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GOVERNOR

STATE OF MICHIGAN
DEPARTMENT OF
ENVIRONMENT, GREAT LAKES, AND ENERGY
GAYLORD DISTRICT OFFICE



LIESL EICHLER CLARK
DIRECTOR

December 21, 2022

VIA EMAIL
RETURN RECEIPT REQUESTED

Bonnie Packer
Acting PFAS Program Manager
Cleanup and Restoration Branch
Army National Guard

Dear Bonnie Packer:

SUBJECT: Compliance Communication Regarding the Review of MIARNG/ARNG Draft Final per- and Polyfluoroalkyl Substances (PFAS) Report for the Site Inspection (SI) at the Camp Grayling Joint Maneuver Training Center (JMTC) North and South Post/Howes Lake, Crawford County, Michigan.

The Michigan Department of Environment, Great Lakes, and Energy (EGLE) has reviewed the Draft Final PFAS Report for the SI at Camp Grayling JMTC North and South Post/Howes Lake for which the Army National Guard (ARNG) is liable. EGLE considers the information submitted in the report to be insufficient to make a determination that further evaluation is not warranted under The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) at Areas of Interest (AOIs) within North and South Post/Howes Lake. Additionally, there are areas off post that warrant SI level investigation due to new information received.

The 2018 Preliminary Assessment (PA) was completed at a time when much less was understood by ARNG, contractors, EGLE, and interviewees about Camp Grayling site specifics and PFAS contamination. The PA has been shown to be inadequate at Cantonment on Lake Margrethe, MATES, and Grayling Army Airfield. Additional release areas were found at all three locations that were not identified in the PA. A supplemental PA with additional interviews and a review of off post locations where Military Specification (Mil-Spec) aqueous film forming foam (AFFF) has likely been released in unknown quantities is necessary. Additional sources of PFAS outside of Mil-Spec AFFF also need to be included as part of the Supplemental PA.

The PA and SI for the North and South Post/Howes Lake has been rudimentary and contains large data gaps identified in our comments. These are similar to the comments that we have made at other Camp Grayling AOIs. ARNG is working with contractors that employ some of the world's leading PFAS experts and the quality of work presented should be reflective of this. If a review from EGLE's Gaylord District staff can identify numerous data gaps, it can be presumed that ARNG's contractor could also identify numerous data gaps. Staff has spent an inordinate amount of time reviewing, researching, and responding to inadequacies of work performed/proposed, most of which should have been included in the original submittals.

It is becoming increasingly clear that a culture of Mil-Spec AFFF use was developed in the greater Camp Grayling Area. EGLE's AFFF pick-up program and EGLE interviews with fire-fighting contacts willing to speak regarding AFFF use have identified that Mil-Spec AFFF was shared with local fire departments and the Michigan Department of Natural Resources to help fight wildfires emanating from Camp Grayling ranges. Many contacts are unwilling to speak or be named for fear of reprimand. The Supplemental PA and SI needs to expand investigation to off post locations where Mil-Spec AFFF may have been transported and released and where Mil-Spec AFFF-containing vehicles are located periodically (i.e., maintenance locations, firefighting source waters, and fire-fighting staging positions). This becomes increasingly important information as regulatory values for PFAS continue to trend downward at federal and state levels.

This letter should not be considered a complete listing of deficiencies in the Draft Final PFAS Report for the SI at Camp Grayling JMTC North and South Post/Howes Lake. It is intended as a cover letter to summarize trends in the comments for our Draft Final PFAS Report for the SI at Camp Grayling JMTC North and South Post/Howes Lake review and reviews for the greater Camp Grayling area.

If the Army National Guard wishes to meet or has questions regarding this letter, please contact the Project Manager, Christiaan Bon, at 989-370-9624 or via email at BonC@michigan.gov; or you may contact me at the telephone number listed below.

Sincerely,



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Enclosure

cc: Mike Price, DMVA
Jonathan Edgerly, DMVA
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**Responses to Comments for the
Draft Final Site Inspection Report, Camp Grayling JMTC, North and South Posts/Howes Lake, MI**

Response Code: A = Agree with comment D = Disagree with comment C = Comment requires clarification

Commenter	Page(s)	Section	Line(s)	Comment	Response Code	Response
TECHNICAL COMMENTS						
EGLE	pdf p. 17	2.2.2	453-459	Were the MATES drinking water wells sampled? If so, when and what were their respective analytical results? All relevant data needs to be included in an SI level presence/absence investigation.		
EGLE	pdf p. 17	2.2.2	-	Are there any other drinking water wells present within, near or service the AOI's? If there are, please describe the well location, depth, etc. and their respective PFAS analytical results. Other Well Head Protection Areas near AOIs also needs to be included.		
EGLE	pdf p. 1935	2.3	-	Prescribed burns as a mean of fire suppression and control, is a common practice at DoD ranges. Was AFFF, wetter water or wet water ever used to manage prescribed burns? PA interviews and EGLE interviews with local firefighters indicate that they were. Please expand this discussion and conduct additional interviews as necessary.		
EGLE	pdf p. p. 18-19	2.2.5	-	A paragraph should be added here to discuss any proposed expansion of CG JMTC if those areas are near the AOI's within this SI.		
EGLE	pdf p. p. 19	2.2.6	539-542	Please update the listing based on the USFWS 2022 species designations. For example, the northern long-eared bat is endangered and the monarch butterfly is a candidate species wherever it is found.		
EGLE	pdf p. p. 21	Figure 2-1	-	Add MATES/Range 30 and Demolition Range to this figure since other PFAS investigations that are current operating areas at Camp Grayling are depicted.		
EGLE	pdf p. p. p. 22	Figure 2-2	-	Mark locations of AOIs on topographic map.		
EGLE	pdf p. p. p. 23	Figure 2-3	-	Mark locations of AOIs on map. Place maps on 11X17 layout to better see the elements depicted. Well Head Protection areas designated by EGLE Drinking Water and Environmental Health, Source Water Protection need to be added to these figures if the on-post WHPA wells are highlighted. For example, there is a WHPA near Howes Lake and Lewiston Grade Road.		
EGLE	pdf p. p. p. 24	Figure 2-4	-	Mark locations of AOIs on map. Place maps on 11X17 layout to better see the elements depicted. Well Head Protection areas designated by EGLE Drinking Water and Environmental Health, Source Water Protection need to be added to these figures if the on post WHPA wells are highlighted. For example there is a WHPA near Howes Lake and Lewiston Grade Road.		
EGLE	pdf p. 25-26	Fig 2-5, 2-6	-	The AOIs are very spread out throughout both on the north and south post and it's difficult to orient. This is also the first zoomed in figures of the AOIs. Call out location boxes are needed on these figures. Another item would be to call out major roads since there is a lack detail or are not high enough resolution to read road names. Aerial imagery is preferred. Figure 2-5: No groundwater elevation contours within range. This is a large data gap. EGLE does not agree with inferred contours near East Branch Au Sable and no contours are depicted for the northern portion of the range. USGS watershed figure should be overlain with range contours for this figure and others to present another line of evidence. Figure 2-6: Contours at northeast side of map present possible preferential pathway not discussed or evaluated. This area can significantly effect placement of downgradient sampling locations. Data gap is not discussed.		
EGLE	pdf p. p. p. 28	Figure 2-8	-	Mark locations of AOIs on map.		
EGLE	pdf p. p. p. 29	Figure 2-9	-	Mark locations of AOIs on map.		
EGLE	-	3 Summary of Areas of Interest	-	This section should include all available data for North and South Post. This includes drinking water that was sampled by DMVA at locations at North/South Post. It should also include surface water and monitoring well sampling that has been conducted by DMVA. Additionally, if groundwater flow directions are known from historic gauging of wells, maps should be shown to establish these flow directions.		
EGLE	pdf p. 31	3.1.1	596-597,602-6060	Prescribed burns as a mean of fire suppression and control, is a common practice at DoD ranges. Was AFFF, wetter water or wet water ever used to manage prescribed burns? Please describe in more detail including the location of the two groundwater samples and four surface water samples taken in 2018.		
EGLE	pdf p. 32	3.2.4	652-654	What type of training was/is conducted at Range 15 in the context of using hazardous substances?		
EGLE	pdf p. 39	4.2	-	Include other information/sampling data that was used that was collected outside of the PA and this SI.		
EGLE	pdf p. 44-45	5.4	-	Why were no surface water samples taken at Howes Lake? AOI 19 abuts up to Howes lake and with little to no detail about training, wet water operations and there is a probability that AFFF may have been sprayed into Howes Lake. Section 7.2.8 states that "Because there is uncertainty regarding the location of training, surface and sediment at Howes Lake may be affected". A similar statement is made in Section 3.3.1, that there is uncertainty regarding the location of training at Howes Lake. No surface and sediment samples were taken at Howes Lake and is large data gap concerning GIS, ecological, and incidental exposure (through water recreation).		
EGLE	pdf p. 52	Figure 5-2	-	Surface water flow direction shown where there is no surface water flow. Nearly all precipitation infiltrates the ground at Camp Grayling. AFFF would infiltrate soil at the source, then travel downgradient in groundwater. This is why sampling surface soil downgradient of sources doesn't make any sense. Please discuss the lack of usability of much of the soil data taken downgradient of potential release areas.		
EGLE	pdf p. 55	6.1 Screening Levels	976-998	The soil screening levels are not representative of Camp Grayling soils. Please use GAAF as an example of leaching potential of low concentration source areas. We have found PFOS soil concentrations less than 10 ppb PFOS in surface soils leach to groundwater exceeding groundwater screening levels. This shows that the current SL approach used for soils is not aligned with site-specifics, EPA Regional Screening Levels, and Michigan MCLs. Most source area surface soils at GAAF were between 1 ppb and 10 ppb (some less than 1ppb; Source: Rapid Site Characterization). EGLE Toxicology Unit can provide site-specific soil criteria upon request. Additionally, soil composition data was collected and it was not used in conjunction in the evaluation. In 6.1, it's unclear how the SLs should be utilized as it states it's only for direct contact and not to be used for anything deeper than 15 below ground level. What value is used for soil for protection of Drinking Water? A total of 4 samples are above EPA's interim HAL AOI19-02-GW, AOI19-02-GW, AOI1902GW-D, AOI19-02-GW		
EGLE	pdf p. 56-98	6.3, 7.1.1	1015-1020, 1357-1358	Soil samples need to be collected to address the soil exposure pathway especially since the location of where wet water or other operations that may have used hazardous substances that contain PFAS are unknown and this data gap needs to be addressed. Ranges can be cleared by EGD from Wright Patterson Air Force Base in order for sampling to occur, even surface and subsurface soil samples with a hand auger can provide insight on the presence of absence of PFAS contamination. Having no soil data within an AOI is not appropriate of an SI.		
EGLE	Section 6 Site Inspection Results	AOI 7, AOI 9, AOI 12, AOI 13	throughout	AOI exceeded EGLE Generic soil GSI criteria of 0.24 ppb PFOS (PFOA is 10,000 ppb). It was discussed that EGLE criteria would be used as a screening level until a decision on EGLE criteria in ARAR decision. Soil needs to be delineated to EGLE's criteria due to the potential for groundwater discharge to surface water bodies. PFAS were found at all of these locations with minimal exploration. Further investigation is warranted at all of these locations with no way of knowing if investigation occurred proximal to source areas. For ranges with no samples, it is easy to determine that samples were not taken proximal to source areas.		
EGLE	pdf p. p. p. 57	6.4.1 AOI 7	1048	These are soil levels are indicative of a source. Please do not cite soil screening levels - lesser soil concentrations have been found at GAAF source areas with significant groundwater impact seen extending greater than a mile. Most source area surface soils at GAAF were between 1 ppb and 10 ppb (some less than 1ppb; Source: Rapid Site Characterization). Please determine a screening level based on soils characteristic of the site or site why the screening level is representative of the site. It is very likely that limited number of temporary wells were not screened in impacted groundwater due to reasons seen at other Camp Grayling sites: diving plumes, small lateral extent of plumes near source, groundwater flow direction different than expected, improper screening intervals bifurcation of plumes, etc. The screened intervals seem to intersect only the very top of the aquifer. This is not sufficient to determine that no further assessment is needed. Further investigation is warranted. Delineation is needed since 3 soil borings aren't sufficient to characterize an area. PFOA/PFOS are present and are likely to be present at higher concentrations given the distance between these borings. Borings are not located near the ranges where dust suppression, staging, and parking would have occurred. They are located at the downgradient edges of the AOI, so it is remarkable that the levels found in soil are seen without a targeted boring at a source. Additionally, if no PFAS is found in surface soils and is found in deeper soils, it is possible that the source is found some distance away and has migrated to depth and spread. On all other areas of Camp Grayling, the observation at source areas is that the PFAS levels are highest at surface and above the water table. The ratio of PFOA:PFOS is different than we have seen at other areas of Camp Grayling. Is this the "wet water" signature. The only other place we have seen higher PFOA is at Former MATES on GAAF. More details should be given on the wet water product. Please look at records and interviews, or conduct a more thorough look into the product used.		
EGLE	pdf p. 72-78	Table 6-5	-	State screened intervals. Are screened intervals sufficient to intercept PFAS plumes emanating from the range? Diving plumes have been documented at GAAF with plumes following downward and upward flow contours. Please discuss in the document.		
EGLE	pdf p. 81 - 96	Figures 6-1 through 6-16	-	Figure unclear. The figure should be split into two with close-ups of defined AOIs. Call out figures would be much more useful for analysis than the circles.		
EGLE	pdf p. 100	7.2.1	1148-1453	Two drinking water wells are located directly north of the active bombing range of Range 40 within the support facilities. Please include them in the drinking water evaluation and include results if DMVA/ARNG has collected samples.		
EGLE	pdf p. 100	7.2.3	1473-1478	There are two type 1 provisional wellhead protection areas and one type 1 traditional well head protection areas that are bound by AOI 9 and intersect Lewiston Grade Road. A discussion of the WHPA DW pathway needs to be included.		
EGLE	pdf p. 101	7.2.4	1483-1486	Were the two drinking water wells mentioned sampled for PFAS?		
EGLE	pdf p. 101	7.2.5	1494-197	The DW pathway is relevant if the drinking water well is still in place even though it is proposed to be properly abandoned.		

EGLE	pdf p. 101	7.2.6	1515	A Southern FOB and training site are mentioned. What operations were conducted at the South FOB and training site? Are the similar to Northern FOB operations including dust suppression with wet water? Have the 3 drinking water wells mentioned been sampled for PFAS?		
EGLE	pdf p. 102	7.2.8	1527-1532	Discussion about the type 1 provisional wellhead protection area directly east of Howes Lake and an evaluation of the drinking water pathway is needed.		
EGLE	pdf p. 2024-2025	Appendix E	AOI09-01, AOI09-02	Missing a vadose zone sample at 2-3 feet. This is a spot check. Please check all and discuss as necessary in report.		
EGLE	pdf p.2025	Appendix E	AOI09-02	No depth to water at time of drilling. This is a spot check. Please check all and discuss as necessary in report.		
EGLE	pdf p. 2030	Appendix E	AOI11-01	No surface or middle soil sample. Is this because it was most at 1' below ground level? Also no depth to water at time of drilling. This is a spot check. Please check all and discuss as necessary in report.		
EGLE	pdf p. 2034	Appendix E	AOI11-03	No depth to water at time of drilling. This is a spot check. Please check all and discuss as necessary in report.		
EGLE	pdf p. 2037	Appendix E	AOI12-01	AOI12-01SB-107-109 is saturated with depth to water at 97' below ground level. The middle sample is between 13-15', this gap does not follow the sampling plan of midway between surface and to depth to water. This is a spot check. Please check all and discuss as necessary in report.		
EGLE	pdf p. 1935	Log of Daily Notice of Field Activity	-	Soil samples arrived at lab above required temperature. Soil samples were analyzed and are not discussed in Section 4.5. Please conduct a more thorough assessment of data quality/usability.		
EGLE	NA	AOI 6 - Range 40 Complex	NA	Monitoring well information (boring logs, etc.) from the existing monitoring well network that borders AOI 6 has not been provided (13 wells). Another data gap is the operations with the support facilities of the Range 40 complex. It is known that it is a maintenance/range target preparation facility and there is a potential for hazardous substances that may contain PFAS were used. GW flow directions may change and be influenced by Guthrie Lake to the west and North Branch Au Sabie River to the North which is stated in section 7.1.1. With such a small cluster of wells it is hard to determine the GW flow within the entire AOI to evaluation GSI and DW pathways. Guthrie Lake may need a pore/sediment and surface water sampling. For AOI this size groundwater and soil samples are needed within the AOI for an adequate SI.		
EGLE	throughout	AOI 6 - Range 40 Complex	throughout	DMVA completed surface water sampling in areas surrounding North Posti as part of periodic sampling around Range 40. Include data and lab sheets in this SI. A groundwater flow diagram of historic gauging of all wells present at Range 40 should be included to show possible migration directions. Results of the DMVA study showed Marsh Lake northeast of Range 40 had highest total PFAS concentrations in that sampling. Clear Lake had the highest PFOA detection. This suggests groundwater flow in a different direction from Range 40 than the assumed flow to the southeast for the entire property from a cluster of wells southeast of the range. All PFAS detections found in their periodic sampling were located on the eastern or western side of the Range. Groundwater flow is likely towards the North Branch Au Sabie River, East Branch Au Sabie River, and associated headwater lakes for portions of the site. Due to topographic high for regional groundwater, I would not be surprised to see radial flow from Range 40. Targeted sampling on the southeastern side of Range 40 appears to have missed previous areas of detections. Screened intervals or boring logs of monitoring wells were not included. EGLE did not receive a report for DMVA work. Only results table, 2 figures, and a short internal memo were shared. Discussion of sampling methodology and lab methods are needed. ARNG needs to repeat this study to confirm results and determine change over time. Discharges of total PFAS into bodies of water from AFFF contamination have been, at minimum, an order of magnitude higher than the surface water at Lake Margrethe during EGLE study. This suggests higher groundwater PFAS levels could be present than those found in bodies of water. Additionally, massive fire scars are present in 1999 aerials (see Figure 5 on next tab) at the center of Range 40 stretching west of Barnes Lake to Briggs Road and down to a fire break at the southern range boundary (western half of the site). This is an obvious place to look for AFFF impact and would be in part of the East Branch watershed. Fire scars with fire breaks are periodically present on northern portions of Range 40 where groundwater flow could be westerly or northwesterly. No samples have been taken from the range where AFFF use would be most likely or in the likely direction of groundwater flow to the northeast or north. Due to nearby surface water features, the water table will likely be much closer to the surface than downgradient. This could allow for more migration of AFFF release to the water table. Additionally, PFAS can be present in munitions. AFFF should not be the only focus of a PFAS investigation. Include all sources of PFAS. Currently, the northern, western, eastern, and center portions of Range 40 remain inadequately characterized. Sampling on the basis of migration to the southeast was premature. EGLE noted this in the QAPP review. EGLE recommends residential well testing at Guthrie Lake community to determine absence/presence of PFAS due to possibility of an easterly component to groundwater flow. Residential sampling has been the most useful presence/absence indicator at Cantonment and GAAF.		
EGLE	throughout	AOI 7 - Former Northern FOB	throughout	In aerial imagery, there is no indication of a large operation at former North FOB at the location presented except for a two-track road about 1/3-mile in length with two offshoots that end 100 feet into woods. EGLE RRD visited the site in Dec 2022 and found the two-track difficult to navigate with a 4x4. It seems unlikely that wet water was used on sandy soils here, yet PFAS is found. It seems much more likely that the adjoining Wakeley Bridge Road would have had dust suppression due to its current dustiness in summer, homes present, vicinity to Co Rd 612, and the ability to be used by more types of transport vehicles. PFOA/PFOS result in soil was highest near Wakeley Bridge Road. EGLE RRD has an aerial from 1981 that shows no indication of a base or deployment area, only a two-track with an area that is largely vegetated. In the 1981 aerial, the current North FOB is already present, contains roads, two trailers, and soil disturbance. AFFF was in use at Camp Grayling during this time. By 2009 the area is largely improved with buildings. It is possible there was a long transition period between the two FOBs where both were in use with similar practices. It is difficult to determine where the samples were actually. Samples do not appear to target two track where wet water would have been used for dust suppression. Aerial imagery needed for this purpose for all figures.		
EGLE	throughout	AOI 9 - Lewiston Grade Road	throughout	Lewiston Grade Road extends towards Range 40 and has areas for bivouacs and FARP's, such as near Duck Lake. Will these be assessed due to possibility of dust suppression and parking of fire suppression vehicles near encampments?		
EGLE	throughout	AOI 10 - Range 8	throughout	Between 2005 and 2011 the shooting ranges were moved more west to its current position on the other side of the road. AFFF may have been used as a fire break further west.		
EGLE	throughout	AOI 12 - Light Demolition Ranges	throughout	Clearly where AOI12-05,04,03, and 02 samples were taken. Were the samples taken within the clear cut area within the circle where range 20 is? Aerial backgrounds for figures are more useful.		
EGLE	throughout	AOI 13 - Range 15	throughout	AOI13 - samples were taken from edges of range. It is quite remarkable soil concentrations were found in ppb range outside of range and well away from the range. Other soils from within the AOI could be much higher. Ppb levels have been shown to contribute to groundwater contamination exceeding DoD screening levels for groundwater at other Camp Grayling sites. It is likely that temp wells straddling top of water table missed groundwater impact for reasons stated earlier. 3 samples from a range this size are insufficient for presence/absence investigation. Additional sampling needed. Fire scar from 2015 (Figure 6 on next tab) shows fire was contained within the area of interest. If AFFF was used on this fire, it was most likely used within the range to control fires in the past. Highest soil concentrations would be expected within the range, as well as groundwater concentrations.		
EGLE	throughout	AOI 19 - Howes Lake	throughout	We need to know if the surface water or the groundwater near the lake are impacted. It is used recreationally. There is also a wellhead protection zone in the direction of higher concentrations. Detections were highest in borings located closer to the lake. Groundwater flow direction is inferred.		
EGLE	throughout	Current North FOB	throughout	Current North FOB at SW corner of Co Road 612 and Briggs Road, has not been assessed. If 'wet-water' was reported to have been used at the former location, it was likely that practices did not change at the new location (present on aerial maps in 1961). It could be that the reports are incorrect and/or give details for the current location. Additionally, this seems a likely location to stage firefighting vehicles. Please assess Current North FOB as large quantities of foam have been observed on adjoining Jones Lake. Additionally, locals have reported large bonfires in the vicinity of this location during the summer. We have had reports of bonfires put out with AFFF at Cantonment. Additionally, EGLE has not found information/discussion on Forward Arming and Refueling Points (FARPs) in the PA or SI. Have these points been looked at as locations of fire truck parking and AFFF release? Areas along Co Rd 612 have the ability to be used as FARPs and encampments. Please conduct additional interviews and looks into records to find FARP locations. It is possible that the former North FOB and current FOB may have been used as FARP locations. The areas along County Road 612 are used heavily for staging/camping and should be looked at further. Current interviews and records are not sufficient for the activity in this area. Additional interviews with former fire fighters and staff have already identified new source areas at Cantonment on Lake Margrethe. The interviews in the PA were conducted when PFAS extent was unknown and the importance of interviews were not known by the interviewees. Others may be more willing to speak today and past interviewees may elaborate on training and product types.		



Figure 1: Jones Lake east shoreline foam. 2021-06-14



Figure 2: Jones Lake foam blowing onto campground beach. 2021-06-14

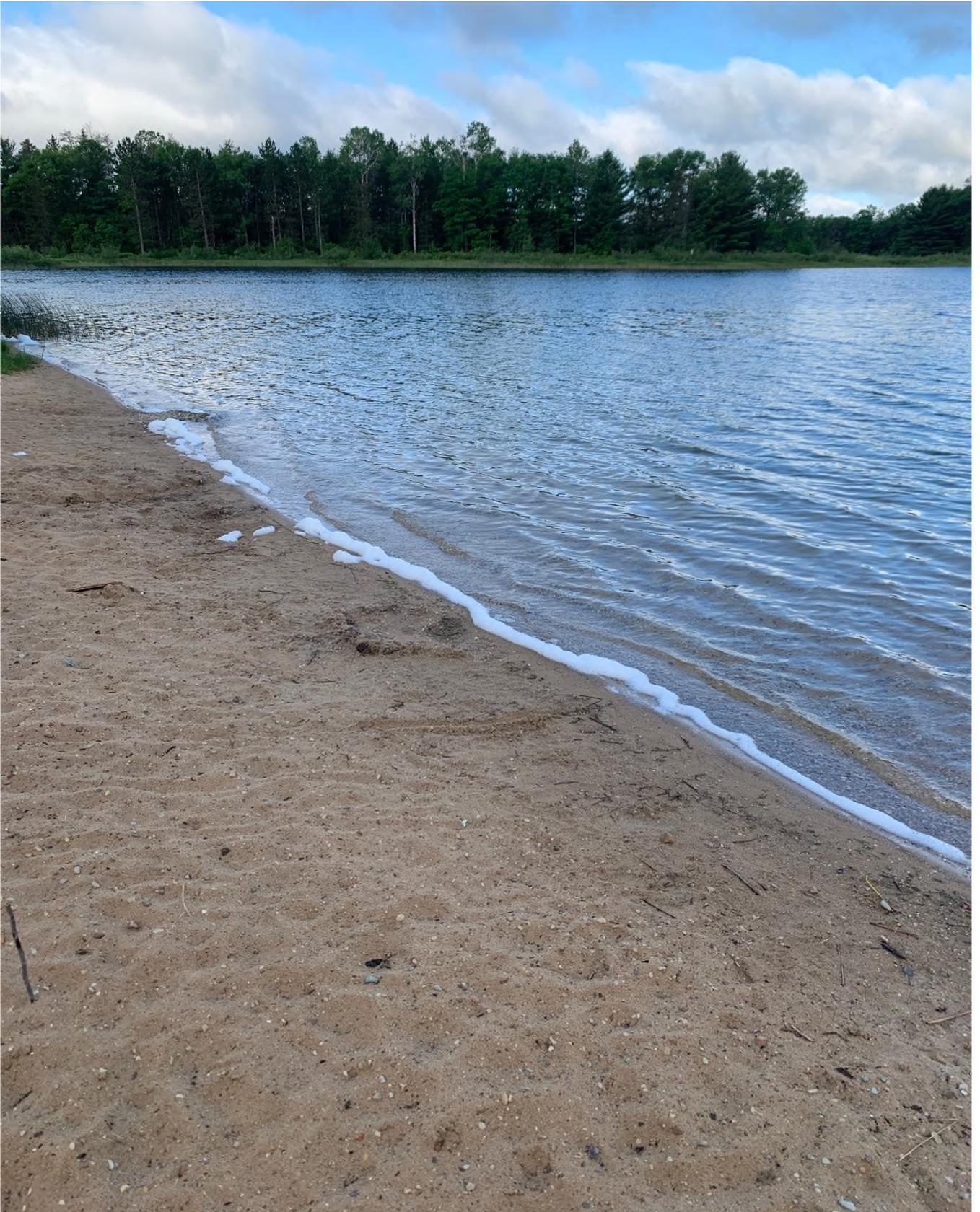


Figure 3: Jones Lake Foam on east shoreline. 2021-06-14



Figure 4: Jones Lake Boat Launch Foam. 2021-06-14

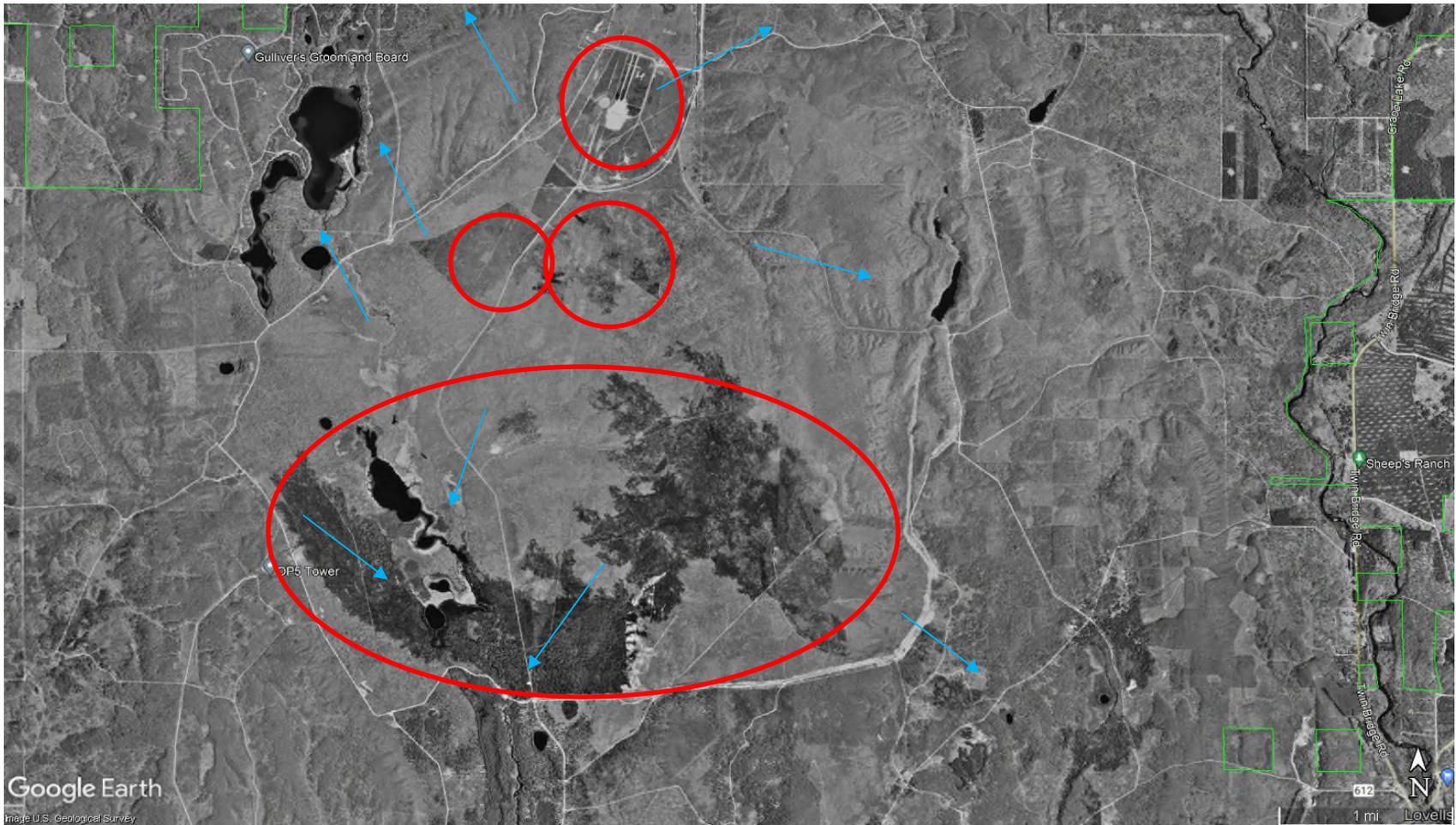


Figure 5: Range 40 1999 Fire Scar. None of samples were taken within the large fire scar or fire scarring at the northern portion of the range. Fires were contained to the range with clear fire breaks. Expected shallow groundwater flow directions (radial) shown due to influence of North/East Branch Au Sable headwaters.



Figure 6: Range 15 2016 Fire Scar. No samples were taken within the fire scar. Fire was contained to the AOI.



Figure 7: Unknown Staging Area not identified in PA or SI. HEMTT firetrucks appear to be parked on concrete slabs at southeastern side (red circle).