3.3 WATER QUALITY

3.3.1 INTRODUCTION

3.3.1.1 Overview

This section addresses potential impacts on surface water and groundwater. Surface water resources at Naval Weapons Systems Training Facility (NWSTF) Boardman are very limited and no year-round surface waters are present. Therefore, the analysis is focused on groundwater, which is water located beneath the ground surface in soil pore spaces and in the fractures of rock formations. A unit of rock or an unconsolidated deposit is called an aquifer when it can yield a usable quantity of water. Proposed activities that could directly affect water resources are limited to the land area of NWSTF Boardman. With the exception of Air-to-Ground Bombing Exercises and Air-to-Ground Gunnery Exercises, activities occurring in the Special Use Airspace would not affect water resources and are not considered further in this section.

3.3.1.2 Regulatory Framework and United States Department of the Navy Policy

3.3.1.2.1 Clean Water Act

The Clean Water Act (33 United States [U.S.] Code [U.S.C.] §1251, et seq.) regulates discharges of pollutants in navigable waters of the United States, including discharges of stormwater runoff from construction activities. The U.S. Environmental Protection Agency (EPA) or an authorized state may issue a permit for a discharge only if the discharge complies with Clean Water Act guidelines. The Oregon Department of Environmental Quality issues these permits in Oregon. Proposed construction activities are subject to conditions of the National Pollutant Discharge Elimination System Stormwater Construction General Permit No. 1200-C if they would disturb 1 or more acres (ac.) (0.4 or more hectares [ha]) and may discharge to surface waters or conveyance systems leading to surface waters of the state. The proposed construction under Alternatives 1 and 2 would disturb more than 1 ac. (0.4 ha), but would not result in discharge to surface waters or conveyance systems leading to surface waters of the state. Therefore, a National Pollutant Discharge Elimination System Stormwater Construction General Permit No. 1200-C is not required for the Proposed Action.

3.3.1.2.2 Resource Conservation and Recovery Act

The Resource Conservation and Recovery Act is applicable to water resources and is described in Section 3.1.1.2.1 (Resource Conservation and Recovery Act).

3.3.1.2.3 Range Sustainability Environmental Program Assessment

The U.S. Department of the Navy (Navy) Range Sustainability Environmental Program Assessment policy is applicable to water resources and is described in Section 3.1.1.2.3 (Range Sustainability Environmental Program Assessment).

3.3.1.2.4 Operational Range Clearance

The Navy's Operational Range Clearance policy is applicable to water resources and is described in Section 3.1.1.2.4 (Operational Range Clearance).

3.3.1.3 Determination of Significance

The impact analysis for water resources considered possible changes in the quality and quantity of groundwater that could result from the Proposed Action. Such changes could arise from incidental spills, use of non-explosive practice munitions, domestic wastewater disposal, or groundwater withdrawal.

Factors used to determine if impacts on water resources would be significant include (1) the potential for groundwater to become contaminated, (2) whether groundwater represents a substantial threat of a contaminant release to an off-range area, and (3) whether such a release poses unacceptable risk to human health or the environment. In addition, impacts to water resources would be determined significant if groundwater withdrawal were to exceed the long-term natural replenishment of the underground water reservoir.

3.3.2 AFFECTED ENVIRONMENT

3.3.2.1 Surface Water

No year-round surface waters occur on NWSTF Boardman. The only natural surface water occurs as rainfall runoff, creating intermittent flows in Juniper and Well Springs canyons on the south end of NWSTF Boardman (Figure 3.3-1). In some years, the flow is sufficient to leave behind pools of standing water. Natural flow once occurred at Tub, Well, and Strait Springs on the south end of NWSTF Boardman, but all have dried up since domestic wells were drilled south of the property from the 1930s to 1950s (U.S. Department of the Navy 2012). A few small, excavated stock ponds existed at NWSTF Boardman when livestock grazing took place (Figure 3.3-1), however, pumping groundwater to these human-made ponds ceased when the grazing program ended in 2002. Two excavated stock ponds, one at the head of Well Springs Canyon and the other centered over the Oregon Trail east of Juniper Canyon (Oregon Trail Pond), capture seasonal rainwater (Figure 3.3-1). No activities are proposed in any of these areas.

Planning level surveys determined that wetlands do not exist at NWSTF Boardman and hydric soils (soil that formed under conditions of saturation, flooding or ponding) are not present (U.S. Department of the Navy 2012).

No wastewater discharges occur on NWSTF Boardman. Stormwater runoff from range areas would not be expected to reach intermittent drainages. The Columbia River is approximately 2 miles (3.2 kilometers) north of NWSTF Boardman, and in an arid climate with little runoff and porous soil, too distant to be affected by stormwater runoff (U.S. Department of the Navy 2004). Based on this information, the Proposed Action would not affect surface water resources. Therefore, surface water is not addressed in further detail.

3.3.2.2 Groundwater

The Columbia River basalt aquifer underlies NWSTF Boardman. The depth to groundwater varies. For example, in nine wells sampled during 2010 (Figure 3.1-3), the depth to water ranged from 12 to 180 feet (ft.) (3.7 to 54.9 meters [m]) below the ground surface (U.S. Department of the Navy 2011a). The Oregon Water Resources Department has designated Critical Groundwater Areas and Groundwater Limited Areas in the vicinity of NWSTF Boardman (Oregon Water Resources Department 2008). A Critical Groundwater Area is one where pumping of groundwater exceeds the long-term natural replenishment of the underground water reservoir. Additional groundwater pumping in a Groundwater Limited Area is restricted to a few designated uses. These designations are made to prevent excessive declines in groundwater levels.

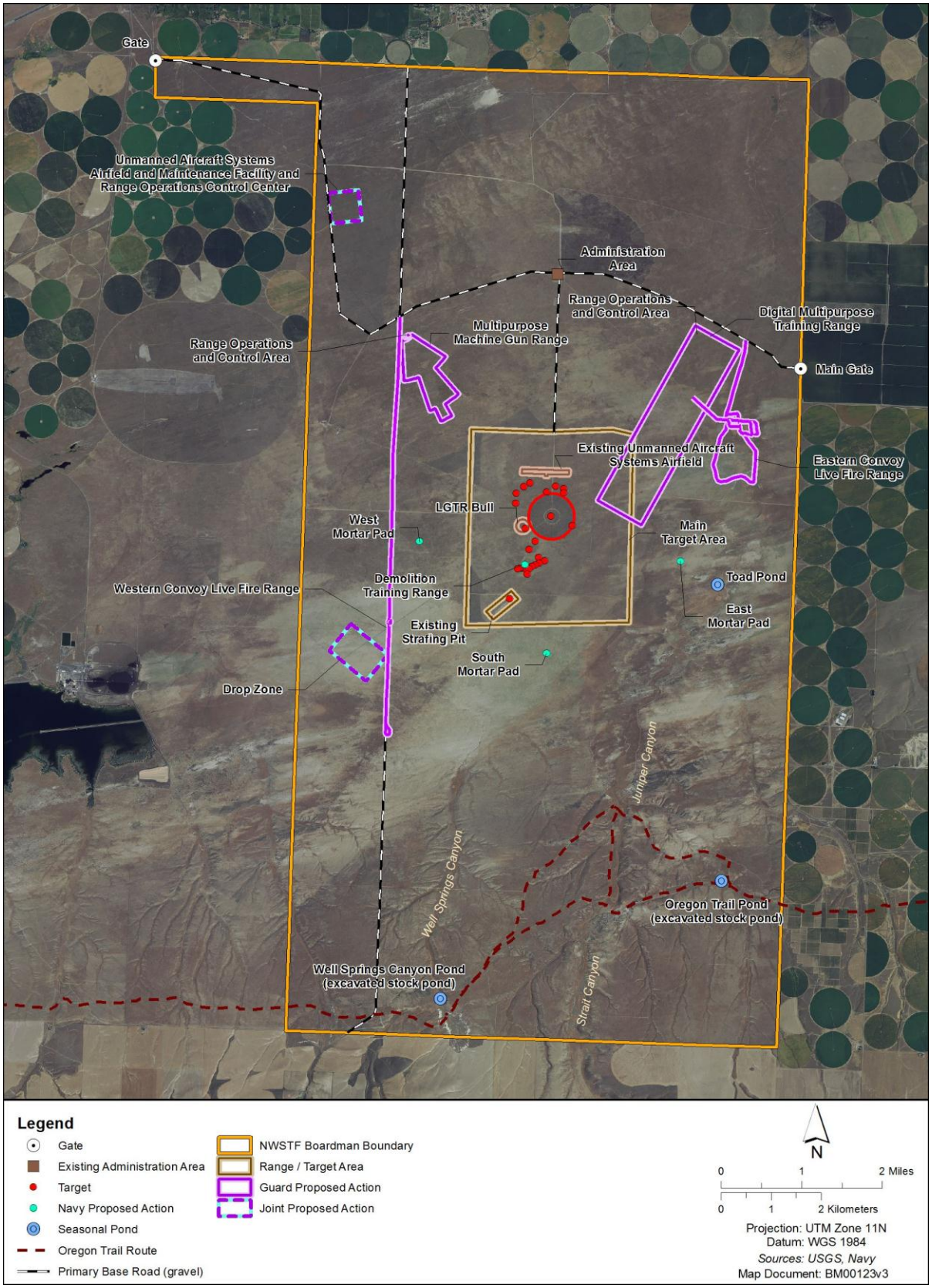

Figure 3.3-1: Water Resources at NWSTF Boardman

One existing groundwater well located on NWSTF Boardman serves the Administration Area with non-potable water (Figure 3.3-1). Several other wells and a water distribution system are located on NWSTF Boardman, but the system has not been regularly functioning since the grazing program ceased in 2002. Bottled water is the only potable water source at NWSTF Boardman. Use of the well in the Administration Area for drinking water was discontinued in the mid-1990s because of high nitrate concentrations. The city of Boardman uses Columbia River water as its drinking water source, rather than groundwater. Some private residences near NWSTF Boardman may use wells for drinking water (U.S. Department of the Navy 2011b).

The Oregon Department of Environmental Quality established the 350,000 ac. (141,640 ha) Lower Umatilla Basin Groundwater Management Area in 1990 because nitrate-nitrogen concentrations exceeded the federal safe drinking water limit of 10 milligrams per liter in many area groundwater samples. This management area includes northern portions of NWSTF Boardman (approximately 25,000 ac. [10,117 ha]). Irrigated agriculture, food processing water, animal feedlots and dairies, domestic septic systems in high densities, and lagoons at U.S. Army Umatilla Chemical Depot were identified as sources of nitrate in groundwater (Oregon Department of Environmental Quality 1997, 2011).

Regional sampling conducted by the Oregon Department of Environmental Quality and the U.S. EPA also indicates a potential for perchlorate contamination throughout the Lower Umatilla Basin Groundwater Management Area. Perchlorate is both a naturally occurring and man-made chemical that is used to produce rocket fuel, fireworks, flares, and explosives. Perchlorate can also be present in bleach and in some fertilizers (U.S. Environmental Protection Agency 2011). In February 2011, the U.S. EPA announced its decision to regulate perchlorate in drinking water. The U.S. EPA has not issued regulations as of April 2015 (projected date for notice of proposed rulemaking is February 2016), but it has provided an Interim Drinking Water Health Advisory level of 15 micrograms per liter (µg/L) based on recommendations of the National Research Council of the National Academies (U.S. Environmental Protection Agency 2008). Following is a summary of groundwater perchlorate data based on information presented in the Range Condition Assessment (RCA) for NWSTF Boardman (U.S. Department of the Navy 2011b):

- In September 2003, the Oregon Department of Environmental Quality performed a round of sampling at 133 wells in the Lower Umatilla Basin Groundwater Management Area. Perchlorate was detected in just over half of the wells and, of the detections, half exhibited values between 1.6 and 4.9 µg/L.
- Eighteen of 25 groundwater samples collected in 2004 from the former Boardman Air Force Range immediately west of NWSTF Boardman and Port of Morrow property north of NWSTF Boardman exhibited detections of perchlorate ranging from 0.46 to 20.7 µg/L.

The types of non-explosive practice munitions used by the Navy at NWSTF Boardman, now and in the recent past, do not contain perchlorate. In addition, research conducted for the 2004 NWSTF Boardman RCA (U.S. Department of the Navy 2004) provided no evidence of historical use of any perchlorate-based munitions at NWSTF Boardman. Soil and groundwater sampling and analysis also indicate that a source of perchlorate does not exist at NWSTF Boardman.

A Comprehensive Range Evaluation field investigation conducted at NWSTF Boardman in 2005 included analysis of groundwater collected from seven monitoring wells (U.S. Department of the Navy 2006a). Perchlorate was detected at 3.0 and 3.7 µg/L in samples from two of the monitoring wells. The well with the higher concentration is considered an upgradient well for the range considering its proximity to the

range boundary, its geographic isolation from potential on-site source areas, and the general regional groundwater flow tendencies. Perchlorate was not detected in the remaining wells, which were located near potential source areas or down gradient of potential source areas. Perchlorate was not detected in any soil samples collected from potential sources areas (U.S. Department of the Navy 2006a).

In 2010, a RCA Five-Year Review and Comprehensive Range Evaluation (U.S. Department of the Navy 2011a, b) were completed for NWSTF Boardman and included sampling at nine monitoring wells. Perchlorate was detected in seven of nine monitoring wells, at concentrations ranging from 0.68 to 4.4 µg/L. Surface soils were also collected from four potential source locations, but perchlorate was not detected in any of the samples. The RCA Five-Year Review concluded that a source of perchlorate does not exist at NWSTF Boardman for the following reasons:

- There is no evidence of historical use of any perchlorate-based munitions at NWSTF Boardman.
- The maximum concentration of perchlorate in groundwater at NWSTF Boardman is lower than maximum concentrations in samples from other areas.
- Perchlorate was not detected in surface soil samples collected from potential source locations.

Explosive compounds were detected at low concentrations in samples from one of nine monitoring wells at NWSTF Boardman in 2010. Nitroglycerin was detected at a concentration of 0.690 µg/L and octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine High Melting Explosive (HMX) was detected at a concentration of 0.059 µg/L. Concentrations of each compound were well below U.S. EPA Regional Screening Levels of 3.7 µg/L for nitroglycerin and 1,800 µg/L for octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine (HMX) (U.S. Department of the Navy 2011a). The RCA Five-Year Review indicated that there is neither evidence for, nor a significant threat of an off-range release of constituents that poses a potential risk to human health and the environment (U.S. Department of the Navy 2011b).

3.3.2.3 Current Requirements and Management Practices

The following is a summary of current requirements and practices applicable to water resources at NWSTF Boardman:

- Incidental spills that could contaminate groundwater are avoided and minimized through the *Hazardous Control and Management Plan*. Navy personnel at NWSTF Boardman receive initial and periodic refresher training in the proper storage, handling, and management of hazardous materials.
- Potential groundwater contamination issues are addressed in the RCA (U.S. Department of the Navy 2004) and subsequent 5-year reviews (U.S. Department of the Navy 2011b), in accordance with the *Range Sustainability Environmental Program Assessment Policy Implementation Manual* (U.S. Department of the Navy 2006b) (see Section 3.1.1.2.3, Range Sustainability Environmental Program Assessment) for general description of RCA).
- Incidental spills from Oregon National Guard (ORNG) activities are addressed in Oregon Army National Guard Regulation 420-47, Hazardous Material, Waste, and Spill Management Plan.
- An *Operational Range Clearance Plan* (U.S. Department of the Navy 2014) is implemented at NWSTF Boardman in compliance with Department of Defense Directive 4715.11 *Environmental and Explosives Safety Management*. The *Operational Range Clearance Plan* includes provisions for safe management and removal of unexploded ordnance, and recycling of training munitions, munitions debris, and range scrap that has been rendered safe. It includes quality assurance and surveillance procedures (see Section 3.1.1.2.4, Operational Range Clearance, for general description of operational range clearance).

3.3.3 ENVIRONMENTAL CONSEQUENCES

3.3.3.1 No Action Alternative

3.3.3.1.1 Potential Groundwater Contamination

Incidental Spills

The potential for incidental spills to affect groundwater at NWSTF Boardman under the No Action Alternative is low because only small quantities of materials are present and current requirements and practices minimize the risk of a spill occurring. Small quantities of hazardous materials, including petroleum, oils, lubricants, compressed gases, and office supplies (e.g., toner and cleaning supplies) are used in the Administrative Area. A 1,000-gallon (gal.) (3,785.4 L) aboveground storage tank with built in secondary containment is located in the Administrative Area. It contains diesel for fueling vehicles. The Navy has a *Hazardous Control and Management Plan*, Authorized Use List, and Hazard Communication Program for NWSTF Boardman. Navy personnel receive initial and periodic refresher training in the proper storage, handling, and management of hazardous materials (U.S. Department of the Navy 2011b).

The small amount of hazardous waste generated at NWSTF Boardman comes from routine activities (building, vehicle, and equipment maintenance), rather than directly from training activities. Typically, hazardous waste is generated only when a specific project, such as painting, is conducted. NWSTF Boardman maintains a Conditionally Exempt Small Quantity Generator status, and is not required to have a U.S. EPA Generator Identification number. Hazardous wastes are disposed of through local vendors (e.g., Safety Kleen provides a parts-cleaning service for vehicle maintenance) (U.S. Department of the Navy 2011b).

The effects of incidental spills on groundwater under the No Action Alternative would be negligible based on the small quantities of materials and wastes used and generated at NWSTF Boardman. There is little chance for a spill to reach groundwater if one were to occur based on the response procedures in place and the small quantities of materials and wastes used and generated at NWSTF Boardman. Incidental spills would have no significant impact on water quality under the No Action Alternative.

Non-Explosive Practice Munitions

As summarized in Tables 2-2 and 2-3, various types of non-explosive practice munitions would be expended in the Main Target Area under the No Action Alternative, including non-explosive practice bombs and small- and medium-caliber rounds. Practice bombs mimic the size, weight, and ballistics of an explosive bomb and consist of a steel or iron bomb body; some are cement-filled. A signal cartridge or spotting charge may be used with most non-explosive practice bombs, based on training needs. The signal cartridge or spotting charge produce a flash of light and puff of smoke upon impact that permits visual evaluation of accuracy. Signal cartridges are used with the smaller practice bombs (MK-76). The main constituents are either 0.4 ounce (oz.) (11.3 grams [g]) of red phosphorus or 0.7 oz. (19.8 g) of titanium tetrachloride, depending on which model cartridge is used. Spotting charges are used with the larger cement-filled bombs (MK-82, MK-83, and MK-84). The main constituent of the spotting charge is 1.5 oz. (42.5 g) of titanium tetrachloride. Most of the constituents of the signal cartridge or spotting charge are consumed upon its activation. Small- and medium-caliber rounds primarily consist of steel or a lead core with a copper jacket.

Non-explosive practice bombs and associated scrap, such as aluminum fin assemblies, would be removed at regular intervals in accordance with the *Operational Range Clearance Plan* (see Section 3.3.2.3, Current Requirements and Management Practices). Spent small- and medium-caliber rounds

would not be removed at regular intervals and would accumulate in soils. These rounds primarily consist of steel or a lead core with a copper jacket. The fate and transport of metals from bullets and bullet fragments accumulating in soil is a potential concern for groundwater, with lead being the primary constituent of concern because of its toxicity and its ability to persist in the environment (U.S. Army Environmental Center 1998). Factors affecting the fate and transport of lead on firing ranges are described in the analysis for soils (see Section 3.1.3.1.2, Potential Soil Contamination). Several factors indicate that there is limited risk of lead migrating to groundwater at NWSTF Boardman:

- Lead would be relatively immobile in soils at NWSTF Boardman based on neutral to slightly alkaline soils (pH 7.3–7.9), limited annual precipitation (9–11 inches [in.] per year [23–28 centimeters {cm}]), and the flat terrain. Elevated concentrations would likely be limited to surface soils in the immediate area of projectile impact (see Section 3.1.3.1.2, Potential Soil Contamination). Lead precipitates out of solution and binds to the soil within the pH range of the soils on the proposed ranges (pH 7.3–7.9).
- Depth to groundwater is deep (94–180 ft.) based on data from monitoring wells located near the proposed range locations (U.S. Department of the Navy 2011a).
- While metals are not expected to reach groundwater, mobility would also be limited there based on the median pH value of 7.3 (pH range 6.4–7.9) obtained for nine monitoring wells sampled in 2010 (U.S. Department of the Navy 2011a).

Non-explosive practice munitions would have negligible effects on groundwater under the No Action Alternative because potential contaminants are not expected to migrate to groundwater. The potential for groundwater contamination at NWSTF would continue to be evaluated through the Range Sustainability Environmental Program Assessment process and during 5-year RCA updates. Continued implementation of the *Operational Range Clearance Plan* would also avoid potential impacts on groundwater. Non-explosive practice munitions would have no significant impact on water quality under the No Action Alternative.

Domestic Wastewater Treatment and Disposal

Domestic wastewater would continue to be treated by a septic system serving the Administrative Area. Based on the limited full time presence at NWSTF Boardman (approximately six personnel), loadings to the system would be low and the effects to groundwater under the No Action Alternative would be negligible. Domestic wastewater would have no significant impact on water quality under the No Action Alternative.

3.3.3.1.2 Groundwater Withdrawal

While current groundwater usage data are not available for NWSTF Boardman, use is limited based on the limited number of full time personnel (approximately six personnel) and the limited needs to support training. The effects of groundwater withdrawal would be negligible under the No Action Alternative. Groundwater withdrawal would have no significant impact on water resources under the No Action Alternative.

3.3.3.2 Alternative 1

3.3.3.2.1 Potential Groundwater Contamination

Incidental Spills

The potential for incidental spills to occur would increase under Alternative 1, primarily from refueling activities during construction and during certain ORNG training activities. Refueling of military

equipment would be limited to tracked vehicles (e.g., Abrams Tanks and Bradley Fighting Vehicles), which would be used at NWSTF Boardman about 10 weekends per year. Wheeled military vehicles (e.g., humvees and trucks) would not refuel at NWSTF Boardman. All refueling of tracked vehicles would be conducted in designated secondary containment areas. Portable containment would be set up in staging areas during construction and in gravel equipment parking areas near the proposed Digital Multipurpose Training Range (DMPTR) during training. All refueling would be required to comply with Oregon Army National Guard Regulation 420-47, *Hazardous Material, Waste, and Spill Management Plan* as well as any other applicable state and federal regulations. Some hazardous materials in the form of lubricants and antifreeze would be used to perform maintenance on construction equipment during construction and on military vehicles during operations. Drip pads would be placed under all military vehicles and construction equipment when parked. The Navy and ORNG would prepare and implement a Spill Prevention, Control, and Countermeasures Plan if quantities of fuel and other petroleum products above the spill prevention, containment, and countermeasures quantity threshold were stored at NWSTF Boardman or a Heavy Expanded Mobility Tactical Truck (i.e., Heavy Expanded Mobility Tactical Truck [HEMTT] or fuel tanker truck) were parked on NWSTF Boardman. Any spills would be managed and cleaned up in accordance with Oregon Army National Guard Regulation 420-47; a Spill Prevention, Control, and Countermeasures Plan, if deemed necessary; Army Regulation 200-1 *Environmental Protection and Enhancement*; and applicable state and federal regulatory requirements. If the ORNG is unable to contain a spill or the spill exceeded 42 gal. (158.9 L) of regulated material, the event would be immediately reported to the Oregon Emergency Response System.

The effects on groundwater would be negligible under Alternative 1 because refueling during both construction and training activities would take place in a secondary containment area, drip pads would be placed under equipment when parked, a spill response plan would be in place, and compliance with applicable ORNG, state, and federal regulations would be required. Rapid response would ensure that contaminants would not reach groundwater. Incidental spills would have no significant impact on water quality under Alternative 1.

Non-Explosive Practice Munitions

As summarized in Tables 2-2 and 2-3, non-explosive practice munitions use would increase under Alternative 1. Activities in the Main Target Area would be similar to the No Action Alternative with an increase in small- and medium-caliber rounds.

Estimated annual projectile deposition on the training ranges is summarized in Table 3.3-1. While most of the fired projectiles are expected to hit the ground in the vicinity of targets, projectiles may also be spread elsewhere within the respective Surface Danger Zone. All Surface Danger Zones and Weapons Danger Zones are contained within the NWSTF Boardman boundary.

As discussed for the No Action Alternative, lead is not expected to migrate to groundwater, despite the increase in rounds under Alternative 1, because it would be relatively immobile in soils at NWSTF Boardman based on neutral to slightly alkaline soils (pH 7.3 to 7.9), limited annual precipitation (9 to 11 in. per year [23 to 28 cm]), and the flat terrain. In addition, depth to groundwater is deep (94 to 180 ft.) and groundwater is neutral (median pH value of 7.3).

Table 3.3-1: Estimated Annual Projectile Deposition for All Ranges Combined (Alternatives 1 and 2)

Ammunition	Projectile Composition	Weight Per Round	Alternative 1		Alternative 2	
			Rounds Per Year	Pounds Per Year	Rounds Per Year	Pounds Per Year
5.56 mm rifle	Rifle: copper-jacket with lead core Machine gun: ball-copper-jacket with lead core or tracer-copper jacket, lead slug, igniter and tracer compounds	0.13 oz.	469,500	3,815	269,500	2,190
7.62 mm	Rifle: copper-jacket with lead core Machine gun: ball- copper-jacket with lead core or tracer-copper jacket, lead slug, igniter and tracer compounds	0.34 oz.	813,000	17,276	333,000	7,076
0.50 caliber machine gun or rifle	Ball: gilding metal jacket, lead-antimony tip, and tungsten-steel core Saboted light armor penetrator: tungsten projectile and plastic sabot. Tracer: Gilding metal jacket, lead-antimony slug, igniter and tracer compounds	1.7 oz.	252,000	26,775	102,000	10,838
20 mm cannon	M55A2TP practice round: aluminum alloy projectile	3.5 oz.	88,800	19,425	88,800	19,425
25 mm cannon	M793TP-T practice round: steel and iron projectile with tracer M910/M910E1 TPDS-T practice round: steel and aluminum alloy projectile with tracer	6.4 oz. 3.4 oz.	20,000	6,125	0	0
40 mm grenade	M385/M918 practice round: aluminum and copper with flash-bang Target practice: metal-plastic composite with spotting charge	8.6 oz.	58,500	31,444	10,500	5,644
120 mm cannon	Aluminum sabot and steel dart	7 lb.	700	4,900	0	0
Tube-launched, optically tracked, wire-guided missile	Aluminum and steel	5 lb.	35	175	0	0
		Totals =	**1,702,535**	**109,935**	**803,800**	**45,173**

Notes: mm = millimeter, oz. = ounces, lb. = pounds

Once the Multipurpose Machine Gun Range (MPMGR), DMPTR, and eastern Convoy Live Fire Range (CLFR) are operational, ORNG would conduct assessments in accordance with the Army's Operational Range Assessment Program to fulfill requirements identified in Department of Defense (DoD) Directive 4715.11 *Environmental and Explosives Safety Management on Operational Ranges within the United States* and DoD Instruction 4715.14 *Operational Range Assessments*. These assessments would determine qualitatively if munitions constituents were leaving the operational range footprint and whether pathways existed for human or ecological receptors. A quantitative assessment would be conducted if the qualitative assessment were inconclusive. The assessments would be conducted on a 5-year review cycle, even if the initial qualitative assessment identified no issues. In addition, ORNG

would proactively manage the new ranges using applicable strategies outlined in the *Army Small Arms Training Range Environmental Best Management Practices Manual* (U.S. Army Environmental Center 2005). In addition, the Navy would continue to conduct RCA Five-Year Reviews and implement the *Operational Range Clearance Plan*.

Non-explosive practice munitions would have no significant impact on water quality under Alternative 1.

Domestic Wastewater Treatment and Disposal

Alternative 1 would include construction of a below-ground septic system and drain field to serve the Unmanned Aircraft Systems (UAS) Training and Maintenance Facility. Based on the limited full time presence at NWSTF Boardman (the current six personnel plus the additional seven personnel for the UAS Training and Maintenance Facility), loadings to the system would be low. This facility would be located on Quincy loamy fine sand 2 to 12 percent slopes (Figure 3.1-1) (Natural Resources Conservation Service 2011). While a site survey has not yet been conducted to evaluate the suitability of site soils, written descriptions indicate that Quincy loamy fine sand is given a "very limited" rating for septic tank absorption fields based on a filtering capacity rating of 1.00 (greatest negative impact on use). The very limited rating indicates that the soil has one or more features that are unfavorable for the specified use. The limitations cannot generally be overcome without soil reclamation, special design, or expensive installation procedures. Poor performance and high maintenance can be expected (Natural Resources Conservation Service 2011).

Potential limitations of the site soils would be addressed during project design and permitting. In Morrow County, septic system permits are issued by the Oregon Department of Environmental Quality. The first step is to apply for a site evaluation, which includes evaluation of the site by a septic system specialist. The second step is to apply for a septic system construction permit. The system would be designed and built in accordance with *Oregon Onsite Wastewater Treatment System Rules* (Oregon Administrative Rules Chapter 340, Divisions 071 and 073). The Rules include provisions for use and approval of alternative treatment technologies when site conditions are not suitable for a traditional septic drain field. In addition, the Rules do not allow installation or use of a system that is likely to pollute public waters or create a public health hazard. Therefore, the effects of domestic wastewater treatment and disposal under Alternative 1 would be negligible. Domestic wastewater would have no significant impact on water quality under Alternative 1.

3.3.3.2.2 Groundwater Withdrawal

Alternative 1 would include development of a groundwater well to serve the proposed UAS Training and Maintenance Facility with non-potable water. The presence of Critical Groundwater Areas and Groundwater Limited Areas in the vicinity of NWSTF Boardman indicate that groundwater resources are limited. Negligible effects on groundwater would be expected under Alternative 1 based on limited water needs and withdrawal, and the fact that withdrawals at NWSTF Boardman are currently low. It is likely that groundwater from the proposed well still would not meet National Primary Drinking Water Regulations for nitrate-nitrogen. Therefore, an alternate potable water source would be used. For example, a potable water tank could be installed and water delivered by tank truck. Groundwater withdrawal would have no significant impact on water resources under Alternative 1.

3.3.3.3 Alternative 2

3.3.3.3.1 Potential Groundwater Contamination

Incidental Spills

The potential for incidental spills to occur would increase under Alternative 2 compared to the No Action Alternative, but would decrease relative to Alternative 1. The DMPTR would not be constructed and operated under Alternative 2. Therefore, the need for refueling associated with construction and training on this range would be eliminated. Management practices (MPs) described for Alternative 1 would also be implemented for Alternative 2. The effects on groundwater would be negligible under Alternative 2 because refueling during both construction and training activities would take place in a secondary containment area, drip pads would be placed under equipment when parked, a spill response plan would be in place, and compliance with applicable ORNG, state, and federal regulations would be required. Rapid response would ensure that contaminants would not reach groundwater. Incidental spills would have no significant impact on water quality under Alternative 2.

Non-Explosive Practice Munitions

As summarized in Tables 2-2 and 2-3, non-explosive practice munitions use would increase under Alternative 2 compared to the No Action Alternative, but would decrease relative to Alternative 1 because the DMPTR would not be constructed and operated, and the non-explosive practice rounds associated with the DMPTR would not be expended at NWSTF Boardman. Under Alternative 2, approximately 1,440 M224 60 millimeter non-explosive practice mortar rounds would be fired into the Main Target Area per year and half of the small- and medium-caliber rounds expended on the eastern CLFR would shift to the western CLFR. Expended non-explosive mortar rounds would be retrieved and reused or scrapped. Therefore, non-explosive practice mortar rounds would have no potential to affect groundwater.

As discussed for the No Action Alternative and Alternative 1, lead is not expected to migrate to groundwater, despite the increase in rounds under Alternative 2, because it would be relatively immobile in soils at NWSTF Boardman based on neutral to slightly alkaline soils (pH 7.3 to 7.9), limited annual precipitation (9 to 11 in. per year [23 to 28 cm]), and the flat terrain. In addition, depth to groundwater is deep (94 to 180 ft.) and groundwater is neutral (median pH value of 7.3).

Once the MPMGR and both CLFRs are operational, ORNG would conduct assessments in accordance with the Army's Operational Range Assessment Program to fulfill requirements identified in DoD Directive 4715.11 *Environmental and Explosives Safety Management on Operational Ranges within the United States* and DoD Instruction 4715.14 *Operational Range Assessments*. These assessments would determine qualitatively if munitions constituents were leaving the operational range footprint and whether pathways existed for human or ecological receptors. A quantitative assessment would be conducted if the qualitative assessment were inconclusive. The assessments would be conducted on a 5-year review cycle, even if the initial qualitative assessment identified no issues. In addition, ORNG would proactively manage the new ranges using applicable strategies outlined in the *Army Small Arms Training Range Environmental Best Management Practices Manual* (U.S. Army Environmental Center 2005). In addition, the Navy would continue to conduct RCA Five-Year Reviews and implement the *Operational Range Clearance Plan*.

Non-explosive practice munitions would have no significant impact on water quality under Alternative 2.

Domestic Wastewater Treatment and Disposal

The volume of domestic wastewater generated at NWSTF Boardman under Alternative 2 would increase slightly compared to the No Action Alternative and Alternative 1. Under Alternative 2, the proposed Joint-Use Administration Building and UAS Training and Maintenance Facility would share a common below-ground septic system and drain field. The system would be designed to accommodate the slight increase in loading. As discussed for Alternative 1, the Quincy loamy fine sand soils in the proposed location have a very limited rating for septic tank absorption fields (Natural Resources Conservation Service 2011). Therefore, alternative treatment technologies might need to be considered during the design and permitting process. As discussed for Alternative 1, the system would be permitted by the Oregon Department of Environmental Quality and would be designed and built in accordance with *Oregon Onsite Wastewater Treatment System Rules* (Oregon Administrative Rules Chapter 340, Divisions 071 and 073). The Rules do not allow installation or use of a system that is likely to pollute public waters or create a public health hazard. Therefore, the effects of domestic wastewater treatment and disposal under Alternative 2 would be negligible. Domestic wastewater would have no significant impact on water quality under Alternative 2.

3.3.3.3.2 Groundwater Withdrawal

Alternative 2 would include development of a groundwater well to serve the proposed Joint-Use Administration Building and UAS Training and Maintenance Facility with non-potable water. The presence of Critical Groundwater Areas and Groundwater Limited Areas in the vicinity of NWSTF Boardman indicate that groundwater resources are limited. Negligible effects to groundwater would be expected under Alternative 2 based on limited water needs and withdrawal, and the fact that withdrawals at NWSTF Boardman are currently low. It is likely that groundwater from the proposed well still would not meet National Primary Drinking Water Regulations for nitrate-nitrogen. Therefore, an alternate potable water source would be used. For example, a potable water tank could be installed and water delivered by tank truck. Groundwater withdrawal would have no significant impact on water resources under Alternative 2.

3.3.3.4 Proposed Management Practices, Monitoring, and Mitigation Measures

3.3.3.4.1 Proposed Management Practices

The current MPs listed in Section 3.3.2.3 (Current Requirements and Management Practices) would continue to be implemented under Alternatives 1 and 2, and existing programs and plans would be updated to reflect new conditions. The following MPs would be implemented to avoid and minimize potential impacts on water quality under Alternatives 1 and 2:

- Incidental fuel spills would be avoided during construction and training by conducting all refueling activities in a secondary containment area.
- Drip pads would be placed under equipment when parked to avoid soil contamination from leaking fluids.
- A Spill Prevention, Control, and Countermeasures Plan would be developed if quantities of fuel and other petroleum products above the spill prevention, containment, and countermeasures quantity threshold were stored at the NWSTF Boardman or a HEMTT or fuel tanker truck were parked on NWSTF Boardman. The Plan would help to ensure rapid and effective response to incidental spills and avoid contaminant migration to groundwater.
- Any spills would be managed and cleaned up in accordance with Oregon Army National Guard Regulation 420-47; a Spill Prevention, Control, and Countermeasures Plan, if deemed necessary; AR 200-1; and applicable Navy, state, and federal regulatory requirements. If the ORNG is

unable to contain a spill or the spill exceeded 42 gal. (158.9 L) of regulated material, the event would be immediately reported to the Oregon Emergency Response System.

- The NWSTF Boardman *Operational Range Clearance Plan* would be updated and implemented to address requirements for the new ranges.
- Under the Navy's Range Sustainability Environmental Program Assessment (RSEPA), RCA 5-year Reviews would continue to be conducted and appropriate steps would be taken to analyze environmental conditions on the range and to prevent or respond to a release or substantial threat of a release of munitions constituents of potential concern to off range areas that could pose risks to human health or the environment. RSEPA focus would be expanded to incorporate new range activities and new training areas under periodic assessments.
- Assessments would be conducted for the DMPTR (Alternative 1 only), MPMGR, and both CLFRs in accordance with the Army's Operational Range Assessment Program. These assessments would first determine qualitatively if munitions constituents were leaving the operational range footprint and whether pathways existed for human or ecological receptors. A quantitative assessment would be conducted if the qualitative assessment were inconclusive. The assessments would be conducted on a 5-year review cycle, even if the initial qualitative assessment identified no issues. In addition, ORNG would proactively manage the new ranges using applicable strategies outlined in the *Army Small Arms Training Range Environmental Best Management Practices Manual*.

3.3.3.4.2 Proposed Monitoring

No specific monitoring needs where identified for water quality. However, the need for groundwater sampling, analysis, or monitoring would continue to be considered during RCA Five-Year Reviews conducted under the Navy's Range Sustainability Environmental Program Assessment program and during Operational Range Assessments conducted by ORNG.

3.3.3.4.3 Proposed Mitigation Measures

No mitigation measures are warranted for water quality based on the analysis presented in Section 3.3.3 (Environmental Consequences), implementation of current MPs, and implementation of proposed MPs.

3.3.3.5 Summary of Effects and Conclusions

Table 3.3-2 lists each stressor analyzed for potential impacts on water resources at NWSTF Boardman. None of the alternatives would result in significant impacts on water quality.

Table 3.3-2: Summary of Impacts on Water Quality

Stressor	Summary of Effects and National Environmental Policy Act Impact Determination
No Action Alternative	
Potential Release of Soil or Water Contaminants	
Incidental Spills	The potential for incidental spills is low based on the small quality of petroleum, oil, and lubricants used in the administrative area.
Non-explosive Practice Munitions	Negligible. Potential contaminants would not migrate to groundwater.
Domestic Wastewater Treatment and Disposal	Negligible. Current septic system loading is low.
Other Stressors	
Groundwater Withdrawal	Negligible. Current groundwater needs are low.
Impact Conclusion	The No Action Alternative would not result in significant impacts on water quality.
Alternative 1	
Potential Release of Soil or Water Contaminants	
Incidental Spills	Negligible. Small fuel spills during refueling and minor equipment leaks may occur, but spill prevention, control, and countermeasures would minimize risk. Rapid response would ensure that contaminants do not reach groundwater.
Non-explosive Practice Munitions	Negligible. Potential contaminants would not migrate to groundwater.
Domestic Wastewater Treatment and Disposal	Negligible. The onsite treatment system would be permitted by the Oregon Department of Environmental Quality and would be designed and built in accordance with Oregon Onsite Wastewater Treatment System Rules (Oregon Administrative Rules Chapter 340, Divisions 071 and 073). The Rules do not allow installation or use of a system that is likely to pollute public waters or create a public health hazard.
Other Stressors	
Groundwater Withdrawal	Negligible based on limited water needs and withdrawal. It is likely that groundwater from the proposed well would not meet National Primary Drinking Water Regulations for nitrate-nitrogen. Therefore, an alternate potable water source would be used (e.g., delivered by tank truck).
Impact Conclusion	Alternative 1 would not result in significant impacts on water quality.

Table 3.3-2: Summary of Impacts on Water Quality (continued)

Stressor	Summary of Effects and National Environmental Policy Act Impact Determination
Alternative 2	
Potential Release of Soil or Water Contaminants	
Incidental Spills	Negligible. Small fuel spills during refueling and minor equipment leaks may occur, but spill prevention, control, and countermeasures would minimize risk. Rapid response would ensure that contaminants do not reach groundwater. Risk of spills would be lower than Alternative 1.
Non-explosive Practice Munitions	Negligible. Potential contaminants would not migrate to groundwater. Fewer projectiles would be expended compared to Alternative 1.
Domestic Wastewater Treatment and Disposal	Negligible. The onsite treatment system would be permitted by the Oregon Department of Environmental Quality and would be designed and built in accordance with Oregon Onsite Wastewater Treatment System Rules (Oregon Administrative Rules Chapter 340, Divisions 071 and 073). The Rules do not allow installation or use of a system that is likely to pollute public waters or create a public health hazard.
Other Stressors	
Groundwater Withdrawal	Negligible based on limited water needs and withdrawal. It is likely that groundwater from the proposed well would not meet National Primary Drinking Water Regulations for nitrate-nitrogen. Therefore, an alternate potable water source would be used (e.g., delivered by tank truck).
Impact Conclusion	Alternative 2 would not result in significant impacts on water quality.

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