, DNR should designate this area as a Critical Water Management Area with respect to groundwater and surface water within the above described boundary.



May 24, 2021

Tom Barrett, Chief of Water Resources — Date

Approved by:

May 24, 2021

Corri A. Feige, Commissioner of Department of Natural Resources — Date