

Finding of No Significant Impact
for the
Construction and Operation of a Multipurpose Machine Gun Range
at
Joint Base Lewis-McChord Yakima Training Center, Washington

Joint Base Lewis-McChord (JBLM) Yakima Training Center (YTC) has prepared an Environmental Assessment (EA) of the potential environmental and socioeconomic impacts associated with the construction and operation of a Multipurpose Machine Gun (MPMG) range at JBLM YTC, Washington. The EA analyzes the potential impacts associated with construction and operation of the range.

Purpose and Need

Soldiers must enter real-life engagements with the best possible assurance of success and survival. The U.S. Army requires Soldiers to be proficient in individual live-fire marksmanship skills with their assigned weapon systems in order for them to conduct operations efficiently in wartime and to be prepared for future global combat operations.

Currently, JBLM YTC does not have a modern machine gun range that adequately supports the need for Soldiers to successfully complete familiarization and qualification testing. The existing machine gun range lacks an observation tower, general instruction building, latrine, and electrical and communications service and provides a low standard of training. Also, the existing machine gun range is improperly configured and results in much longer training periods for Soldiers to obtain required training qualifications. The Standards in Training Commission has established a requirement for each Soldier to qualify with issued weapons twice annually. The Army Range Requirements Model (ARRM), which projects how many ranges (by type) are needed to meet the training requirements of the Soldiers assigned to or regularly training on an installation, indicates that JBLM YTC requires a modern MPMG range to meet designated training requirements.

Proposed Action

The Proposed Action includes the construction and operation of a modern MPMG range designed to train individual Soldiers in basic machine gun live-fire tasks required to sustain combat proficiency. Construction would consist of rebuilding an existing range that was previously used for machine gun and other weapons training on JBLM YTC, and would include demolition of existing range components. Existing range components that would be demolished include 41 stationary armor targets, 2 firing positions, 2 range signs, 1 moving armor target, 3 areas of range-related materials, and 3 culverts with headwalls. Existing berms at targets to be demolished would be graded to match the surrounding topography. Approximately 1 mile of existing service roads would be abandoned. The area of the existing weapons range would be included within the new range to minimize the area of new disturbance.

The primary features of the proposed MPMG range include 84 stationary infantry targets, 24 moving infantry targets, 20 stationary armor targets, and 10 firing lanes. All targets would be fully automated, and event-specific target scenarios would be computer-driven and scored from the range operations center. The proposed MPMG range would provide immediate performance feedback to Soldiers training at the range.

Supporting range facilities would include one classroom building, one operations/storage building, one ammunition breakdown building, one air-vented vault latrine, one range operations tower, and covered bleachers with an enclosure. Supporting infrastructure would include primary and secondary electric service, data distribution systems, transformers and lighting, surfaced roads, parking, flagpoles, and stormwater drainage. The proposed target and construction areas would encompass approximately 250 acres; however, only approximately 5.5 percent (13.75 acres) of that area would include ground disturbance for construction. The downrange area that would encompass overshoots from live-fire training would cover an additional approximately 6,445 acres and is included in the analysis of potential impacts to biological resources and wildland fire. This area is referred to as a Surface Danger Zone (SDZ).

Facility force protection measures would consist of laminated safety glass, security fencing, and gates. Anti-terrorism/force protection measures would include vehicle barriers, appropriate vehicle parking setbacks, security lighting, and gates.

Alternatives Considered

The Army considered two alternatives: the No Action Alternative and the Preferred Alternative, which is the Proposed Action. An MPMG range would not be constructed under the No Action Alternative. The Preferred Alternative is to construct an MPMG range that meets the purpose and need and meets the requirements of Training Circular (TC) 25-8. Under this alternative, an MPMG range would be constructed and operated on an existing range, Range 5, thereby reducing impacts compared to constructing a range in a previously undisturbed area. The Army also considered other alternatives such as using another range on JBLM YTC and using another Department of Defense range asset; however, these alternatives did not meet the screening criteria. The screening criteria included the following: within existing range and/or SDZ footprint; year-round accessibility; suitable to support all TC 25-8 design requirements; land use constraints do not exist for the site (temporal and/or spatial); within 10,000 feet of power source; and within existing wildland fire containment area.

Environmental Impacts of the Proposed Action

The EA analyzed the potential impacts of the Proposed Action on air quality, noise, soils, water quality, biological resources, wildland fire, cultural resources, infrastructure, land use, geology, topography, environmental justice, protection of children, human health and safety, hazardous materials and solid waste, and transportation. The analysis within the EA concludes that no significant environmental impacts would result from the Proposed Action. The determination of less than significant impacts is based on the following:

- It is expected that construction and operation of the MPMG range would increase soil erosion. However, a Construction Stormwater Pollution Prevention Plan (SWPPP) developed in compliance with State of Washington requirements and construction best management practices (BMPs) as required by a National Pollutant Discharge Elimination System (NPDES) construction permit would reduce impacts from erosion during construction. Use of range restoration programs would reduce the potential for impacts associated with erosion during operation of the MPMG range. These measures would reduce potential erosion impacts to less than significant.
- No significant impacts to threatened and endangered species would occur. No additional impacts above baseline or expected conditions, as stated in the Fort Lewis Army Growth and Force Structure Realignment Final Environmental Impact Statement (GTA FEIS), would be anticipated to the greater sage-grouse, which is a federal candidate species. Measures set forth in the Sage-grouse Management Plan and developed for the GTA FEIS to protect sage-grouse, shrub-steppe habitat, and leks would reduce impacts to the species. Restrictions placed on Sage-grouse Protection Areas (SGPAs) would continue.
- The risk of a wildland fire on the proposed MPMG range would likely be the same as existing Range 5, which the MPMG range would replace. The same gunnery type would be used on the proposed MPMG as currently used on Range 5. The elimination of off-road maneuvers could reduce the potential for wildland fires, but would be negligible due to a potential increase in use of the range. Measures within the JBLM YTC Integrated Wildland Fire Management Program and described in the GTA FEIS are in place and would continue. No additional impacts above baseline or anticipated conditions as stated in the GTA FEIS would be expected.

Mitigation Measures

While no significant impacts would be expected, JBLM YTC will implement measures to mitigate potential impacts and further reduce or prevent adverse environmental effects. Mitigation measures identified in the GTA FEIS Record of Decision will continue to be implemented and will apply to this Proposed Action. Mitigation measures identified in the EA include the following:

- To mitigate potential soil erosion and resulting water quality impacts, a Construction SWPPP would be developed in compliance with State of Washington requirements. A Construction Stormwater General Permit, which satisfies NPDES requirements and requires a SWPPP, will be obtained prior to initiation of

construction. BMPs identified in the *Army Small Arms Training Range Environmental BMPs Manual* (Fabian and Watts, 2005) and the *Prevention of Lead Migration and Erosion from Small Arms Ranges* (USAEC, 1998) guidance documents will be implemented, as appropriate, to prevent impacts to soils and surface waters from lead in munitions. Range restoration programs will be implemented to prevent the establishment and spread of non-native grasses and to stabilize soils once the proposed MPMG range is operational.

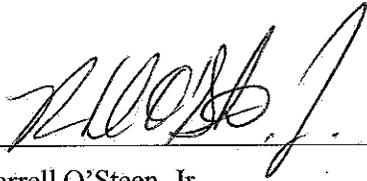
- Where fill would be placed across a drainage path, culverts will be installed to maintain flow paths for stormwater runoff and minimize the potential for soil erosion.
- All proposed roads will be constructed with a hardened surface to limit erosion and rutting, which can be a problem on unimproved roads during wet periods.
- Lighting on the proposed MPMG range will be directed away from the Range 5 lek to reduce impacts on sage-grouse.
- Elevated structures will include deterrents to limit opportunities for predators, such as raptors, to perch and prey on sage-grouse, and to prevent predators such as ravens from nesting on the structures.
- Mitigation measures from the GTA FEIS to reduce impacts on sage-grouse will be applied to the Proposed Action. Training restrictions for SGPAs will be continued, including temporal land use constraints during sage-grouse protection periods. During the sage-grouse breeding season, February 1 to May 15, all activities will be restricted within the SGPAs between 12:00 a.m. and 9:00 a.m., and weapons firing will be allowed on established ranges only between 9:00 a.m. and 12:00 a.m. Construction and maintenance activities will occur outside of the nesting and brood rearing periods for sage-grouse and migratory birds to the extent practicable. Activities that must occur during the sage-grouse protection period will be reviewed by the JBLM YTC wildlife biologist to ensure that disturbances to sage-grouse are minimized and that habitat protection is maintained to the extent practicable.
- Firebreaks will be constructed or updated as needed to augment the firebreaks provided by range roads. If needed, the Integrated Wildland Fire Management Program will be updated to account for changes in fire suppression measures, such as firebreaks. No additional fire suppression equipment is anticipated as a result of the Proposed Action. The need for additional fire suppression measures and equipment due to increased training and development on JBLM YTC was determined in the GTA FEIS, which would satisfy the needs of the Proposed Action.

Public Comment

During the public comment period held between December 19, 2013 and January 18, 2014 the Army received two comment letters. The comments did not warrant a change in the EA. Comment letters and responses from the Army have been incorporated into the appendix of the EA, which can be found on the Army Joint Base Lewis-McChord website (<http://www.lewis-mcchord.army.mil/publicworks/sites/envir/eia.aspx>).

Conclusion

I have considered the results of the analysis in the EA, the comments received during the public comment period, the GTA FEIS determination of the current baseline conditions, and associated cumulative effects. Based on these factors, I have decided to proceed with the Proposed Action, construction and operation of an MPMG range on JBLM YTC. Implementation of the Proposed Action, along with specified mitigation measures, would not result in an increase of impacts above the current conditions; therefore, no significant impacts to the quality of the human or natural environment are expected under this action. This analysis fulfills requirements of the National Environmental Policy Act of 1969 as implemented by the Council on Environmental Quality regulations (40 CFR Parts 1500-1508), as well as the requirements of the Environmental Analysis of Army Action (32 CFR Part 651). Therefore, the issuance of a Finding of No Significant Impact (FNSI) is warranted and an Environmental Impact Statement is not necessary.



R. Darrell O'Steen, Jr.
Lieutenant Colonel, U.S. Army
Commanding
Joint Base Lewis-McChord Yakima Training Center

24 MAR 14

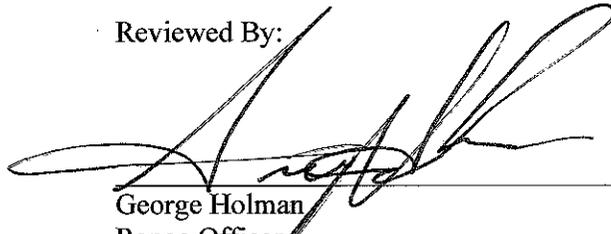
Date

FINAL ENVIRONMENTAL ASSESSMENT
MULTIPURPOSE MACHINE GUN RANGE
JOINT BASE LEWIS-McCHORD
YAKIMA TRAINING CENTER

March 24, 2014

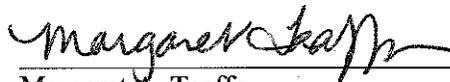
**MULTIPURPOSE MACHINE GUN RANGE
AT
JOINT BASE LEWIS-McCHORD YAKIMA TRAINING CENTER
ENVIRONMENTAL ASSESSMENT**

Reviewed By:



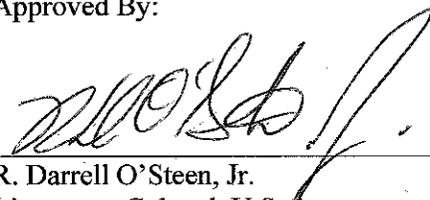
George Holman
Range Officer
Joint Base Lewis-McChord Yakima Training Center

Reviewed and Submitted By:



Margaret A. Taaffe
Chief, Environmental Division
Joint Base Lewis-McChord Yakima Training Center

Approved By:



R. Darrell O'Steen, Jr.
Lieutenant Colonel, U.S. Army
Commanding
Joint Base Lewis-McChord Yakima Training Center

Contents

Section	Page
1.0 Purpose and Need for the Proposed Action.....	3
1.1 Introduction.....	3
1.2 Background.....	3
1.3 Purpose of the Proposed Action.....	3
1.4 Need for the Proposed Action.....	3
1.5 Scope of the Environmental Analysis and Decision to be Made.....	5
2.0 Description of the Proposed Action and Alternatives	7
2.1 Description of the Proposed Action.....	7
2.2 Criteria for Evaluating Alternative Sites.....	7
2.3 Alternatives Considered, but Not Carried Forward for Further Analysis.....	10
2.3.1 Use of Another Range on JBLM YTC.....	10
2.3.2 Use of Another Department of Defense Range Asset.....	10
2.4 Description of Alternatives Carried Forward for Analysis.....	10
2.4.1 Alternative 1 – No Action Alternative.....	10
2.4.2 Alternative 2 – Preferred Alternative.....	10
3.0 Existing Environmental Conditions (Affected Environment)	11
3.1 Air Quality.....	11
3.2 Noise.....	11
3.3 Soils.....	12
3.4 Water Quality.....	13
3.5 Biological Resources.....	15
3.5.1 Threatened and Endangered Species.....	16
3.6 Wildland Fire.....	22
3.7 Cultural Resources.....	23
3.8 Infrastructure.....	24
4.0 Environmental Consequences	27
4.1 Air Quality.....	27
4.1.1 No Action Alternative.....	28
4.2 Noise.....	28
4.2.1 No Action Alternative.....	28
4.3 Soils.....	28
4.3.1 No Action Alternative.....	29
4.4 Water Quality.....	29
4.4.1 No Action Alternative.....	30
4.5 Biological Resources.....	30
4.5.1 No Action Alternative.....	35
4.6 Wildland Fire.....	36
4.6.1 No Action Alternative.....	36
4.7 Cultural Resources.....	36
4.7.1 No Action Alternative.....	37
4.8 Infrastructure.....	37
4.8.1 No Action Alternative.....	37
5.0 Cumulative Effects and Conclusions	39
5.1 Actions Considered in the Cumulative Effects Analysis.....	39
5.2 Soils.....	40
5.3 Biological Resources.....	41
5.4 Wildland Fire.....	41
5.5 Air Quality.....	41

5.6	Noise	42
5.7	Water Quality	42
6.0	Conclusion	43
6.1	Mitigation	43
7.0	List of Acronyms and Abbreviations	45
8.0	List of Preparers and Distribution List	47
8.1	List of Preparers	47
8.2	Distribution List	47
9.0	References	49

Tables

1	Screening Criteria	10
2	Noise Compatibility Zones	12
3	Wildlife and Plants of Concern with Potential to be Impacted by the Proposed Action	16

Figures

1	Joint Base Lewis-McChord Yakima Training Center	4
2	Proposed MPMG Range and SDZ	8
3	MPMG Range Layout	9
4	Environmental Constraints	14

Appendix

- A Rare Plant Survey Report
- B Comments and Responses

1.0 PURPOSE AND NEED FOR THE PROPOSED ACTION

1.1 INTRODUCTION

The U.S. Army is proposing to construct and operate a Multipurpose Machine Gun (MPMG) range at Joint Base Lewis-McChord (JBLM) Yakima Training Center (YTC), Washington. Construction would consist of rebuilding an existing range previously used for machine gun and other weapons training on JBLM YTC and would include minimal demolition of existing range components. The proposed MPMG range would provide facilities that meet Army training requirements (Training Circular [TC] 25-8-1 and TC 25-8) for training and qualification on light and heavy machine guns (up to 0.50 caliber) for active and reserve units.

1.2 BACKGROUND

JBLM YTC is a training center in central Washington northeast of the City of Yakima and along the western bank of the Columbia River in Yakima and Kittitas Counties (Figure 1). JBLM YTC encompasses approximately 327,242 acres dominated by shrub-steppe vegetation and a series of minor valleys and ridges. Primary land use is military training consisting of live-fire, maneuver, and bivouac activities. Other prominent features include permanent impact areas, drop zones, live-fire ranges, tactical air strip, and village sites. Weapons training by ground and aerial units are supported by the range facilities at JBLM YTC, and includes both direct (e.g., line of sight) and indirect (e.g., artillery) live-fire activities. The main units that train at JBLM YTC include active Army units stationed at JBLM and JBLM YTC, the Washington Army National Guard 81st Heavy Brigade Combat Team, and the Oregon Army National Guard 41st Infantry Brigade Combat Team. Other branches and entities that train at JBLM YTC include Special Operations Command, Marine Corps, Air Force, Navy, Coast Guard, local and federal law enforcement agencies, and military forces from Canada, Japan, and other allied nations.

1.3 PURPOSE OF THE PROPOSED ACTION

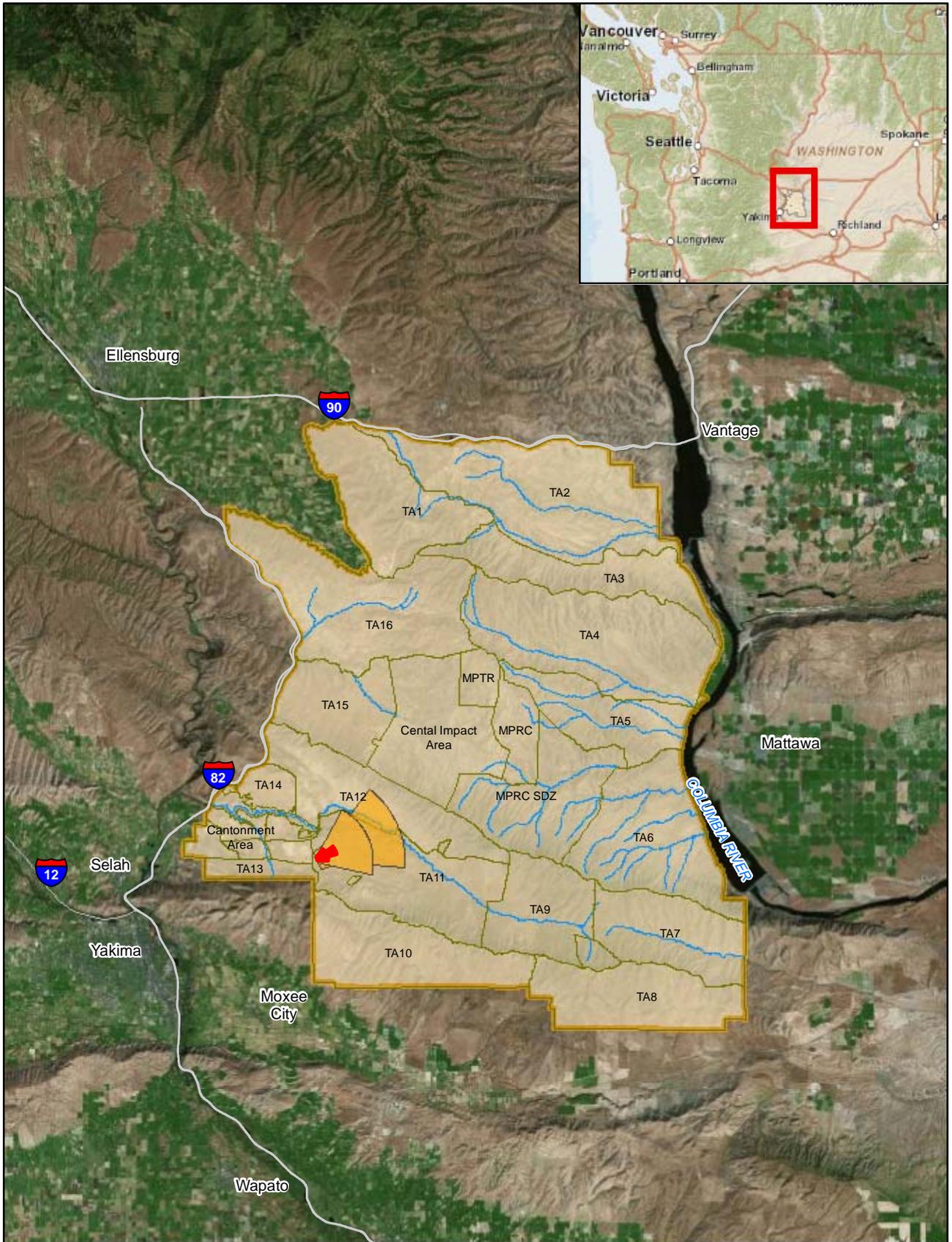
The purpose of the Proposed Action is to provide year-round, comprehensive, and realistic training and range facilities to support recurring training requirements for units that train at JBLM YTC to meet basic marksmanship skills. The MPMG range would be used by Soldiers assigned to units that train at JBLM YTC.

The MPMG range would be used to train and test individual Soldiers on the skills necessary to identify, engage, and defeat targets. Weapons that would be used on the proposed MPMG range include the M249 squad automatic weapon, the M240 machine gun, and the M2 machine gun. Training on the MPMG range would satisfy the Army training and qualification requirements for light and heavy machine guns.

1.4 NEED FOR THE PROPOSED ACTION

Soldiers must enter real-life engagements with the best possible assurance of success and survival. The U.S. Army requires Soldiers to be proficient in individual live-fire marksmanship skills with their assigned weapon systems in order for them to conduct operations efficiently in wartime and to be prepared for future global combat operations.

Currently, JBLM YTC does not have a modern machine gun range that adequately supports the need for soldiers to successfully complete familiarization and qualification testing. The existing machine gun range lacks an observation tower, general instruction building, latrine, and electrical and communications service, and the existing range provides a low standard of training. The existing machine gun range is not configured properly for optimal training and results in much longer training periods for Soldiers to obtain required training qualifications. The Standards in Training Commission has established a requirement for each Soldier to qualify with issued weapons twice annually. The Army Range Requirements Model (ARRM), which projects how many ranges (by type) are needed to meet the training requirements of the



LEGEND

- MPMG Range Footprint
- Creeks
- MPMG Range SDZ
- Training Area (TA) Boundaries
- Yakima Training Center Boundary

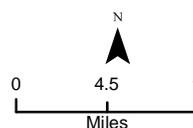


FIGURE 1
Joint Base Lewis-McChord
Yakima Training Center
MPMG Range EA

Soldiers assigned to or regularly training on an installation, indicates that JBLM YTC requires a modern MPMG range to meet designated training requirements.

1.5 SCOPE OF THE ENVIRONMENTAL ANALYSIS AND DECISION TO BE MADE

Construction and operation of the proposed MPMG range was analyzed programmatically in the *Fort Lewis Army Growth and Force Structure Realignment Final Environmental Impact Statement* (GTA FEIS) (JBLM, 2010). However, specific locations of range features were not designated at the time of that analysis. The GTA FEIS identified significant impacts associated with an increase in training and construction on JBLM and JBLM YTC due to a potential increase of up to 5,700 Soldiers. This Environmental Assessment (EA) tiers from the GTA FEIS programmatic analysis of the proposed MPMG range and provides greater site-specific detail, including a detailed analysis of potential impacts.

This EA was prepared in accordance with the National Environmental Policy Act (NEPA) of 1969 [42 United States Code [USC] 4321 et seq.], Council on Environmental Quality (CEQ) Regulations 40 Code of Federal Regulations (CFR) Part 1500 through 1508, and 32 CFR Part 651 (Environmental Analysis of Army Actions). The purpose of this EA is to describe current environmental resources at and adjacent to the location of the proposed MPMG range and to inform decision-makers and the public of the potential environmental consequences of construction and operation, as well as presenting the rationale used for identifying and evaluating impacts. Design measures to reduce the potential for impacts are identified and described where warranted.

This EA identifies, documents, and evaluates potential environmental and socioeconomic effects of the Proposed Action and seeks to ensure that appropriate consideration is given to environmental resources. It includes a thorough evaluation of direct, indirect, and cumulative impacts, both temporary and permanent, that could occur as a result of implementing the Proposed Action. Reasonably foreseeable future actions are identified in Section 5.

This EA also considers the potential impacts of the No Action Alternative, as required by NEPA. The No Action Alternative provides a benchmark against which the potential impacts of the Proposed Action and the alternatives can be compared.

The focus of the EA is to analyze the Proposed Action and alternatives in light of existing conditions and identify relevant beneficial and adverse effects associated with the action and alternatives. The following resource areas were identified and analyzed:

- Air Quality
- Noise
- Soils
- Water Quality
- Biological Resources
- Wildland Fire
- Cultural Resources
- Infrastructure

The following resource areas would not be affected by the Proposed Action and were eliminated from further analysis.

LAND USE: The proposed site is on an existing training range and there would be no changes from designated land uses under the Proposed Action or No Action Alternative. Weapons used for training on the proposed MPMG range would be the same as currently used on the existing range.

GEOLOGY/TOPOGRAPHY: There would be no substantive impacts to geological resources or topography as a result of the Proposed Action or No Action Alternative. The proposed MPMG range would retain natural features to the maximum extent practicable to maintain a realistic effect for training purposes.

Grading and fill associated with the Proposed Action would result in minor topographical changes at target locations, the firing line, emplacements, roads, and facilities, but would not result in any substantial changes in topography at the proposed site.

ENVIRONMENTAL JUSTICE AND PROTECTION OF CHILDREN: On February 11, 1994, President Clinton issued Executive Order (EO) 12898, “Federal Actions to Address Environmental Justice in Minority and Low-Income Populations.” The EO is designed to focus the attention of federal agencies on the human health and environmental conditions in minority and low-income communities. Environmental justice analyses are performed to identify potential disproportionately high and adverse impacts from proposed actions and identify alternatives that might mitigate the impacts. In addition, EO 13045 seeks to protect children from disproportionate adverse environmental health or safety risks that might arise as a result of federal policies, programs, activities, and standards. The Proposed Action consists of construction and operation activities at an existing training range within the boundaries of JBLM YTC. Public access to JBLM YTC is restricted. There would be no direct or indirect impacts to minorities, low-income populations, or children as a result of the Proposed Action or No Action Alternative.

HUMAN HEALTH AND SAFETY: All activities associated with the Proposed Action would be confined within the boundary of JBLM YTC, which is an access-controlled installation. Access to ranges is managed through Range Operations to control access down-range during weapons firing. Soldiers are trained on how to coordinate with Range Operations to avoid conflicts and potential safety issues, and how to use weapons properly on live-fire ranges. Prior to demolition, structures would be surveyed by a certified asbestos inspector. Should asbestos-containing materials be identified, a Notice of Demolition/Renovation would be issued. Construction workers would adhere to Occupational Safety and Health Administration (OSHA) requirements. There would be negligible impacts to human health under the Proposed Action and No Action Alternative.

HAZARDOUS MATERIALS AND SOLID WASTE: Impacts from hazardous materials and solid waste from construction and operation of the proposed MPMG range would be consistent with historic use of the existing range the proposed MPMG would overlay. Disposal of materials from construction and operation activities would occur at permitted facilities. Installation guidelines and procedures would regulate the procurement and inventory of hazardous materials. Non-hazardous, hazardous, and Toxic Substances Control Act (TSCA) wastes would be managed by the JBLM YTC One Stop Yard according to installation requirements, including federal and state laws and regulations. Waste generation and collection during operation of the MPMG range would remain consistent with current operational activities at the existing range.

TRANSPORTATION: Transportation would not be affected as a result of the Proposed Action or No Action Alternative. The proposed site is at an existing range within JBLM YTC and there would be no change in transportation routes or traffic capacities as a result of the action or alternatives. There would be negligible increases in traffic during construction; however, any impacts associated with increased traffic would be short-term and would not result in substantial traffic delays.

2.0 DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES

2.1 DESCRIPTION OF THE PROPOSED ACTION

The Proposed Action includes the construction and operation of a modern MPMG range designed to train individual Soldiers in basic machine gun live-fire tasks required to sustain combat proficiency (Figure 2). Construction would consist of demolition of existing range components and rebuilding an existing range that has been used for machine gun and other weapons training on JBLM YTC. Existing range components that would be demolished include 41 stationary armor targets, 2 firing positions, 2 range signs, 1 moving armor target, 3 areas of range-related materials, and 3 culverts with headwalls. Existing berms at targets to be demolished would be graded to match the surrounding topography. Approximately 1 mile of existing service roads would be abandoned. The area of the existing weapons range would be included within the new range to minimize the area of new disturbance.

The primary features of the proposed MPMG range include 84 stationary infantry targets, 24 moving infantry targets, 20 stationary armor targets, and 10 firing lanes. All targets would be fully automated, and event-specific target scenarios would be computer driven and scored from the range operations center. The proposed MPMG range would provide immediate performance feedback to Soldiers training at the range.

Supporting range facilities would include one classroom building, one operations/storage building, one ammunition breakdown building, one air-vented vault latrine, one range operations tower, and covered bleachers with an enclosure (Figure 3). Supporting infrastructure would include primary and secondary electric service, data distribution systems, transformers and lighting, surfaced roads, parking, flagpoles, and stormwater drainage. The proposed target and construction areas would encompass approximately 250 acres; however, only approximately 5.5 percent of that area (13.75 acres) would include ground disturbance for construction. The downrange area that would encompass overshoots from live-fire training covers an additional approximately 6,445 acres and is included in the analysis of potential impacts to biological resources and wildland fire. This area is referred to as a Surface Danger Zone (SDZ), as shown on Figure 2.

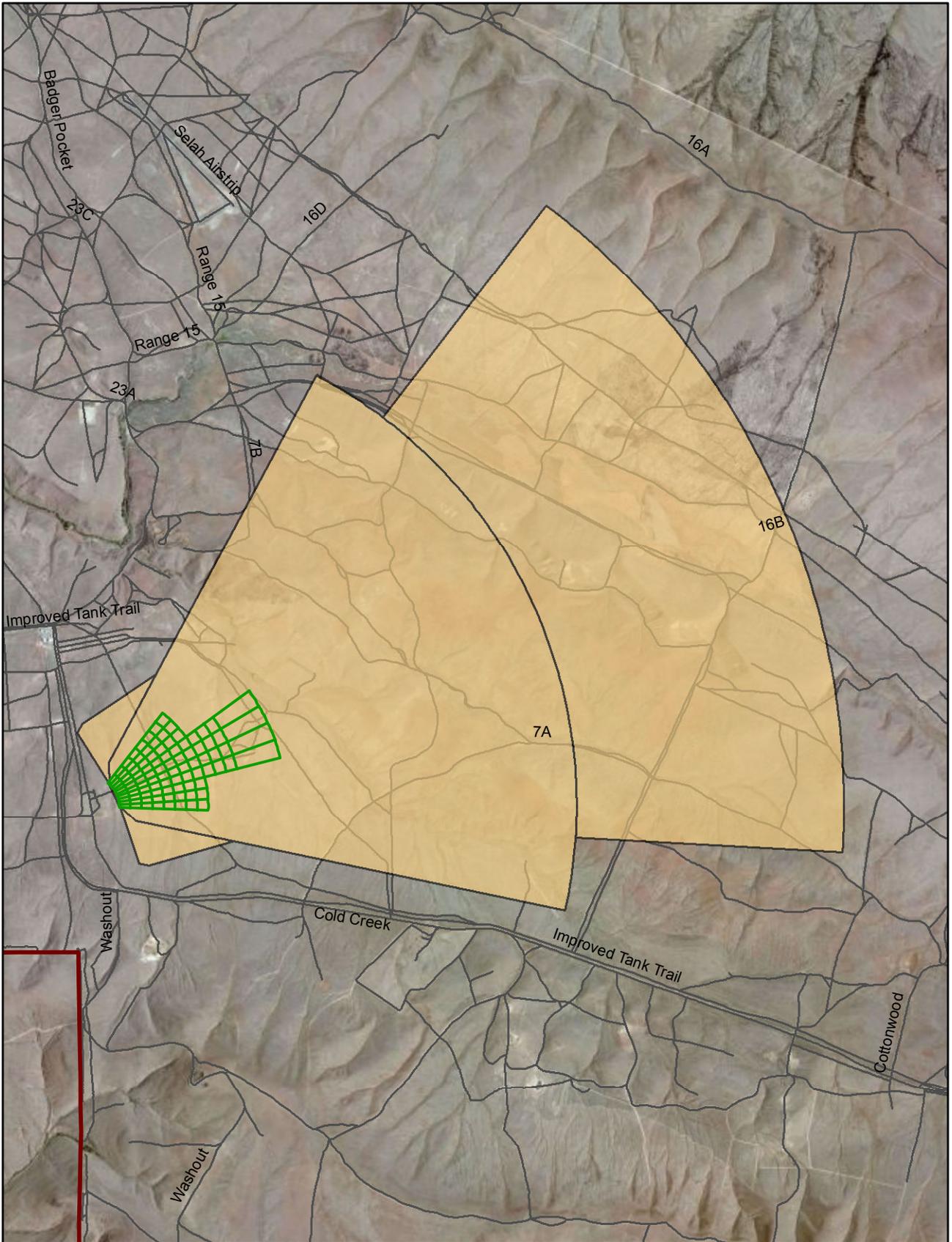
Facility force protection measures would consist of laminated safety glass, security fencing, and gates. Anti-terrorism/force protection measures would include vehicle barriers, appropriate vehicle parking setbacks, security lighting, and gates.

Once operational, the range would be maintained through routine maintenance activities, as done on Range 5. In addition, maintenance activities would also involve revegetation of areas impacted by fires.

2.2 CRITERIA FOR EVALUATING ALTERNATIVE SITES

Preliminary alternatives were compared against a list of screening criteria during the Initial Scope of Work Planning Package (JBLM YTC, 2012a) to identify the preferred alternative and eliminate those that did not reasonably meet the purpose of and need for the Proposed Action. The alternatives were compared against the screening criteria listed in Table 1.

The results of the screening criteria evaluation are also shown in Table 1. The color green indicates that the alternative meets the screening criteria requirement, while yellow indicates that the alternative meets the requirement, but with constraints. In this case, all of the alternative sites had land use constraints due to being within sage-grouse protection areas that would require temporal and spatial restrictions on training activities. The color red indicates that the alternative did not meet the screening criterion. Range 10 was dismissed from consideration because it was not within 10,000 feet of a power source, while Range 1487A was dismissed because it was not within an existing range and/or SDZ footprint.



LEGEND

- MPMG Range Footprint
- Roads
- MPMG Range SDZ
- Yakima Training Center Boundary

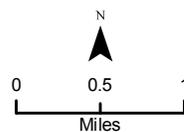
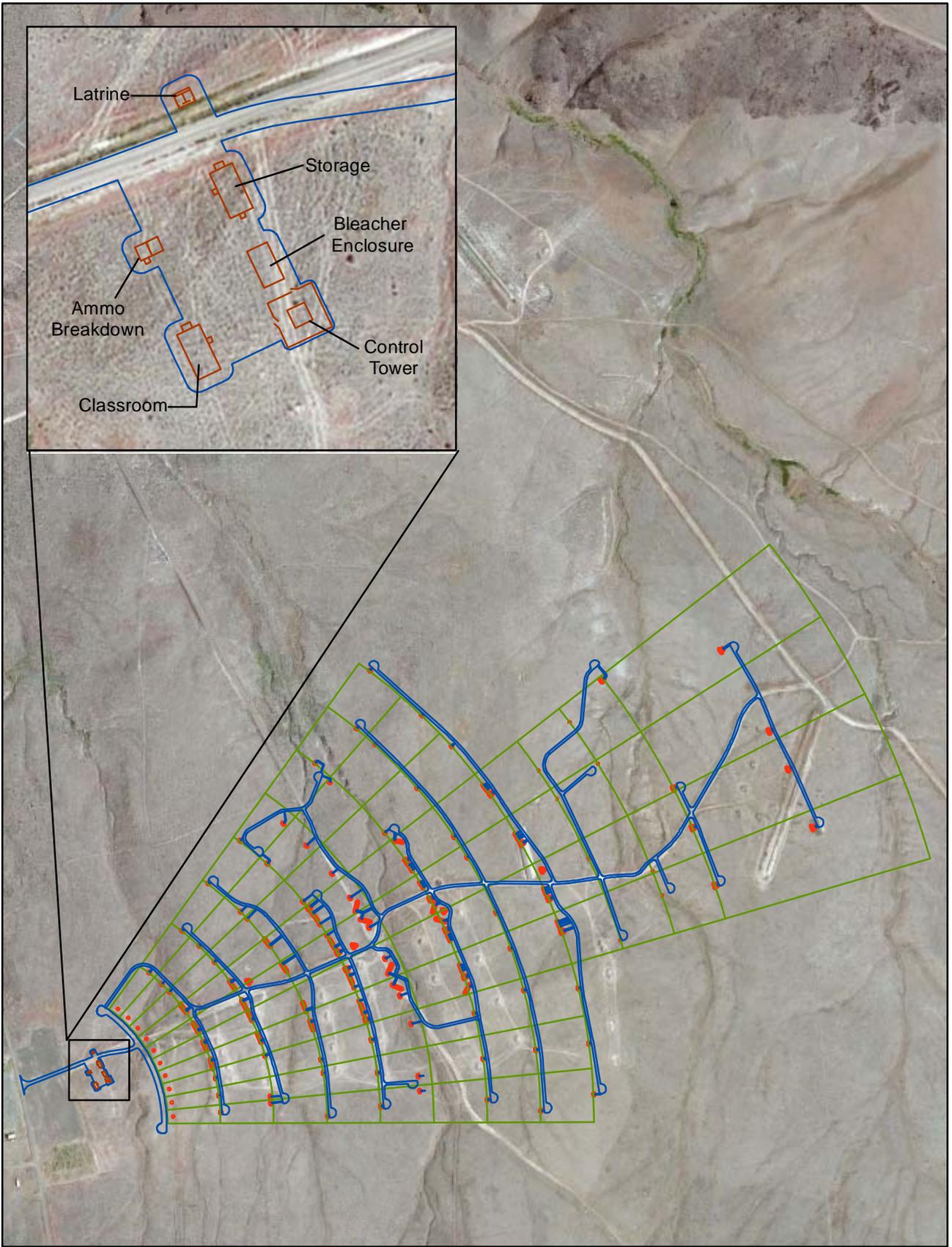


FIGURE 2
Proposed MPMG Range and SDZ
MPMG Range EA



Legend

- Proposed Targets
- Proposed Aggregate Areas and Range Roads

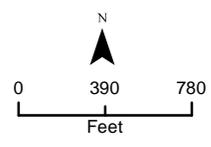


FIGURE 3
MPMG Range Layout
MPMG Range EA

TABLE 1
 Screening Criteria
Construction and Operation of an MPMG Range EA, Yakima Training Center, WA

Screening Criteria	Alternative Sites		
	Range 5	Range 10	Range 1487A
Within Existing Range and/or SDZ Footprint.			
Year-Round Accessibility.			
Site is Suitable to Support All TC 25-8 Design Requirements.			
Land Use Constraints do not Exist for the Site (Temporal and/or Spatial).			
Within 10,000 Feet of Power Source.			
Within Existing Wildland Fire Containment Area.			

Color Green=Meets Screening Requirements; Yellow=Meets Screening Requirements, though with Constraints; Red=Does Not Meet Screening Requirements

2.3 ALTERNATIVES CONSIDERED, BUT NOT CARRIED FORWARD FOR FURTHER ANALYSIS

2.3.1 Use of Another Range on JBLM YTC

Use of another range on JBLM YTC was eliminated from consideration because JBLM YTC does not have a modern machine gun range to conduct marksmanship training and testing required of each Soldier. Other live-fire ranges on JBLM YTC are used for other training activities, are scheduled for other uses within the JBLM YTC Range Complex Master Plan (RCMP), are of low quality, and/or do not have an SDZ that meets the requirements for machine guns.

2.3.2 Use of Another Department of Defense Range Asset

The use of another Department of Defense (DOD) range asset was eliminated from consideration because there is not another range at JBLM, JBLM YTC, or any other nearby military installation that could accommodate machine gun training to the required TC 25-8 standard. In addition, using a machine gun range at another installation would present logistical and scheduling constraints, as well as increased costs associated with travel.

2.4 DESCRIPTION OF ALTERNATIVES CARRIED FORWARD FOR ANALYSIS

2.4.1 Alternative 1 – No Action Alternative

Under the No Action Alternative, JBLM YTC would not construct an MPMG range and associated facilities. There are no adequate, modern machine gun marksmanship ranges on JBLM YTC, so Soldiers who train on the installation would not be trained to Army standards. The ranges that do exist on the installation for machine gun marksmanship training cannot accommodate the annual marksmanship throughput needed to test Soldiers in their live-fire marksmanship skills. Continued use of Range 5 would result in a lower standard of training for Soldiers, ultimately decreasing the assurance of success and survival. The current configuration of Range 5 limits the throughput of Soldiers training on that range, resulting in longer training periods, and lacks immediate feedback on training observations.

2.4.2 Alternative 2 – Preferred Alternative

The preferred alternative is to construct an MPMG range on the footprint of Range 5, an existing weapons range.

3.0 EXISTING ENVIRONMENTAL CONDITIONS (AFFECTED ENVIRONMENT)

3.1 AIR QUALITY

The air quality at JBLM YTC is generally considered good. However, air quality can degrade rapidly when particulate matter (PM) is generated by rangeland fires and fugitive dust associated with maneuver training activities (JBLM, 2010). JBLM YTC is within an attainment area for all National Ambient Air Quality Standards (NAAQS), except for a small area in the Cantonment Area. A maintenance area for PM less than 10 micrometers in size (PM₁₀) originating from off-post covers a small portion of the Cantonment Area. A maintenance area for carbon monoxide (CO) has been established in the city of Yakima, approximately 3 miles southwest of the JBLM YTC boundary.

JBLM YTC is registered with the Yakima Regional Clean Air Agency as a Complex Minor Source. Primary stationary sources of air pollution at JBLM YTC include fuel-burning equipment consisting of generators, heaters/furnaces, and boilers. Other stationary sources of air pollution include painting operations, a wastewater treatment plant, fuel storage, degreasing operations, and vehicle maintenance. Non-stationary sources generally include emissions from vehicles, but could also include smoke generators. Certain smoke generators, such as smoke grenades, artillery shells, and smoke pots, can emit hazardous air pollutants including zinc chloride, phosphoric acid, and hydrogen chloride (JBLM, 2010).

Range 5 is located in an attainment area for all NAAQS.

3.2 NOISE

Noise is defined as unwanted or annoying sound that interferes with or disrupts normal human activities. Although exposure to very high noise levels can cause hearing loss, the principal human response to noise is annoyance. The response of different individuals to similar noise events is diverse and is influenced by the type of noise, the perceived importance of the noise, its appropriateness in the setting, the time of day, type of activity during which the noise occurs, and the sensitivity of the individual.

Army environmental noise policies are based on land use compatibilities as indicated by objective noise levels. A number of noise measurements are used to assess compatibility, including the following:

- Decibel (dB): A measurement of the sound pressure level.
- dBA (A-weighted sound pressure level): Sound pressure level, in decibels, as measured on a sound level meter using an A-weighting filter network. The A-weighting filter de-emphasizes the very low and very high frequency components of the sound, placing greater emphasis on those frequencies within the sensitive range of the human ear.
- dBC (C-weighted sound pressure level): Sound pressure level, in decibels, as measured on a sound level meter using a C-weighting filter network. The C-weighting filter emphasizes the very low frequency components of the sound.
- ADNL (A-weighted day-night level): Average A-weighted day-night noise level.
- CDNL (C-weighted day-night level): Average C-weighted day-night noise level.

Noise generated by transportation sources (such as vehicles and aircraft) and from continuous sources (such as generators) is assessed using ADNL. Impulsive noise resulting from armor, artillery, and demolition activities is assessed using CDNL. Noise from small arms ranges is assessed using the peak unweighted sound level. Using these measurement scales, noise limits and associated zones are defined as shown in Table 2.

TABLE 2

Noise Compatibility Zones

Construction and Operation of an MPMG Range EA, Yakima Training Center, WA

Noise Zone	Population (% highly annoyed)	Transportation (ADNL)	Impulsive (CDNL)	Small Arms (dB)
I	Less than 15%	Less than 65 dBA	Less than 62 dBC	Less than 87 dB
II	15% - 39%	65-75 dBA	62-70 dBC	87-104 dB
III	More than 39%	More than 75 dBA	More than 70 dBC	More than 104 dB

Source: U.S. Army Regulation 200-1, Chapter 7 Environmental Noise Management Program

Noise-sensitive land uses such as housing, schools, and medical facilities are compatible with the noise environment in Zone I, normally incompatible in Zone II, and incompatible in Zone III.

The predominant noise source on JBLM YTC is military training operations, including military aviation activities, small arms, artillery, large caliber weapons training, demolition activities, and vehicular traffic (JBLM, 2010). Noise produced on the installation has minimal impacts off-post due to the size, topography, and remote location of the installation. Land surrounding JBLM YTC is zoned as undeveloped, agricultural, rural residential, and recreational lands. Due to the mountainous terrain, the area surrounding JBLM YTC is generally uninhabited or sparsely populated (JBLM, 2010). The nearest city, Yakima, is approximately 3 miles southwest of JBLM YTC.

Range 5, the proposed site of the new MPMG range, is within Noise Zones I, II, and III. Range 5 is used for live-fire machine gun training and was used historically for other weapons training, including live-fire tank training. Peak noise at Range 5 likely exceeds 104 dB during training activities. A small portion of the Zone II noise contour in the area of the Range 5 footprint extends outside the JBLM YTC boundary. However, the area is rural and either unpopulated or sparsely populated (JBLM, 2010).

Wildlife in the proposed project area are affected by noise generated from current training activities at Range 5. Species sensitive to noise disturbances likely have been displaced from or avoid Range 5 and the surrounding area. Wildlife species that remain in proximity to Range 5 are likely tolerant of noise disturbances. Range 5 is within a Sage-grouse Protection Area (SGPA) and near the Range 5 lek (a communal breeding ground where aggregations of males display competitively to attract females for mate selection and breeding). The greater sage-grouse (*Centrocercus urophasianus*) and measures to reduce the potential for impacts to this species from noise generated during training activities are discussed in Section 3.5.

3.3 SOILS

The proposed MPMG location consists of soils that are primarily formed in loess, alluvium, and slope alluvium on alluvial fans and terraces. Soils of this type range from shallow to very deep and are well drained. On JBLM YTC, these soils are commonly used as sites for military training and as wildlife habitat.

The soils at the proposed site include three different described associations: Benwy-Selah-Manastash, Vantage-Clerf-Argabak, and Nevo-Fortyday-Drino. In addition to the MPMG range footprint, the SDZ includes two additional soil associations: Marlic-Zen and Camaspach-Whiskeydick. The typical vegetation of the identified soil types primarily consists of grasses and shrubs.

Benwy-Selah-Manastash soils have a silt loam surface layer, are well drained, and exhibit moderate to very great depths to hardpan. Benwy-Selah-Manastash soils have 0 to 30 percent slopes and are found on alluvial fans from elevations of 1,800 to 2,900 feet. Limitations or hazards of this soil association for military use include water erosion in the winter and dustiness in the summer (U.S. Department of Agriculture [USDA], 2006).

Vantage-Clerf-Argabak soils are very shallow to moderately deep and well drained and generally occur on hillslopes, ridgetops, and benches from elevations ranging from 1,800 to 2,900 feet. These soils have a slope of 3 to 45 percent and are derived from basalt and loess parent material. Limitations or hazards of this soil association for military use include excessive wetness in the spring, erosion in the winter, and extreme slopes. Depth to bedrock and rock fragments can also inhibit the ability to construct fences (USDA, 2006).

Nevo-Fortyday-Drino soils are gently sloping, moderately deep, and well drained. Nevo-Fortyday-Drino soil associations are derived from basalt and loess parent material and are found on hillslopes, ridgetops, and benches from elevations of 500 to 2,000 feet. Limitations or hazards of this association for military use include a slope of 3 to 75 percent, excessive wetness in early spring, and erosion in winter. Depth to bedrock and rock fragments can potentially restrict the construction of fences (USDA, 2006).

There are three soil types within the project footprint. Gorst loam soils, which cover 72 percent of the proposed MPMG range footprint, are relatively shallow soils derived from loess that typically occur on alluvial fans. Benwy silt loam, which formed in loess and slope alluvium typically on alluvial fans, hillslopes, toeslopes, and benches, covers 20 percent of the proposed MPMG range footprint. Selah silt loam covers 8 percent of the proposed MPMG range footprint and was formed in loess and alluvium, typically on alluvial fans. These three soil types typically are moderately deep (USDA, 2006).

Camaspatch-Whiskeydick soils and Marlic-Zen soils occur in the SDZ associated with the proposed MPMG range. Both associations are shallow to moderately deep, well drained, and gently sloping to moderately steep. Camaspatch-Whiskeydick soils are derived from basalt and loess parent material and are found on hilltops, ridgetops, and benches in elevations ranging from 2,500 to 4,500 feet. Marlic-Zen soils are derived from basalt and are found on plateaus, ridgetops, hillslopes, and benches at elevations ranging from 1,800 to 2,900 feet (USDA, 2006). Many soils in the SDZ consist of unweathered or partly weathered rock fragments, known as basalt lithosols.

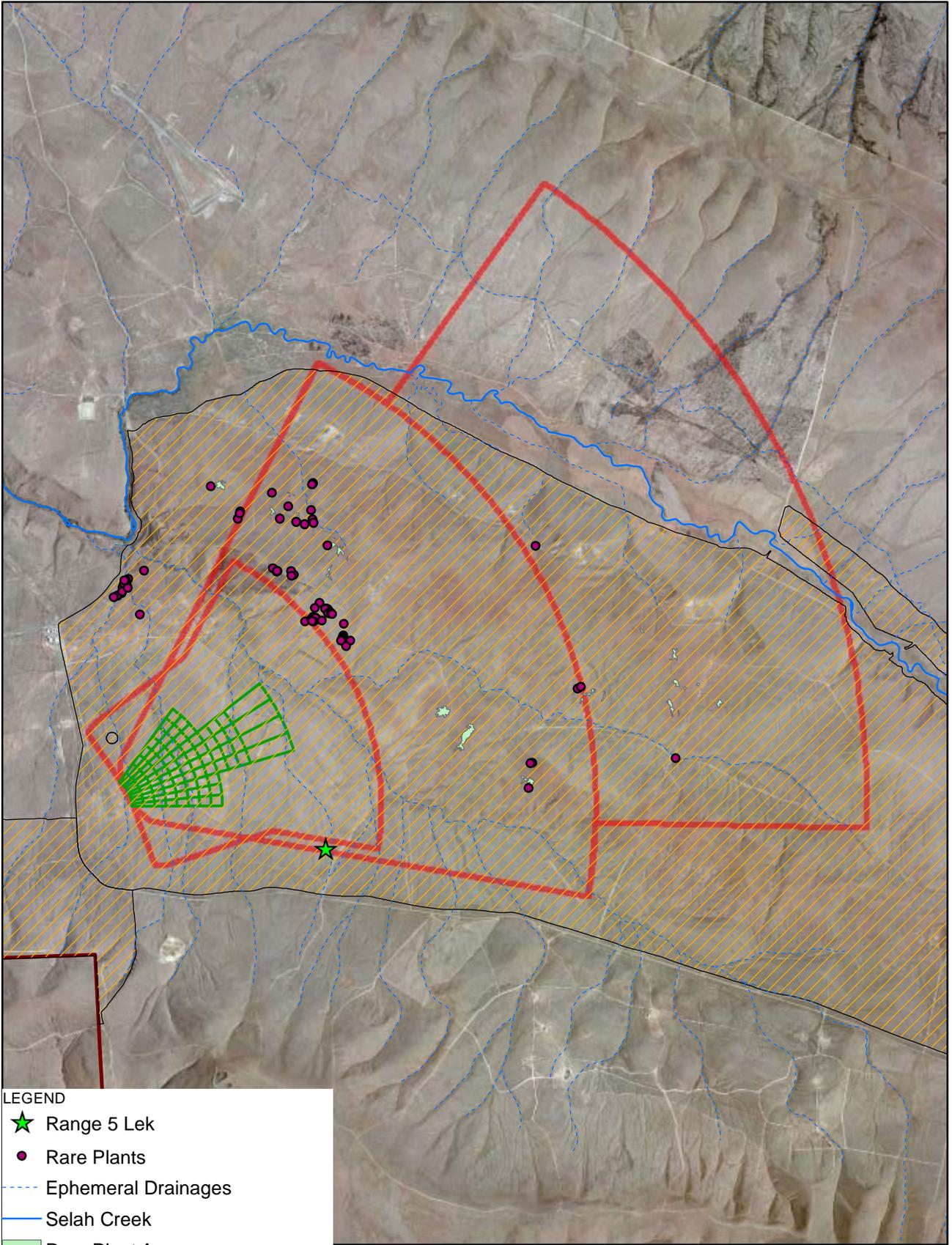
Physical properties, steep slopes, and limited vegetative cover result in a majority of soils at JBLM YTC being highly erodible. Methods used to reduce the impacts caused by soil erosion are discussed in Section 3.4.

3.4 WATER QUALITY

The proposed MPMG location is within the Selah watershed, which drains into the Yakima River. Selah Creek includes reaches that exhibit perennial flow within the boundaries of JBLM YTC, but is intermittent near the project area and downstream of the project area. Selah Creek is considered Class A (excellent) by Washington State surface water quality standards. Other unnamed intermittent or ephemeral drainages in the upper reaches of the Selah Creek watershed occur in the proposed project footprint (JBLM YTC, 2002). Intermittent streams on JBLM YTC may flow for a short time in the spring, while ephemeral streams generally only flow immediately following a large rain or snowmelt event. Selah Creek and ephemeral drainages within the project area are shown on Figure 4.

The main water quality concern at JBLM YTC is the discharge of fine sediment into streams. Sedimentation generally occurs after short-term, high-flow rain or snowmelt events, typically on frozen ground. Sources of erosion include degraded upland areas, improperly designed and located roads, degraded channels, and natural erosion processes. Data indicate that JBLM YTC contributes only a small fraction of the total sediment load in the Yakima River system. The Yakima River is listed on the 303(d) list as impaired by pH, temperature, and pesticides. The main sources of pollution in the Yakima River include irrigated cropland, animal holding areas, and in-place (sediment) contamination; however, JBLM YTC has not been identified as a source of water quality impairment (JBLM, 2010).

JBLM YTC implements a revegetation program to reduce and minimize discharge of sediments to both the Yakima and Columbia Rivers. Components of the program include management and rotation of training areas to allow vegetation to return, active revegetation by planting and seeding, construction of



- LEGEND**
- ★ Range 5 Lek
 - Rare Plants
 - Ephemeral Drainages
 - Selah Creek
 - Rare Plant Areas
 - ▨ Sage Grouse Protection Area
 - MPMG Range Footprint
 - ▭ MPMG Range SDZ
 - ▭ Yakima Training Center Boundary

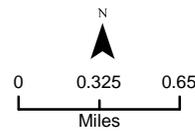


FIGURE 4
Environmental Constraints
 MPMG Range EA

sediment trapping check dams at critical locations, and protection of critical riparian vegetation corridors by restricting use of those areas. The revegetation program on JBLM YTC is consistent with best management practices (BMPs) to comply with the antidegradation policy of the State of Washington (WAC 173-201A-070) for nonpoint sources of pollution, as required by Section 319 of the Clean Water Act. As part of the program, JBLM YTC has improved the road network and structure, closed roads, realigned roads, and improved channel crossings to reduce the potential for erosion (JBLM, 2010). Over 300 miles of existing roadways on JBLM YTC have been resurfaced with crushed rock, approximately 14 miles of deteriorated or poorly located roads were closed, and 390 stream channel crossings were improved with culverts and fords to reduce water quality impacts on surface waters (JBLM YTC, 2002). Other BMPs to reduce erosion include riparian and upland revegetation programs, such as the Integrated Training Area Management program (JBLM, 2010). Range maintenance for erosion control and invasive plant species is conducted by the JBLM YTC Directorate of Public Works (DPW), Environmental Division, Land Management Branch. The Operations and Maintenance section of the DPW conducts maintenance on range roads.

There are no wetlands at or in downstream proximity of the proposed project area (JBLM, 2012a).

3.5 BIOLOGICAL RESOURCES

The approximately 250-acre proposed project area and associated 6,445-acre SDZ are located in a shrub-steppe habitat region, where vegetative communities are characterized by shrub-dominated overstories (often several species of *Artemisia*) coupled with perennial bunchgrass understories (usually dominated by various species of *Festuca*, *Poa*, *Pseudoroegneria*, and/or *Stipa*). European settlement, including agriculture and rangeland development, reduced what was estimated at 10.4 million acres of shrub-steppe vegetation to approximately 4.2 million acres (JBLM YTC, 2002). Additional reductions in shrub-steppe habitat across the region have continued since 2002 as a result of development pressure, wildland fires, and agriculture. Roadways, exotic weeds, and other human-caused disturbances have resulted in fragmentation of much of the remaining habitat and reduced the capacity of eastern Washington to support shrub-steppe-obligate species. Habitat within the project footprint is degraded and of lesser quality due to disturbances associated with the construction and use of Range 5 and previous impacts from recurring fires. Habitat within the SDZ is also degraded from off-road maneuvers and recurring fires. Almost all of the range footprint burned between 1987 and 2010, while approximately half of the SDZ burned during that period. A list of plant species identified in the project footprint and SDZ was compiled during a rare plant survey of the proposed MPMG range and a portion of the associated SDZ, and is included in the survey report (Salstrom and Easterly, 2013; Appendix A).

JBLM YTC provides habitat for approximately 246 wildlife species including 50 mammal, 174 avian, 14 reptile, and 8 amphibian species (JBLM YTC, 2002). Common mammal species in shrub-steppe habitat include deer mouse (*Peromyscus maniculatus*), sagebrush vole (*Lemmyscus curtatus*), Great Basin pocket mouse (*Perognathus parvus*), least chipmunk (*Eutamias minimus*), and northern pocket gopher (*Thomomys talpoides*). Other small to medium sized mammal species that occur in shrub-steppe habitat and that would likely occur in the project area include black-tailed jackrabbit (*Lepus californicus*) and Townsend's ground squirrel (*Spermophilus townsendii*). Common large mammals that typically occur year-round in shrub-steppe vegetation at JBLM YTC include coyote (*Canis latrans*) and mule deer (*Odocoileus hemionus*) (JBLM YTC, 2002).

Four of the 14 reptile species that occur on JBLM YTC typically occur in sagebrush (*Artemisia sp.*) areas and may occur in the shrub-steppe habitat of the proposed project area. These species include the side-blotched lizard (*Uta stansburiana*), sagebrush lizard (*Sceloporus graciosus*), and western fence lizard (*Sceloporus occidentalis*). Other species, such as short-horned lizards (*Phrynosoma douglassii*), gopher snakes (*Pituophis melanoleucus*), and western rattlesnakes (*Crotalus viridis*), occur more evenly throughout the landscape at JBLM YTC and could occur in the proposed project site (JBLM YTC, 2002).

None of the amphibian species documented on JBLM YTC would be expected to occur in the project area because of the lack of suitable habitat.

Birds that inhabit the shrub-steppe habitat year-round include greater sage-grouse, golden eagle (*Aquila chrysaetos*), prairie falcon (*Falco mexicanus*), northern harrier (*Circus cyaneus*), common raven (*Corvus corax*), and rock wren (*Salpinctes obsoletus*). Seasonal residents of this habitat include sage sparrow (*Amphispiza belli*), sage thrasher (*Oreoscoptes montanus*), burrowing owl (*Speotyto cunicularia*), rough-legged hawk (*Buteo lagopus*), Northern shrike (*Lanius excubitor*), bald eagle (*Haliaeetus leucocephalus*), and rosy finch (*Leucosticte arctoa*). The most common migratory species of birds likely to occur within the proposed project area include horned larks (*Eremophila leucophrys*), western meadowlarks (*Sturnella neglecta*), Brewer's sparrows (*Spizella breweri*), vesper sparrows (*Pooecetes gramineus*), and sage thrashers (JBLM YTC, 2002). Bird species of special management interest and documented within the proposed project area include greater sage-grouse, burrowing owls, long-billed curlews (*Numenius americanus*), and short-eared owls (*Asio flammeus*). The bird nesting season on JBLM YTC generally occurs from March 1 through July 15 (JBLM YTC, 2012a). Most raptor species would use the project area only for foraging, due to a lack of suitable nesting sites. However, the project area provides suitable nesting habitat for burrowing owls and northern harriers, which are ground-nesting raptors. Other resident or migrant bird species, such as passerines, could use the project area for nesting, which includes 22 bird species (Potomac-Hudson Engineering, Inc., 2012). Impacts to these species are discussed in Section 4.5.

3.5.1 Threatened and Endangered Species

Federally listed species such as gray wolf (*Canis lupus*), grizzly bear (*Ursus arctos horribilis*), marbled murrelet (*Brachyramphus marmoratus*), and northern spotted owl (*Strix occidentalis caurina*) are not discussed as there is no suitable habitat for these species on or near the project area and they are not documented within the project area.

The North American wolverine (*Gulo luteus*) is proposed for listing; however, there is no habitat for this species within or near the project area. Fisher (*Martes pennant*), Mardon skipper (*Polites mardon*), yellow-billed cuckoo (*Coccyzus americanus*), and whitebark pine (*Pinus albicaulis*) are federal candidate species. These species are not discussed, as there is no suitable habitat within the project area or SDZ and these species are not documented within the project area or SDZ.

Critical habitat for bull trout (*Salvelinus confluentus*) and northern spotted owl is designated within Yakima County. The nearest critical habitat for the bull trout is in the Yakima River, approximately 7 miles to the west of the project area, while the nearest critical habitat for the northern spotted owl is more than 24 miles west of the project area. No other critical habitat has been designated in Yakima County.

Listed species of wildlife and plants of concern with potential to be impacted by the Proposed Action are presented in Table 3.

TABLE 3

Wildlife and Plants of Concern with Potential to be Impacted by the Proposed Action
Construction and Operation of an MPMG Range EA, Yakima Training Center, WA

Common Name	Scientific Name	Status
Bull trout	<i>Salvelinus confluentus</i>	FT, SC
Upper Columbia River Spring Run Chinook Salmon "ecologically significant unit" (ESU)	<i>Oncorhynchus tshawytscha</i>	FE, SC
Upper Columbia River Steelhead Trout ESU	<i>Oncorhynchus mykiss</i>	FE, SC
Middle Columbia River Steelhead Trout ESU	<i>Oncorhynchus mykiss</i>	FT, SC
Bald eagle	<i>Haliaeetus leucocephalus</i>	FSC, SS

TABLE 3

Wildlife and Plants of Concern with Potential to be Impacted by the Proposed Action
Construction and Operation of an MPMG Range EA, Yakima Training Center, WA

Common Name	Scientific Name	Status
Golden eagle	<i>Aquila chrysaetos</i>	SC
Burrowing owl	<i>Athene cunicularia</i>	FSC, SC
Ferruginous hawk	<i>Buteo regalis</i>	FSC, ST
Loggerhead shrike	<i>Lanius ludovicianus</i>	FSC, SC
Greater Sage-grouse, Columbia Basin Distinct Population Segment	<i>Centrocercus urophasianus</i>	FC, ST
Townsend's ground squirrel	<i>Spermophilis townsendii</i>	FSC, SC
Long-eared myotis	<i>Myotis evotis</i>	FSC
Pallid Townsend's big-eared bat	<i>Corynorhinus townsendii pallescens</i>	FSC, SC
Sagebrush lizard	<i>Sceloporus graciosus</i>	FSC, SC
Sharptail snake	<i>Contia tenuis</i>	FSC, SC
Ute ladies' tresses	<i>Spiranthes diluvialis</i>	FT
Umptanum wild buckwheat	<i>Eriogonum codium</i>	FT
Hoover's tauschia	<i>Tauschia hooveri</i>	FSC, ST
Snowball cactus	<i>Pediocactus nigrispinus</i>	SS
Coyote tobacco	<i>Nicotiana attenuata</i>	SS

Federal Status: U.S. Fish and Wildlife Service (USFWS), 2013a

State Status: Washington Department of Fish and Wildlife, 2013a

FT=Federally Threatened, FC=Federal Candidate, FSC=Federal Species of Concern, SC=State Candidate, SS=State Sensitive, ST=State Threatened

Bull Trout

The federally threatened bull trout occurs in the Yakima River approximately 7 miles downstream of Selah Creek, but is not documented in or near the project area. Selah Creek near the proposed MPMG range does not support fish populations because of the intermittent flow regime in this area. Bull trout are cold-water fish that prefer pristine stream and lake habitats in western North America. This species is threatened primarily by habitat degradation and fragmentation, blockage of migratory corridors, poor water quality, the effects of climate change, and past fisheries management practices, including the introduction of non-native salmonids such as brown, lake, and brook trout (USFWS, 2013a).

Upper Columbia River Spring-Run Chinook Salmon ESU

The federally endangered spring spring-run Chinook salmon ESU include naturally occurring populations in all reaches of the Columbia River upstream of Rock Island Dam and downstream of Chief Joseph Dam in Washington, except for the Okanogan River. The portion of the Columbia River adjacent to the eastern boundary of JBLM YTC has been designated as Critical Habitat for this species due to its importance as a migratory corridor. Individuals may spend several days in this area during migration. Upriver migration adjacent to JBLM YTC occurs from late August to mid-September, while downriver migration of smolt typically occurs from mid-April to early June. Spawning areas of this ESU are upstream of JBLM YTC. Habitat requirements for the spring-run Chinook salmon ESU include cool fresh water streams and estuaries. The decline in the species is mainly due to over-harvest, hydropower development, reservoir

construction, logging, mining, and grazing. Increased turbidity affects food production by eliminating habitat for food sources and by limiting photosynthesis, which can affect the growth of food sources (Potomac-Hudson Engineering, Inc., 2012).

Upper Columbia River Steelhead ESU

The federally endangered upper Columbia River steelhead ESU occurs as a migrant in the Columbia River adjacent to the eastern boundary of JBLM YTC and this reach has been designated as Critical Habitat for the species. The migration of smolt to the ocean in the area of JBLM YTC typically occurs from mid-March through mid-May, while adult steelhead pass by JBLM YTC from early June through mid-October (Potomac-Hudson Engineering, Inc., 2012). Habitat for steelhead is similar to that of Chinook salmon, except that steelhead can tolerate higher temperatures. Reasons for decline and issues with turbidity are the same as for Chinook salmon.

Mid Columbia River Steelhead ESU

The federally threatened mid Columbia River steelhead ESU extends from the Klickitat River to the Yakima River, but does not include Snake River. Reaches included within this area where spawning may occur are the Klickitat, Deschutes, John Day, Umatilla, Walla Walla, Yakima, and Columbia rivers and associated tributaries with suitable habitat. Migration for this species is bimodal, which includes an early migration from September through November and a later migration from February through June. Smolt typically migrate to the ocean from early March through mid-June. Critical Habitat for this species includes all tributaries known to support steelhead within the ESU boundary, which includes the Yakima River adjacent to the western boundary of JBLM YTC. The current run size of steelhead in the Yakima River averages approximately 1,000 fish, and was approximately 10,000 fish, historically. The size is depressed due to low spawner escapement. Other causes for decline, not already mentioned, include passage at irrigation diversions, high temperatures/low dissolved oxygen, and a highly altered hydraulic regime, mainly associated with storage reservoirs and irrigation (Potomac-Hudson Engineering, Inc., 2012).

Bald Eagle

Bald eagles were delisted in 2007, but remain protected under the Bald and Golden Eagle Protection Act of 1940 (16 USC 668-668d, 54 Stat. 250) and the Migratory Bird Treaty Act (MBTA) of 1918 (16 USC 703-712; 40 Stat. 755). Bald eagles typically occur on JBLM YTC as winter residents from November until April. Additionally, the species is known to roost at three sites along Hanson Creek and forage along the Columbia River (JBLM YTC, 2002). No bald eagles are documented in the proposed project area. Bald eagles could forage along Selah Creek near the Proposed Action; however, this would be unlikely due to the size and intermittent nature of Selah Creek in this area and because better foraging areas are available along the Yakima River and Columbia River.

Golden Eagle

Golden eagles are also protected under the Bald and Golden Eagle Protection Act of 1940 and the MBTA. This species occurs on JBLM YTC as year-round residents and also as migrants (JBLM YTC, 2002). Golden eagles typically nest along cliffs and exposed rock. No golden eagles are known to nest within the proposed project area due to a lack of suitable nesting habitat, but they have been documented using the proposed project footprint and SDZ for foraging.

Burrowing Owl

Burrowing owls primarily occur in open areas with short vegetation and bare ground in desert, grassland, and shrub-steppe habitats. Burrowing owls are dependent on the burrows created by mammals, such as prairie dogs or badgers, which are used for nesting and roosting (USFWS, 2003). The project area and SDZ contain suitable nesting and foraging habitat for the burrowing owl. Burrowing owls have been documented within the project area (JBLM YTC, 2012a).

Ferruginous Hawk

Ferruginous hawks prefer grassland and shrub-steppe habitat, including pastures, hayland, and cropland. They typically nest in trees and large shrubs or on utility structures and roofs (USFWS, 2013b).

Ferruginous hawks have not been documented nesting on JBLM YTC since 1993, but there have been rare opportunistic sightings during this period (JBLM YTC, 2002). The species could use the project area and SDZ for foraging, but this would be unlikely. The project area and SDZ do not provide suitable nesting habitat for the ferruginous hawk.

Loggerhead Shrike

Loggerhead shrike typically breeds in open areas dominated by grasses and/or forbs, interspersed with shrubs or trees and bare ground. The species forages in short grass habitat (USFWS, 2000). Loggerhead shrikes likely use the project area and SDZ for foraging. Nesting by loggerhead shrikes in the proposed MPMG range footprint or the SDZ is unlikely due to the lack of suitable shrubs or trees.

Greater Sage-grouse

The greater sage-grouse is a large ground-dwelling bird found at elevations from 500 to 4,100 feet on JBLM YTC. Greater sage-grouse are highly dependent on sagebrush for cover and food within shrub-steppe habitat. Greater sage-grouse occupy only approximately 56 percent of their historical range, with the primary causes of the population decline attributed to habitat fragmentation and destruction (USFWS, 2013c). JBLM YTC supports one of two greater sage-grouse populations in Washington. In 2013, 19 leks have been identified and monitored on JBLM YTC. Two leks are near the proposed MPMG range. The Range 5 lek is approximately 1 mile west-southwest of the proposed firing line (existing Range 5 firing line) and within the SDZ boundary, but this lek has not been active since 2006 (Figure 4: Leingang, 2013). The Range 5 lek was known to be active from 1989 to 2006, with male attendance ranging from a high of 33 in 1991 to a low of 2 in 2006. The area around the Range 5 lek continues to be used by sage-grouse during the nesting/brood-rearing and early to mid-fall seasons, as evidenced by visual observations and telemetry locations of radio-marked sage-grouse (Leingang, 2013).

The other lek near the proposed MPMG range, known as Knuckles, is approximately 2 miles from the firing line and within the SDZ. The location of this lek is not shown because it is considered sensitive. The Knuckles lek is active and has been known to be active since 1997, when the lek was first discovered. Male attendance has ranged from a high of 37 in 1999 to a low of 4 in 2012. Five males were counted at the lek in 2013. Male counts from 1997 to 2013 indicate a downward trend in use of the lek. Due to the topography and distance, this lek is not in the line of sight of the Range 5 firing line (proposed MPMG range firing line) and has not been previously impacted by fires.

In June of 2010, sage-grouse were observed within the footprint of the proposed MPMG range, which indicates current active use of early seasonal brood habitat during the sage-grouse protection period from February 1 to June 15. The proposed MPMG range, including Range 5, is within a Sage-grouse Protection Area (SGPA) (JBLM YTC, 2012a). In 2012 and 2013, sage-grouse were observed near the edge of the MPMG range footprint. During this period, telemetry data showed five sage-grouse (three male and two female) within the SDZ. A nest was observed within the SDZ near the eastern edge, approximately 4 miles from the firing line of Range 5 and the proposed MPMG range firing line. Within the SGPAs, most forms of training are permitted but are controlled either spatially or temporally to minimize the potential for impacts (JBLM YTC, 2002).

The SGPA on JBLM YTC was recently increased by 33,100 acres and now encompasses approximately 77,420 acres or 24 percent of the installation. This increase in area resulted from the following: findings from the 2010 sage-grouse status review, continued training-related fire impacts to sage-grouse habitat, new fire management practices developed during the installation's Fire Summit process, and implementation of mitigation measures listed in the GTA FEIS Record of Decision. Prior to the increase in size of the SGPA on JBLM YTC, training-related fires burned approximately 14,570 acres (33 percent) of the original 44,320-acre SGPA. In addition, from 1987 to 2009, approximately 102,200 acres (31

percent of YTC) burned from training-related fires, resulting in significant impacts to sage-grouse habitat (Leingang, 2013).

JBLM YTC monitors its sage-grouse population and leks. In 2012 the sage-grouse population at JBLM YTC was estimated at 146, which is the lowest population estimate since sage-grouse monitoring was initiated and 38 percent less than 2011. Monitoring data from 1989 to 2012 indicate a downward trend in the estimated sage-grouse population size (JBLM YTC, 2012b). The GTA FEIS noted that a further decline in sage-grouse numbers could occur as a result of increased training and construction on JBLM YTC, which was considered a significant impact (JBLM, 2010). A Sage-Grouse Management Plan is implemented to protect sage-grouse and habitat from training activities. The plan includes measures to minimize fire risk and impacts to sage-grouse and shrub-steppe habitat from training activities. As a result of specification in the GTA FEIS Record of Decision and conservation measures specified in the Sage-grouse Management Plan, an increased emphasis on sage-grouse management was implemented that included increasing the size of the SGPA, increasing the amount of sagebrush restoration to address a backlog of fire-related impacts to sage-grouse habitat, and participation in regional management activities to conserve populations and habitat outside of the JBLM YTC boundary. Other measures to protect greater sage-grouse on JBLM YTC include (JBLM, 2010):

- Follow restrictions on training between February 1 and May 15, between 12:00 a.m. and 9:00 a.m. daily, within a 0.6-mile radius of each designated lek and SGPA. During this period, access to ranges is restricted to main supply routes and designated roads to ranges.
- Do not fly aircraft lower than 300 feet above ground level between 12:00 a.m. and 9:00 a.m. during the lek protection period within a 0.6-mile radius of leks.
- Do not bivouac in an SGPA.
- Prohibit digging in the SGPA.
- Restrict access to Ranges 4, 5, 10, 10z, 12, 14, 16, 26, and 55 to main supply routes and designated roads to ranges.

Townsend's Ground Squirrel

Townsend's ground squirrel typically inhabit shrub-steppe, native grasslands, pastures, orchards, vineyards, highway margins, vacant city lots, and the banks of canals (Washington Department of Fish and Wildlife, 2013b). Townsend's ground squirrel is documented on JBLM YTC and could occur within the project area and SDZ.

Long-eared Myotis

Long-eared myotis (*Myotis evotis*) and pallid Townsend's big-eared bat (*Corynorhinus townsendii pallescens*) could occur in the project area and SDZ while foraging, although they are not documented on JBLM YTC (JBLM YTC, 2002). There are no suitable hibernacula or roost sites for these species in the project area or SDZ.

Sagebrush Lizard

Sagebrush lizard occurs in sagebrush habitat and is documented on JBLM YTC (JBLM YTC, 2002). It is likely that this species would occur within the project area and SDZ, although the habitat within the project is degraded.

Sharptail Snake

Sharptail snakes typically prefer moist areas in coniferous forests, deciduous woodlands, chaparral, and grasslands. The species frequently occurs in open grassy areas at the edge of forests, usually under the cover of logs, rocks, fallen branches, or talus (Oregon Department of Fish and Wildlife, 2013). The project area and SDZ do not offer the preferred habitats for this species and it is unlikely that this species would occur within the project area or SDZ.

Surveys for rare and sensitive plants were conducted within the project footprint and a portion of the associated SDZ in 2013 from April 24 to May 1, May 20 to 22, June 13 to 14, and June 27 to July 2 to optimize the potential to observe plants that would grow at different times (Appendix A). The surveys concentrated on areas with habitat known to be preferred by sensitive and rare plants that occur in the region. No sensitive or rare plants were identified within the proposed MPMG range footprint, but Hoover's *tauschia* and snowball cactus were identified within the SDZ (Figure 4). No other rare or sensitive plants were identified during the survey and are not discussed, with the exception of federally listed plant species. The results from the survey are included in Appendix A (Salstrom and Easterly, 2013).

The remainder of the SDZ was surveyed between March 29 and June 15, 2012, also concentrating on potentially suitable habitats for known rare plants. Rare and sensitive plants identified during the survey included snowball cactus, Hoover's *tauschia*, and shy *gilia* (*Gilia inconspicua*). Shy *gilia* is not federally or State listed, but is of potential concern to the State and needs more field work to assign a different ranking. Coyote tobacco (*Nicotiana attenuata*), a State sensitive species, was previously known to occur in the SDZ, but was not identified again during the survey (Salstrom and Easterly, 2012).

Ute Ladies' Tresses

Ute ladies' tresses is a perennial orchid that typically occurs on alkaline flats and on stabilized gravel bars adjacent to the Columbia River. This species typically occurs in areas that are periodically inundated at elevations ranging from 720 to 1,500 feet. Ute ladies' tresses is not documented on JBLM YTC; however, the riparian area along Selah Creek may provide suitable habitat for the Ute ladies' tresses (JBLM YTC, 2012c). This species was not identified during surveys of the project footprint and SDZ (Salstrom and Easterly, 2013; Appendix A).

Umptanum Wild Buckwheat

Umptanum wild buckwheat is a low, mat-forming perennial that grows on relatively flat terrain overlooking the Columbia River from Umptanum Ridge. This species is not documented on JBLM YTC; however, populations of this species have been previously impacted by fire originating from JBLM YTC. The only known population is in Benton County on Umptanum Ridge approximately 24 miles east of the proposed MPMG range. Potential habitat for the species may be present on JBLM YTC, including habitat within the SDZ of the proposed MPMG range (JBLM YTC, 2012c). This species was not identified during surveys of the project footprint and SDZ (Salstrom and Easterly, 2013; Appendix A).

Hoover's Tauschia

Hoover's *tauschia* is a low-growing perennial typically found on basalt lithosols within shrub-steppe habitats. This species typically occurs in flat areas with bare rocks and gravel with very little soil that are well drained and at an elevation of 1,400 to 3,000 feet (JBLM YTC, 2012c). During the 2013 surveys, Hoover's *tauschia* was not identified within the proposed MPMG range footprint, but was identified in large numbers within the SDZ (Salstrom and Easterly, 2013; Appendix A). This species does not appear vulnerable to the direct effects of fire, but could be affected by fire suppression activities that include application of chemicals for suppressing weedy species or indirectly from erosion related to fire suppression activities.

Snowball Cactus

Snowball cactus is a small cactus found in thin, rocky soil on ridge tops, desert valleys, and low mountains, typically at elevations from 1,000 to 4,000 feet in Washington. On JBLM YTC, the species tends to prefer southern aspects and is widespread in some areas (JBLM YTC, 2012c). This species was not identified within the MPMG footprint, but an estimated 240 widely scattered plants were observed in the SDZ (Salstrom and Easterly, 2013; Appendix A). This species appears to be vulnerable to fire, as it was not found in areas that had recently burned.

Shy Gilia

Shy gilia is a small herb with pink flowers. Little is known of the distribution of the shy gilia. Within the survey area, the plant was located on the south side of eroded hills and on a two-track road on a slope within the northern mid-section of the SDZ (Salstrom and Easterly, 2012).

Coyote Tobacco

Coyote tobacco is a species of wild tobacco known to occur in the central portion of Washington. This species typically occurs in dry sandy bottomlands, rocky washes, and other dry open places (Washington Department of Natural Resources, 2013). Coyote tobacco was previously known to occur within the SDZ at sites in Selah Creek, but has not been identified again in recent years. Based on previous occurrences, coyote tobacco appears only during years with particular environmental and habitat conditions, although these conditions are not well defined (Salstrom and Easterly, 2012). It is likely that coyote tobacco occurs within the SDZ, but only expresses under certain conditions.

3.6 WILDLAND FIRE

Early explorers of the area noted large expanses of sagebrush, which indicates that natural fires were relatively infrequent. Although infrequent, fire played an important role in sagebrush habitat by creating a patchwork of young and old sagebrush stands across the landscape, with grassland openings, wet meadows, and other shrub communities. Native bunchgrasses between sagebrush tend not to provide a continuous layer of fuel to move fire long distances. In presettlement times, fires were generally patchy and small, except for those occurring during extremely dry years. Before European settlement, fire intervals are estimated at 20 to 25 years in wetter regions and 60 to 110 years in arid sagebrush steppe habitat. Generally, fire occurred less frequently in drier climates because of the lack of fuel build-up (Paige and Ritter, 1999).

In the past, sagebrush was controlled by burning, plowing, chaining, disking, and spraying herbicides to improve foraging conditions for livestock in areas lacking native grasses. Non-native grasses were sometimes planted as forage for livestock and have spread across the region. Non-native annual grasses and forbs, such as cheatgrass (*Bromus tectorum*), have invaded much of the sagebrush region. Cheatgrass, in particular, has been replacing native species. Cheatgrass alters the fire and vegetative patterns in sagebrush habitat. Cheatgrass provides a continuous fuel source that can carry fire over longer distances. Fire intervals in areas with cheatgrass are 3 to 5 years. Species of sagebrush can reestablish within 5 years of a burn; however, pre-burn densities of sagebrush and structure required by shrub-steppe obligate species may not return for 15 to 30 years or longer. Frequent fires can eventually eliminate sagebrush (Paige and Ritter, 1999).

Fire frequencies on JBLM YTC are greater than under naturally occurring conditions; however, 90 percent of fires on JBLM YTC are confined to established containment areas (JBLM, 2010). Fires can start as a result of training activities, including live-fire exercises, use of tracer rounds and explosive ordnance, and some components of maneuver training. The frequency of fire is related to the type and location of the specific training activity and the fuel load provided by the habitat. Fires start mainly on existing ranges, in the Central Impact Area, and in dud areas within associated containment areas. Containment areas are intended to confine fires within a certain area, typically around ranges and other areas with a high risk of fire. Firebreaks, roads, pre-burn areas, and ridgetops are used to contain fires to certain areas around ranges and impact areas. From 1987 to 2009, approximately 102,200 acres or 31 percent of the installation burned from training-related fires (Leingang, 2013). Almost all of the MPMG range footprint burned between 1987 and 2010, while approximately half of the SDZ burned during that period. In 2012, approximately 90 acres of the SDZ burned, while no burns occurred within the project footprint (Range 5 footprint). In 2011, approximately 315 acres of the SDZ and range footprint burned, including approximately 42 acres of the range footprint. In 2011 and 2012, approximately 3,200 and 13,460 acres burned installation-wide, respectively.

The GTA FEIS analyzed the impacts of increased training and development on JBLM YTC and concluded that future actions would increase the risk of fire and would result in significant impacts to wildland fire management and biological resources. The current baseline condition is that fires will continue to occur and reduce amounts of shrub-steppe habitat on JBLM YTC. An increase in fire suppression measures and equipment and an increase in the size of SGPAs were implemented following the GTA FEIS Record of Decision (JBLM, 2010).

Fires on JBLM YTC adversely impact soil retention, water quality, vegetation, wildlife, habitat, and training readiness. JBLM YTC manages the effects of fire by implementing a planning process that involves risk assessment, fire prevention, maintaining facilities and resources to suppress fire, enacting restrictions on training to reduce fire risks, and supporting recovery and post-fire restoration programs. These measures and management guidelines are included within the JBLM YTC Integrated Wildland Fire Management Program (JBLM YTC, 2012d). Specific components of JBLM YTC's strategy to manage fire are listed below:

- Development and implementation of a Fire Management Plan
- Implementation of annual Pre-Burn Plan
- Enhanced weather data collection
- Implementation of the Fire Risk Assessment
- Pyrotechnic restrictions during periods of high fire danger
- Increased wildland fire staffing
- Wildland Fire Fighting Training
- Enhancement of Fire Suppression Support Teams
- Upgrade of firebreak system and roads to contain fires
- Development of primary and secondary fire containment areas around established ranges
- Development of fire dip ponds and firefighting wells
- Annual retention and use of a dedicated Type 1 Helicopter for aerial fire suppression
- Enhanced troop education
- Remote sensing, fire history monitoring, and related geographic information system (GIS) data layer maintenance

3.7 CULTURAL RESOURCES

The earliest evidence of human occupation of the interior Pacific Northwest is approximately 11,000 to 11,500 years old and is located approximately 31 miles north of JBLM YTC. During this time, small bands of people hunted megafauna such as mammoth and a large form of bison that are now extinct.

The oldest known archaeological sites on JBLM YTC were from approximately 10,500 and 8,000 years ago. During this period, people used lanceolate and large-stemmed projectile points to hunt elk, bison, and pronghorn. People resided in seasonal communities and in temporary shelters. Most of these sites occur on the eastern side of JBLM YTC and are buried under alluvial or aeolian sediments with little exposure. A large campsite from 10,000 years ago was discovered on JBLM YTC that has projectile points rarely found in the Pacific Northwest, which represent the presence of people from the Northern Great Basin.

Archaeological sites from 8,000 to 6,000 years ago are more common on JBLM YTC and occur mainly on the eastern side, mainly along streams. Projectile points from this period have been found all across JBLM indicating broad ranging forays in opportunistic pursuit of animal and plant resources.

Archaeological sites from 6,000 to 3,000 years ago have been found almost all over JBLM YTC from along streams to the crests of ridges, with long-term settlements clustered in the valleys and along the major rivers. Archaeological sites along upland streams were used to process edible plants for storage, including mainly the roots of bitterroot (*Lewisia rediviva*) and some *Lomatium* species. This indicates either a more focused economy based on targeted food resources or an increase in population, and therefore a greater abundance of archaeological sites.

Numerous sites from approximately 3,000 years ago to the mid-1800s occur throughout JBLM YTC. During this period, people inhabited winter villages along the Yakima and Columbia Rivers and traveled seasonal routes for food gathering. The first contact with Euroamericans occurred in the early 1800s, when fur traders first arrived. Native populations were decimated by disease and populations aggregated into fewer large villages along the major rivers. Ranchers began coming to the area in the mid-1800s to take advantage of the extensive grasslands. Historic trails from the mid-1800s cross JBLM YTC, including a major trail that followed Cold Creek and Selah Creek.

Homesteaders began arriving in the area in the 1880s and until the 1930s. Families with large amounts of acreage remained, while those with smaller plots abandoned the land. A majority of the homestead and ranching sites were found within the Lmuma, Selah, and Moxee complexes. Ranching continued on JBLM YTC until the Army acquired the land in the 1940s. A railroad was constructed across the northern portion of JBLM YTC from 1908 to 1909, served by several small communities along the line. The railroad was abandoned in the 1980s and is now the location of the recreational John Wayne Trail. Diatomaceous earth was mined in the Lmuma complex between the 1900s and 1950s.

The U.S. Army originally acquired 261,451 acres of land and established an anti-aircraft firing range in 1942. In 1992, the Army acquired additional lands to the north, to form the current configuration of the installation with a current total acreage of 327,242.

JBLM YTC remains an important cultural resource to the Yakama Nation and Wanapum People. JBLM YTC is within an area ceded by bands and tribes of the Yakama Nation pursuant to the Treaty of 1855. The Wanapum People reside next to the eastern boundary of JBLM YTC near the Priest Rapids Dam and use the installation for traditional, religious, and ceremonial purposes. Root crop plants important to Native Americans, such as bitterroot and certain species of *Lomatium* commonly occur throughout JBLM YTC. Bitterroot and *Lomatium* are gathered in February and early March. Other plants used by Native Americans on JBLM YTC include important supplementary food sources such as the bulbs of wild onion (*Allium acuminatum*) and yellow bell (*Fritillaria pudica*), and plants with traditional uses, such as balsamorhiza (*Balsamorhiza* sp.). Fruits of chokecherry (*Prunus virginiana*), blue elderberry (*Sambucus cerulea*), serviceberry (*Amelanchier alnifolia*), and currant (*Ribes cereum*) and fibers from Indian hemp (*Apocynum cannabinum*) are collected in riparian areas (JBLM YTC, 2002).

The proposed project area was surveyed for cultural resources and no cultural resources were identified within the project area (JBLM YTC, 2013). The ground surface of the project footprint has been heavily disturbed and the potential for intact cultural material within the project area is minimal.

3.8 INFRASTRUCTURE

Only the components of the JBLM YTC infrastructure that could be impacted by the Proposed Action are discussed below. Utilities such as natural gas and steam are not discussed, as there would be no potential for impacts as a result of the Proposed Action.

Drinking water on JBLM YTC is provided from groundwater sources derived from wells at the Cantonment Area and throughout the training area. Water used during training activities is either hauled

from the Cantonment Area to the training area or from one of the wells in the training area. The average demand for water at JBLM YTC during the summer is 200,000 gallons per day (gpd), with approximately 75 percent of the usage occurring at the Cantonment Area. There is a total of approximately 1.92 million gallons of water storage capacity on JBLM YTC, most of which is located at the Cantonment Area (JBLM, 2010).

Water used for fire suppression is obtained from groundwater and surface water sources. JBLM YTC maintains 17 fast-fill wells, 3 spring-fed fast-fill wells, 2 fast-fill tanks, 5 earthen ponds, and 2 heli-wells in the range areas used for fire suppression. The Columbia River is the primary surface water source and is used mainly for aerial firefighting (JBLM, 2010).

A wastewater treatment plant (WWTP) serves the Cantonment Area and is permitted to treat 720,000 gpd. Only a portion of the permitted capacity of the WWTP is used. The peak daily flow of the WWTP is estimated at approximately 150,000 gpd. Remote structures within the Cantonment Area utilize individual septic tanks and drain fields. Wastewater outside of the Cantonment Area is treated by septic tanks and drain fields or lagoons. Self-contained field latrines are used during training activities (JBLM, 2010).

JBLM YTC is in the Kittitas Public Utility District. Electricity is supplied primarily by PacificCorp. In 2008, the average daily use of electricity at JBLM YTC was 33,838 kilowatt-hours (JBLM, 2010).

The transportation infrastructure of JBLM YTC includes approximately 1,648 miles of road. There are five classes of roads: primary, secondary, light duty all-weather, unimproved, and trail. Most of the roads are unimproved and/or trails, while approximately 516 miles are all-weather or maintained roads (U.S. Army Environmental Command [USAEC], 2012). The Range 5 road network is within the proposed MPMG range footprint and SDZ and includes approximately 1 mile of main road and approximately 1.5 miles of service roads for targets.

4.0 ENVIRONMENTAL CONSEQUENCES

Chapter 4 assesses the environmental consequences associated with the Proposed Action and the No Action Alternative. Direct, indirect, and cumulative environmental impacts are described for each resource.

- Direct effects are caused by the action and occur at the same time and place (40 CFR Section 1508.8).
- Indirect effects are caused by the action and occur later in time or farther removed in distance but are still reasonably foreseeable (40 CFR Section 1508.8).
- Cumulative impacts are those that result from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions (40 CFR Section 1508.7).

Impacts were analyzed for each of the resources identified in the previous chapter as potentially affected by implementation of the Proposed Action. The degree of impact is characterized as negligible, minor, moderate, or major. Impacts classified as negligible, minor, or moderate are considered to be less than significant in the analysis, while those classified as major are considered to be significant. The thresholds of significance for the intensity of impacts are defined as follows:

- Negligible: When the impact is localized and not measureable at the lowest level of detection.
- Minor: When the impact is localized and slight, but detectable.
- Moderate: When the impact is readily apparent and appreciable.
- Major: When the impact is severely disruptive to current conditions.

4.1 AIR QUALITY

The threshold of significance for air quality is when the Proposed Action affects the achievement or maintenance of NAAQS.

During construction and demolition, air quality impacts could result from fugitive dust and combustive emissions from construction equipment. The structures to be demolished could contain asbestos. The Yakima Regional Clean Air Agency would be contacted before an asbestos survey would be conducted. Should asbestos-containing materials be identified, a Notice of Demolition/Renovation would be issued. The primary risks from fugitive dust relate to human health and human nuisance values. Fugitive dust can contribute to respiratory health problems and create an inhospitable working environment. Minimal ground would be disturbed to maintain natural, realistic battlefield conditions. Construction BMPs, such as watering, using soil binders, or covering disturbed ground with mulch would reduce the potential for fugitive dust. A dust control plan could be required by the Yakima Regional Clean Air Agency. Emissions from construction equipment would contribute less than significant levels of regulated air pollutants and would not violate NAAQS. Any impacts to air quality during construction would be negligible and short-term.

The primary source of air pollution from operation of the proposed MPMG range would be from fugitive dust. Amounts of fugitive dust from operation of the MPMG range would likely be less than under current conditions, because off-road maneuvers would no longer be allowed. Potential fires occurring from operation of the proposed range could contribute to an increase in air pollutants; however, the potential for fires at the proposed MPMG range would be the same as that of Range 5 historically, as there would be no change in the type of gunnery used at the MPMG range compared to Range 5. Anticipated air emissions from operation of the proposed MPMG range would be similar to historical emissions from use of Range 5, but would lack emissions from off-road vehicles and associated fugitive dust. Air emissions from operation of the proposed MPMG range would not violate NAAQS and would contribute to a less than significant increase in air pollutants. Impacts to air quality from operation of the

proposed MPMG would be similar to those of the No Action Alternative, but would lack emissions from off-road vehicles and associated fugitive dust.

4.1.1 No Action Alternative

Under the No Action Alternative, there would be no emissions associated with construction and demolition activities. Air quality impacts from air pollutants, namely fugitive dust, from use of Range 5 under the No Action Alternative would continue as under current conditions and would be negligible. Off-road maneuvers would continue, and operational emissions would be greater than those of the Proposed Action.

4.2 NOISE

The threshold of significance for noise would be when noise from the Proposed Action causes harm or injury to on- or off-site communities; or exceeds applicable environmental noise limit guidelines.

There are no nearby sensitive receptors who would likely perceive construction noise from the proposed MPMG range. Construction workers working near equipment would wear proper hearing protection as required to minimize exposure to increased noise levels. Noise impacts due to an increase in noise levels during construction and demolition activities would be negligible and short-term.

During operation of the proposed MPMG range, noise levels would be similar to historical noise levels at Range 5, where the proposed range would be constructed. A large portion of the proposed MPMG range is in Noise Zone II and Zone III areas from the historical use of Range 5, which was used for machine gun training. Guns used under the Proposed Action would be machine guns and other small arms up to 0.50 caliber, which are the same weapons used at Range 5. Explosives would not be used under the Proposed Action. Noise contours in the proposed project area would not increase as a result of the Proposed Action. Noise during operation of the proposed MPMG would be similar to noise under current conditions, and any impacts would be negligible.

4.2.1 No Action Alternative

Under the No Action Alternative noise levels would not change. Noise from training activities on Range 5 would persist. Noise impacts from continued use of Range 5 would be negligible.

4.3 SOILS

The threshold of significance for soils is when impacts from the Proposed Action cause excessive soil loss that impairs plant growth, violates federal, state, or local laws pertaining to this resource, or if the landscape can no longer sustain military training.

Temporary minor to moderate impacts to soils due to construction and demolition activities would be expected. Soils in the proposed project area are highly susceptible to erosion. Construction and demolition ground-disturbing activities could require the removal of up to 250 acres of vegetation, which would likely increase the potential for erosion. Grading generally would occur only at proposed features such as the firing line, targets, roads, emplacements, and facilities and would be limited to approximately 13.75 acres of ground disturbance within the proposed MPMG range during construction. Approximately 138,275 cubic yards of fill material, consisting of soil from existing borrow pits on JBLM YTC, would be needed for final grading based on design calculations. Linear disturbances such as roads, which would be relocated to accommodate maintenance of targets, and trenches for electrical service also would contribute to the potential for increased erosion. Where fill would be placed across a drainage path, culverts would be installed to maintain flow paths for stormwater runoff and minimize the potential for soil erosion.

To limit the impacts of erosion, the design of the proposed MPMG range would include an erosion control plan and a stormwater management plan. The MPMG range would be designed to meet the requirements of the 2004 Stormwater Management Manual for Eastern Washington published by the

Washington State Department of Ecology. The design may include construction BMPs, such as silt fences, check dams, and revegetation of disturbed areas, to limit the potential for and effects of erosion and sedimentation. Nineteen service roads extending approximately 4 miles would be constructed within the proposed MPMG range footprint and could contribute to increased erosion potential. Approximately 0.15 mile of the main road would be realigned. All proposed roads would be constructed with a hardened surface to limit erosion and rutting, which can be a problem on unimproved roads during wet periods. Design plans and construction BMPs would meet Washington construction stormwater permit requirements and would comply with federal, state, and local laws concerning erosion and sedimentation control. The MPMG range would also be designed using the *Army Small Arms Training Range Environmental BMPs Manual*, which provides BMPs for erosion control on small arms ranges and provides guidance and mitigation to address the potential for the transport of metal munitions constituents, primarily lead (Fabian and Watts, 2005).

During operation of the proposed MPMG range the potential of erosion would occur mainly from training-related activities. Recurring fires from training-related activities at the proposed MPMG range would increase the potential for erosion through the removal of vegetation. Range maintenance programs would provide long-term erosion control guidance, which would include a strong emphasis on the reestablishment of vegetation. Post-construction BMPs, such as stormwater swales and outlet protection, could be used to reduce erosion and control stormwater during operation of the proposed MPMG range. All proposed roads would be constructed with a hardened surface to limit erosion and rutting, which can be a problem on unimproved roads during wet periods. Under existing conditions, off-road maneuvers are allowed, which increases the potential for erosion. Eliminating off-road maneuvers at the proposed MPMG range would have long-term beneficial impacts on soils and would contribute to a long-term reduction in erosion. Lead fragments from spent ammunition would continue to accumulate in the soils. However, the proposed MPMG range would be designed to limit lead in the soil and lead migration to surface waters using engineered solutions identified in the *Army Small Arms Training Range Environmental BMPs Manual* (Fabian and Watts, 2005) and the *Prevention of Lead Migration and Erosion from Small Arms Ranges* guidance document (USAEC, 1998). Additionally, due to the DOD Green Ammunition Program, it is likely that less toxic bullets would be used in the future to reduce and potentially eliminate the use of hazardous materials in small-caliber ammunitions. Impacts to soils due to the Proposed Action during operations would be minor and long-term, which would be the same as under the No Action Alternative.

4.3.1 No Action Alternative

No soil impacts from construction and demolition activities would occur under the No Action Alternative. Range 5 would continue to be used for live-fire training. The potential for erosion and sedimentation due to ground-disturbing training activities, off-road maneuvers, accumulation of lead in soils, and training-related fires would persist as a result of continued operation of Range 5. Impacts to soils would be minor and long-term under the No Action Alternative.

4.4 WATER QUALITY

The threshold of significance for water quality is when the Proposed Action results in the exceedance of federal or state regulatory limits.

Minor short-term impacts to water quality during construction and demolition activities could occur as a result of the Proposed Action. Increased erosion and sedimentation could impact water quality in nearby streams, including Selah Creek and other unnamed ephemeral drainages in the proposed project area. However, the proposed MPMG range would be designed to minimize ground disturbance to the extent practicable and would include erosion and sedimentation control BMPs in compliance with construction permit requirements. The MPMG range would be designed to meet the requirements of the *2004 Stormwater Management Manual for Eastern Washington* published by the Washington State Department of Ecology. Due to the relatively large size of the project area (250 acres) and limited amount of grading

and filling (13.75 acres) the project does not require stormwater flow control. The project meets the requirements of full dispersion by preserving existing vegetation on at least 65 percent of the site because only 5.5 percent of the ground would be disturbed for construction of the MPMG range. The project area will be able to disperse the 25-year storm runoff volume without the need for flow control. Stormwater flows would generally sheet flow from the south end of the project area to the north (U.S. Army of Corps of Engineers [USACE], 2013). A Construction Stormwater General Permit from the Washington Department of Ecology that meets National Pollutant Discharge Elimination System (NPDES) requirements would be obtained, which would require the development of a Stormwater Pollution Prevention Plan (SWPPP).

Four ephemeral drainages would be directly impacted by construction of the MPMG range. Where fill would be placed across a drainage path, culverts would be installed to maintain flow paths for stormwater runoff and minimize the potential for soil erosion. All proposed roads would be constructed with a hardened surface to limit erosion and rutting, which can be a problem on unimproved roads during wet periods.

During operation, water quality could be impacted by erosion due to ground disturbance from training activities and from vegetation loss as a result of training-related fires. Continuation of range maintenance programs in place at JBLM YTC would reestablish vegetation in disturbed areas as soon as practicable, which would reduce the potential for erosion. Off-road maneuvers would be precluded on the MPMG range under the Proposed Action, which would reduce erosion potential and associated water quality impacts from sedimentation, resulting in long-term benefits to water quality. Impacts to water quality from migration of metals found in munitions, such as lead, to surface waters could occur. However, the proposed MPMG range would be designed to limit lead in the soil and lead migration to surface waters using engineered solutions identified in the *Army Small Arms Training Range Environmental BMPs Manual* (Fabian and Watts, 2005) and the *Prevention of Lead Migration and Erosion from Small Arms Ranges* guidance document (USAEC, 1998). Also, due to the DOD Green Ammunition Program, it is likely that less toxic bullets would be used in the future to reduce and potentially eliminate the use of hazardous materials in small-caliber ammunitions. Long-term impacts to water quality from operation of the proposed MPMG range would be minor and the same as under the No Action Alternative.

4.4.1 No Action Alternative

Construction-related impacts to water quality would not occur under the No Action Alternative. Range 5 would continue to operate as a small arms range for live-fire training. The potential for impacts to water quality from erosion and metal constituents from munitions would persist. Long-term impacts to water quality as a result of prolonged use of Range 5 would be minor.

4.5 BIOLOGICAL RESOURCES

The threshold of significance for biological resources includes the following: (1) long-term loss or degradation or loss of diversity within unique or high-quality plant communities; (2) unpermitted “take” of federally listed species; (3) local extirpation of rare or sensitive species not currently listed under the Endangered Species Act; (4) unacceptable loss of critical habitat as determined by the USFWS; (5) non-compliance with policies, regulations, or permits related to wetlands conservation and protection; or (6) high probability of increasing the frequency and/or intensity of wildland fires, especially in sensitive ecological areas.

During construction, impacts of the Proposed Action to biological resources would mainly occur as a result of the removal of shrub-steppe habitat. Operational impacts of the proposed MPMG range would be similar to those of the existing and active Range 5; however, off-road maneuvers at the proposed MPMG range would no longer be allowed. Operational impacts on shrub-steppe habitat from training-related fires installation-wide were determined to be significant, as described in the GTA FEIS (JBLM, 2010). Impacts from implementation of the Proposed Action would not extend beyond baseline and anticipated

conditions as described in the GTA FEIS. Impacts to biological resources specific to the proposed MPMG range are discussed below and are expected to be less than significant.

Vegetation removal from construction of the proposed MPMG range would impact native shrub-steppe vegetation. Up to 250 acres of vegetation could be removed as a result of construction of proposed range facilities, targets, and roads, but only approximately 13.75 acres would actually be graded or filled for construction of range features. Vegetation could also be cleared to allow for a line-of-sight to targets; however, the project footprint generally lacks a shrub component so only limited vegetation clearing would be necessary. The impacts would be less than significant because vegetation and habitat in the proposed MPMG range footprint is degraded from construction and operation of Range 5 and from training-related fires. Almost all of the project footprint has burned since 1987, while slightly less than half of the SDZ has burned during that period. New construction would occur in previously disturbed areas to the extent practicable. Rare and sensitive plants would not be impacted by construction of the proposed MPMG range, as 2013 surveys did not identify any such species in the proposed MPMG range footprint (Salstrom and Easterly, 2013; Appendix A). Disturbed areas would be reestablished with native vegetation to prevent the potential for invasive plants, such as cheatgrass, to become established. The reestablished native vegetation would generally lack a shrub component (sagebrush); however, the proposed MPMG footprint already generally lacks a shrub component due to the impacts from previous training activities and recurring fires. Impacts from the removal of native shrub-steppe vegetation during construction would be minor and long-term.

Operational impacts of the proposed MPMG range to vegetation would be minor to moderate. Disturbed areas would be replanted with native vegetation to reduce the potential for invasive species, but would generally lack a shrub component, such as sagebrush, due to recurring fires; however, as noted above, the proposed range footprint generally lacks a shrub component, such as sagebrush, due to past training activities and recurring fires. Fire risk would be managed through the Integrated Wildland Fire Management Program (JBLM YTC, 2012d). A loss of vegetative diversity within the project area could occur as a result of continued use of the area as a range; however, vegetation and habitat within the project area is already degraded from previous use as Range 5 and recurring fires. Off-road maneuvers, which were allowed on Range 5, would not be allowed on the proposed MPMG range. The elimination of off-road maneuvers would have long-term benefits to vegetation within the project area. No loss of vegetative diversity on JBLM YTC would be expected from the Proposed Action. Rare and sensitive plants were not observed within the project footprint, but were located within the SDZ.

Ute ladies' tresses and Umptanum wild buckwheat would not be impacted by construction or operation of the proposed MPMG range. These species were not identified during surveys of the project area and SDZ (Salstrom and Easterly, 2013; Appendix A) and are not documented on JBLM YTC.

Hoover's *tauschia* was observed in the SDZ, but not in the range footprint during plant surveys (Salstrom and Easterly, 2013; Appendix A). It is unlikely this species would be directly impacted by construction activities. This species could be impacted by changes in hydrology and erosion from the construction area; however, hydrology patterns are not expected to change as a result of the proposed MPMG range, and construction BMPs would limit erosion from disturbed soils. Training-related fires within the SDZ could adversely impact this species within the fire containment area of the range. However, concentrations of Hoover's *tauschia* occur in other areas of JBLM YTC, and no significant decline in the population would be expected (JBLM YTC, 2002). Additionally, this species appears to be tolerant of fire, as it was identified in previously burned areas of the SDZ. Impacts to Hoover's *tauschia* from construction and operation of the proposed MPMG range would be minor.

Snowball cactus was identified within the SDZ, but not in the range footprint during plant surveys (Salstrom and Easterly, 2013; Appendix A). This species would not be impacted by construction activities. Training-related fires could adversely impact this species within the SDZ and fire containment area of the range, as this species appears to be vulnerable to fire. Populations of snowball cactus within

the SDZ could decrease over time due to recurring fires; however, it is unlikely that training-related fires from the proposed MPMG range would significantly reduce populations of snowball cactus on JBLM YTC. Impacts to snowball cactus from operation of the proposed MPMG range would be minor.

Shy gilia was identified within the SDZ during plant surveys, but not in the range footprint (Salstrom and Easterly, 2012). This species would not be impacted by construction activities. Training-related fires could adversely impact this species within the SDZ and fire containment area of the range. Eliminating off-road maneuvers would have long-term beneficial impacts on the species. Populations of shy gilia within the SDZ could decrease over time due to recurring fires; however, it is unlikely a significant reduction in the population of the species would occur. Populations of shy gilia are considered secure (Washington Natural Heritage Program, 2013). Impacts to shy gilia from operation of the proposed MPMG range would be minor.

Though coyote tobacco was not identified during recent surveys, it likely occurs within the SDZ. This species would not be impacted by construction activities, but could be adversely impacted by recurring fires in the SDZ and fire containment area of the range. Eliminating off-road maneuvers would have long-term beneficial impacts on the species. Training-related fires could directly impact the species and reduce potential suitable habitat within the SDZ. Populations of coyote tobacco appear to be low within the SDZ and any large reduction in the population of the species due to operation of the MPMG range would be unlikely. Impacts to coyote tobacco from operation of the proposed MPMG range would be minor.

The removal of shrub-steppe habitat during construction would be minimal (13.75 acres), but would be long-term. Impacts to wildlife would be less than significant because habitat in the project area is degraded from previous use and recurring fires. Also, ongoing human activity in the area likely deters wildlife from residing in the area. Wildlife would be temporarily disturbed by construction activities and would likely be displaced from the area, while less mobile species could experience a temporary increase in mortality. Wildlife displaced from the construction area would likely relocate to other areas on JBLM YTC with suitable and available habitat. Impacts to wildlife during construction of the proposed MPMG range would be minor and temporary.

Twenty-two species of migratory birds with potential to nest in the area could be directly impacted by construction activities (Potomac-Hudson Engineering, Inc., 2012). Up to three nesting seasons could be disrupted due to construction activities. However, construction impacts would be less than significant because the habitat within the proposed project footprint is degraded and only 13.75 acres of ground would be graded or filled for construction. Vegetation cleared for line-of-sight would be limited due to a lack of a shrub component that could visually block targets. Additionally, current uses and high levels of human activity at the existing range likely deter MBTA-protected bird species from nesting in the project area. Due to regional population abundance and limited suitable habitat within the project area, impacts to the following species would be considered negligible: grasshopper sparrow (*Ammodramus savannarum*), long-eared owl (*Asio otus*), American goldfinch (*Carduelis tristis*), killdeer (*Charadrius vociferus*), lark sparrow (*Chondestes grammacus*), horned lark, song sparrow (*Melospiza melodia*), brown-headed cowbird (*Molothrus ater*), savannah sparrow (*Passerculus sandwichensis*), spotted towhee (*Pipilo maculatus*), vesper sparrow, Brewer's sparrow, western meadowlark, and mourning dove (*Zenaida macroura*).

Impacts to the long-billed curlew and sage thrasher would be negligible because the project area has only limited nesting habitat and it is unlikely these species would nest there. Due to lower regional population levels, impacts to the sage sparrow, short-eared owl, burrowing owl, northern harrier, loggerhead shrike, and common poorwill (*Phalaenoptilus nuttallii*) would be considered minor.

Impacts to wildlife from operation of the MPMG range, including MBTA-listed species, the bald eagle, and golden eagle, would be similar to, but likely somewhat less than, those of the No Action Alternative. Training activities on the proposed MPMG range would be the same as current activities on Range 5 with the exception that off-road maneuvers would no longer be allowed. Elimination of off-road maneuvers

would reduce the magnitude of impacts on wildlife. Wildlife in the area are likely adapted to or tolerant of higher noise levels from use of Range 5 or have already been displaced due to training disturbances. Direct impacts could occur during firing activities; however, the greatest impact to wildlife would result from wildland fire. Fire risk would continue to be managed by pre-suppression and suppression strategies, as stated in the Integrated Wildland Fire Management Program (JBLM YTC, 2012d). The elimination of off-road maneuvers could reduce the incidence of wildland fire on the range, as this potential ignition source would cease. Impacts from operation of the MPMG range would not cause a population level decrease in species on JBLM YTC beyond baseline conditions and would be less than significant. Impacts to wildlife from operation of the MPMG range would not be expected to exceed baseline or anticipated conditions, as described in the GTA FEIS (JBLM YTC, 2010).

It is unlikely that bull trout and other listed salmonids would be impacted by the proposed MPMG range. No direct impacts to these species would result because they do not occur in or adjacent to the project area. Indirect impacts to protected salmonids could occur from sedimentation associated with erosion and reduced water quality in the Yakima River, which is approximately 7 miles downstream from Selah Creek. Selah Creek is approximately 1 mile from the proposed MPMG range footprint. Sediments from JBLM YTC are not known to significantly impact the Yakima River. Any impacts to protected salmonids resulting from construction and operation of the proposed MPMG range would be negligible.

Burrowing owls within the project area and SDZ may be tolerant of human disturbances from previous use of Range 5 and remain in the area. Burrowing owls that are not tolerant of range activities would likely be displaced to other suitable habitat on or near JBLM YTC. The loss of habitat from construction of proposed MPMG range features would have a minor impact on burrowing owls. During operation of the proposed MPMG range, burrowing owls would be disturbed primarily by noise and human activity during training activities, which is the same as existing conditions. Burrowing owls would either become tolerant of these activities or be displaced and move to nearby suitable habitat. Operational impacts would be similar to those associated with the No Action Alternative. Fires from operation of the proposed range would have temporary direct adverse impacts on the burrowing owl, but would result in indirect benefits to the species through creation of more favorable habitat for the species in the long-term. Eliminating off-road maneuvers would have long-term benefits to the burrowing owl. Operational impacts associated with the proposed MPMG range would have minor impacts on the burrowing owl.

Ferruginous hawks would likely not be impacted by construction or operation of the proposed MPMG range. This species is rarely observed on JBLM YTC and would likely use the project area and SDZ only for foraging. Other suitable foraging habitat is available near the proposed range and SDZ.

Loggerhead shrike would likely be displaced from the project area during construction of the proposed range unless individuals are tolerant of human activities and associated noise. Nearby habitat is similar to that of the proposed range footprint. Minor impacts to loggerhead shrike could be expected during construction of the proposed MPMG range. Operational impacts to the loggerhead shrike would be similar to those of the No Action Alternative. Under both alternatives, live-fire training would occur and could displace loggerhead shrike from the area, unless individuals are tolerant of human disturbances associated with training. Minor impacts to loggerhead shrike would be expected from operation of the proposed MPMG range.

Impacts to greater sage-grouse associated with the increased training and development expected to occur on JBLM YTC were determined to be significant in the GTA FEIS (JBLM YTC, 2010). Potential impacts were mainly associated with loss of habitat resulting from an increased potential for fires due to live-fire training and maneuver activities installation-wide. To mitigate the adverse impacts to sage-grouse from proposed training increases, the Army proposed a list of conservation measures to reduce fire risk and impacts to sage-grouse and shrub-steppe habitat. One of the measures was extensive fire management to contain and minimize the size of fires and to prevent loss of sage-grouse habitat to fire. Conservation measures also included increased sage-grouse management on JBLM YTC through increasing the size of

the SGPA and increasing the amount of habitat restoration. JBLM YTC also committed to participate in regional management to aid in the conservation of populations and habitats outside of JBLM YTC (JBLM, 2010). These measures have been implemented and would continue to be applied during construction and operation of the proposed MPMG range. Because the Army would construct and operate the new range on the site of an existing range, impacts to sage-grouse attributable solely to the proposed MPMG range are expected to be less than significant and would not exceed baseline or anticipated conditions, as described in the GTA FEIS.

Greater sage-grouse would likely be disturbed by construction activities. Direct impacts to sage-grouse within the proposed MPMG footprint during construction would not be expected due to the degraded habitat and general lack of sagebrush in that area. Nearby leks and suitable habitat could be indirectly impacted from noise and human activity during construction. The Range 5 lek is not active, and sage-grouse likely would continue to avoid the Range 5 lek long-term during construction. The Knuckles lek would likely be impacted by construction activities to a lesser degree than the Range 5 lek due to the greater distance from the proposed project footprint and the intervening topography. Sage-grouse utilizing the Knuckles lek may not perceive the noise and construction activity as a disturbance given that the lek has remained active even during historical use of Range 5. However, disturbance from training on Range 5 may be a contributing factor in the downward trend in use of the Knuckles lek; this trend could continue during construction and operation of the proposed MPMG range. To avoid impacts to sage-grouse, proposed construction would occur outside of the sage-grouse protection period, February 1 through June 15, to the extent practicable. However, due to seasonal weather constraints, it is not practicable to conduct all construction outside of the sage-grouse protection period. Up to three breeding seasons could be disrupted by construction activities. Impacts to sage-grouse resulting from construction of the Proposed Action would be minor to moderate and temporary.

Direct impacts to sage-grouse during operation of the MPMG range would be minimized by implementation of guidelines in the Sage-Grouse Management Plan, which provide protection and management measures for SGPAs. Sage-grouse could continue to avoid the Range 5 lek long-term due to training activities and associated activities. However, use of this lek could resume if the discontinued use of off-road maneuvers results in a reduced level of disturbance and reduced wildland fire recurrence. Sage-grouse also could abandon the Knuckles lek due to training activities at the proposed MPMG range. However, this lek remained active during use of Range 5 as a machine gun range that allowed off-road maneuvers. The downward trend in use of the Knuckles lek could continue or the reduced level of training disturbance and reduced wildland fire recurrence could allow increased use of this lek. To mitigate operational impacts to leks, all training activities during the breeding season of sage-grouse, February 1 to May 15, would be restricted within a designated SGPA between 12:00 a.m. and 9:00 a.m., and weapons firing at the proposed MPMG range would be allowed only from 9:00 a.m. to 12:00 a.m. Other measures to reduce impacts on sage-grouse are identified in Section 3.5 and include those in the GTA FEIS (JBLM, 2010).

Perch deterrents on structures such as the elevated range tower, aerial transmission lines, and associated lights on facilities would be used to the extent practicable to deter predation of sage-grouse from raptors. Proposed security lighting would be directed away from leks and the sage-grouse high use area to the extent practicable to further reduce impacts to sage-grouse. Training activities at the proposed MPMG range would be the same as those currently taking place on Range 5 with the exception that off-road maneuvers would no longer be allowed. Disturbances to sage-grouse would be similar to those under existing conditions at Range 5. As stated in the GTA FEIS, a decline in sage-grouse population on JBLM YTC could occur as a result of increased training and development installation-wide. Sage-grouse continued to use the area around the Range 5 lek even with long-term training activities taking place at Range 5, while the Knuckles lek has remained active. Eliminating off-road maneuvers would have long-term benefits to sage-grouse and would reduce disturbances to the species. With continued

implementation of the Sage-grouse Management Plan and Integrated Wildland Fire Management Program, impacts to sage-grouse would be moderate.

Townsend's ground squirrel would be adversely impacted by construction of the proposed MPMG range. Townsend's ground squirrel would likely be displaced by construction activities, but could relocate to nearby suitable habitat. Those individuals tolerant of disturbances associated with construction activities and not displaced could remain in the area. Impacts to Townsend's squirrel from construction activities and loss of habitat would be minor. Operational impacts from use of the proposed MPMG range would be similar to those from the No Action Alternative; however, off-road maneuvers would no longer be allowed, which would have long-term beneficial impacts on the species. Townsend's squirrel in the area are likely tolerant of training activities and associated disturbances such as noise from use of Range 5. The main impact from operation of the proposed MPMG range would occur from the potential for fires associated with live-fire training and extensive loss of habitat; however, no significant decrease in populations of Townsend's ground squirrel on JBLM YTC would be anticipated. Minor to moderate impacts to Townsend's ground squirrel would be expected as a result of operation of the proposed MPMG range.

Negligible impacts to long-eared myotis and pallid Townsend's big-eared bat would be expected due to construction and operation of the proposed MPMG range. No roosts or hibernacula would be impacted by the proposed MPMG range and these species could continue to forage in the area. However, fires could cause a short-term reduction in potential foraging habitat in the area of the proposed MPMG range. Other foraging habitat on JBLM YTC and the surrounding area would be available.

Sagebrush lizards would likely be adversely impacted by construction of the proposed MPMG range. This lizard would likely be displaced by construction activities, but could relocate to nearby suitable habitat. Those tolerant of disturbances associated with construction activities and not displaced could remain in the area. Impacts to sagebrush lizard from construction activities and loss of habitat would be minor. Operational impacts from use of the proposed MPMG range would be similar to those of the No Action Alternative; however, off-road maneuvers would no longer be allowed, which would have long-term beneficial impacts on the species. Sagebrush lizards in the area are likely tolerant of training activities and associated disturbances from use of Range 5. The main impact from operation of the proposed MPMG range would occur from the potential for fires associated with live-fire training and extensive loss of sagebrush habitat; however, no significant decrease in populations of the species on JBLM YTC would be anticipated. Minor to moderate impacts to sagebrush lizards would be expected as a result of operation of the proposed MPMG range.

It is unlikely that the sharptail snake would occur within the project area or SDZ due to the lack of suitable habitat. No impacts to this species would be anticipated as a result of construction and operation of the proposed MPMG range.

4.5.1 No Action Alternative

There would be no impacts to biological resources from construction activities under the No Action Alternative. No changes in conditions would occur as a result of the No Action Alternative. Under the No Action Alternative, impacts to biological resources would be minor to moderate. The risk of fire and disturbances to wildlife, such as sage-grouse, would continue as Range 5 would remain an active firing range that allows off-road maneuvers. Range 5 would continue to contain reduced amounts and quality of late successional shrub-steppe habitat for sagebrush obligate species due to the frequency of wildland fire and previous development and use as a range. A decline in the population of greater sage-grouse on JBLM YTC could continue as a result of the No Action Alternative based on findings of the GTA FEIS (JBLM, 2010).

4.6 WILDLAND FIRE

The threshold of significance for wildland fire management is based on the potential of the action to increase wildland fire risk or adversely impact the ability of JBLM YTC to manage wildland fires.

Over 90 percent of fires on JBLM start and are contained within established range areas, such as Range 5 (JBLM, 2010). A wildland fire at the proposed MPMG range could impact animal and plant communities, including listed species, increase soil erosion from the removal of vegetation, and increase the spread of invasive plant species. Fires carried off-post could damage nearby homes and community resources. Fires in shrub-steppe habitat within the footprint of the proposed MPMG range and associated SDZ could easily start and quickly spread. Factors contributing to fire risk include weather conditions, location of ignition, and fuel loads.

The same type of gunnery would be used at the proposed MPMG range as at the existing Range 5; however, off-road maneuvers would no longer be allowed. It is likely that an increase in training at the proposed MPMG range compared to current usage at Range 5 would occur, as stated in the GTA FEIS. However, even with an increase in training, the risk of fire would likely be the same as current conditions because of the elimination of off-road maneuvers on the proposed MPMG range and because there would be no change in the type of gunnery used. The elimination of off-road maneuvers would remove a potential ignition source from the range. Incidental fires could also occur due to ricochets, cigarettes, or careless error, as with any range; however, the main cause would be from weapons firing and the use of tracers.

Measures contained within the JBLM YTC Integrated Wildland Fire Management Program would continue to reduce the risk of a wildland fire occurring as a result of training activities (JBLM YTC, 2012d). Actions taken to decrease the extent and intensity of fires that do occur include construction and maintenance of firebreaks, development of suppression water resources, prescribed burning, pre-incident planning, and implementation of a system of risk management that takes into account daily fire danger and proposed activities. Measures within the program to suppress fires include providing adequate ground and aerial assets, such as seasonal wildland firefighters and firebucket assets during the fire danger season, which are needed to rapidly suppress and control fires, containing them on JBLM YTC and preventing them from escaping primary containment areas. Other measures for wildland fire management include revised firebreak coverages, establishment of primary and secondary containment areas, development of pre-incident wildland fire plans, continued use of aerial fire suppression assets, and increased wildland fire management resources.

These measures are in place for the existing Range 5. As noted previously, the risk of a fire at the MPMG range would likely be the same as current conditions at Range 5. The construction and operation of the proposed MPMG range would not impair the ability of JBLM YTC to respond to or manage wildland fires. Firebreaks would be constructed or updated as needed to augment the firebreaks provided by range roads. Under the Proposed Action, the impacts of a wildland fire are anticipated to remain the same as under current conditions, which is the same as the No Action Alternative.

4.6.1 No Action Alternative

No changes from baseline conditions would be expected under the No Action Alternative. Range 5 would continue to be used for live-fire training that allows off-road maneuvers. The risk of a wildland fire and resulting impacts from continued use of Range 5 would continue as under current conditions.

4.7 CULTURAL RESOURCES

The threshold of significance for cultural resources includes the following: (1) permanently restricts access of tribal members to traditional cultural places; (2) appreciably increases safety risks to tribal members using traditional cultural places; (3) results in a long-term loss or degradation of plant or animal populations of traditional cultural importance to Native Americans; or (4) diminishes integrity of a

historic property or archaeological site such that it becomes no longer eligible for listing in the National Register of Historic Places.

No impacts to cultural resources would occur as a result of the Proposed Action, as none were identified in the project area (JBLM YTC, 2013). Mitigation measures, which have been approved by the Washington State Historic Preservation Office (SHPO), would be implemented if subsurface artifacts are inadvertently discovered during construction or demolition activities.

4.7.1 No Action Alternative

Construction and demolition activities would not occur under the No Action Alternative and there would be no impact to cultural resources.

4.8 INFRASTRUCTURE

The threshold of significance for infrastructure is when the Proposed Action impairs the ability to meet the overall training mission of JBLM YTC.

The Proposed Action would have minimal impacts on the JBLM YTC utility infrastructure. The proposed MPMG range would require an electrical system expansion for power. However, this would not be a substantial change and ample power from electrical service providers is available. Any increase in use of electricity due to the Proposed Action would be negligible. Water for consumptive purposes at the proposed MPMG range would come from groundwater wells in the area. There would be no change in the amount of water use on JBLM YTC as a result of the Proposed Action. There would be no increase in training beyond anticipated conditions as described in the GTA FEIS. There would be no impacts to the JBLM YTC wastewater system, as the Proposed Action includes the construction of a vault latrine. Negligible impacts to JBLM YTC utilities would occur as a result of the Proposed Action.

Existing roads from Range 5 would be used to the extent practicable to reduce further disturbance of soils and vegetation. The main road through Range 5 would be reused, with only approximately 0.15 mile of this roadway realigned. Some service roads would require relocation to reach targets within the proposed MPMG range footprint. Nineteen service roads totaling approximately 4 miles are proposed, which would be used for target maintenance. All proposed roads would be constructed with a hardened surface to limit erosion and rutting, which can be a problem on unimproved roads during wet periods. Approximately 1 mile of existing roads would be abandoned and restored to the extent practicable with native vegetation. No safety risks would be anticipated from the closure of some roads during construction, as other routes are available. Impacts to the transportation infrastructure of JBLM YTC as a result of the Proposed Action would be negligible.

4.8.1 No Action Alternative

There would be no changes in utilities or use of utilities as a result of the No Action Alternative. Range 5 would remain without power service and without supporting facilities.

5.0 CUMULATIVE EFFECTS AND CONCLUSIONS

The most severe environmental impacts may not result from the direct impacts of any particular action, but from the combination of impacts of multiple, independent actions over time. The President's CEQ regulations implementing NEPA define a cumulative impact for purposes of NEPA as follows:

Cumulative impact is the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time (40 CFR Section 1508.7).

The range of alternatives considered must include the No Action Alternative as a benchmark against which to evaluate cumulative impacts.

The CEQ guidelines state that cumulative impacts analyses should be limited to the impacts that can be evaluated meaningfully by the decision-makers. The guidelines further state that the area to use in defining the cumulative impacts geographical boundary should extend to the point at which the resource is no longer affected significantly (CEQ, 1997).

Significant cumulative impacts would occur if incremental impacts of the Proposed Action (or the alternatives) were to add to the environmental impacts of past, present, and reasonably foreseeable actions, or result in an adverse significant impact on regional resources. For an impact to be considered cumulative, these incremental impacts and potential incremental impacts must be related in space and time, so that they are capable of combining (when considering potential incremental impacts of future projects) or have, in fact, combined (when considering impacts of current and past projects).

5.1 ACTIONS CONSIDERED IN THE CUMULATIVE EFFECTS ANALYSIS

Actions that are recent, ongoing, or reasonably foreseeable that may take place on JBLM YTC or in the vicinity are listed below.

- PacifiCorp Powerline Project from Vantage to Pomona Heights
- 17th Fires Brigade Firebases
- JBLM Combat Aviation Brigade Stationing Action (Ongoing, approved in 2011)
- Fort Lewis Grow the Army Action (Ongoing, approved in 2011)
- YTC Urban Operations Village
- YTC Range Development – Combined Arms Collective Training Facility (CACTF) (Planned for construction in 2019)
- YTC Range Development Project – Sniper Field Fire Range
- Vantage Wind Power Project
- Washington Army National Guard Tactical Unmanned Aerial System Training Facility
- Yakima Basin Integrated Water Resource Management Plan
- YTC Convoy Live Fire Range
- YTC Counter-Rocket, Artillery, Mortar (C-RAM) Intercept
- YTC Unmanned Aerial Systems Shadow Landing Strip
- Bonneville Power Administration (BPA) Midway-Moxee Transmission Line Rebuild Project

An in-depth analysis of cumulative impacts was conducted in the Fort Lewis Grow the Army EIS and the Programmatic EIS for Realignment, Growth, and Stationing of Army Assets. The analysis identified significant cumulative effects for biological resources and wildfire management. The cumulative effects for geology, soils, and water resources were determined to be less than significant with mitigation.

The Bureau of Land Management (BLM) conducted an analysis of the PacifiCorp project to construct and operate a 230-kilovolt transmission line from Vantage to Pomona Heights. The route of the transmission line has not been selected. The transmission line could cross the northern portion of JBLM YTC and travel from the Pomona Heights Substation near Selah in Yakima County to the Vantage Substation in Grant County near the Wanapum Dam or could be placed around the southern edge of JBLM YTC. This project could impact sage-grouse habitat outside and within the boundaries of JBLM YTC, but would likely not impact any known leks or SGPAs within JBLM YTC. The project also could increase the risk of wildland fires. Construction and operation of the transmission line have the potential to ignite wildland fires through sparks or heat from construction vehicles or equipment. Also, construction of the transmission line has the potential to increase off-road use of existing and proposed access roads and rights-of-way. New access roads, disturbances within the rights-of-way, and staging areas could further spread cheatgrass and other non-native annual species known to increase the risk and severity of wildland fires (BLM, 2013). To mitigate impacts to sage-grouse and from wildland fires, the project would include BMPs to reduce impacts on vegetation, and the development and implementation of a Noxious Weed and Invasive Plant Management Plan and a Fire Protection and Control Plan. Potential fires from Range 5 or the proposed MPMG range would be contained in an area away from the proposed transmission line and interaction effects would be unlikely. With the implementation of revegetation and fire management plans on JBLM YTC, cumulative impacts from the proposed transmission line would be less than significant.

The BPA Midway-Moxee Transmission Line Rebuild Project would consist of a rebuild of the 34-mile Midway-Moxee No. 1 115-kilovolt wood-pole transmission line. The project would include replacing existing transmission line infrastructure in or near the existing locations. Some access roads would need improvements and some new access roads would be needed (U.S. Department of Energy, 2012). This project is in early planning stages and impacts have not yet been fully assessed.

The Vantage Wind Power project was completed in 2010 and included the construction of 60 wind turbines on approximately 325 acres with a 3.2-mile transmission line, 18 miles of roads, and a substation. The project is approximately 7 miles west of the Columbia River, between I-90 and Vantage Highway. The project impacted sage-grouse habitat and could contribute to increased fire risk. An increase in the use of existing access roads could occur, potentially contributing to an increase in fires started by humans. Also, ground disturbances from construction of wind turbines and access roads could increase the spread of cheatgrass, which is known to increase the risk and severity of wildland fires. However, it is unlikely that potential fire risk and impacts from the proposed MPMG range would interact with those from the Vantage Wind Farm.

Those resources that could have potential cumulative impacts to which the Proposed Action could contribute are discussed below. Infrastructure and cultural resources are not expected to have cumulative impacts because the electrical demand of proposed range facilities would be minimal and no cultural resources are documented within the proposed project area. These resource areas are not further discussed here.

5.2 SOILS

Cumulative effects from impacts on soils resulting from the Proposed Action would occur during construction and could occur during operations due to recurring fires. During construction, vegetation removal and ground-disturbing activities could increase erosion; however, construction BMPs and erosion control design plans would mitigate and reduce the potential for impacts. The use of culverts, as needed, to prevent fill placement from altering existing stormwater flow paths would reduce the potential for future soil erosion from precipitation events. It is unlikely that impacts to soils during construction

would result in significant cumulative impacts. During operation, the proposed MPMG range could contribute to cumulative effects to soils due to the effects of fire. Off-road maneuvers, which were allowed at Range 5, would not be allowed on the proposed MPMG range. Long-term beneficial impacts to soils at the proposed MPMG range would be expected from the elimination of off-road maneuvers. The Integrated Wildland Fire Management Program would reduce the severity and risk of fires. Ground exposed or disturbed during training activities and training-related fires would be revegetated as soon as practicable. The Proposed Action and other projects in the area, such as the Vantage Wind Farm project and other projects on JBLM YTC, would adhere to the State of Washington erosion control requirements and would obtain and comply with NPDES permits. With use of construction BMPs and revegetation programs, the Proposed Action would not have significant cumulative effects on soils.

5.3 BIOLOGICAL RESOURCES

The GTA FEIS considered cumulative effects for biological resources to be significant; however, the construction and operation of the proposed MPMG range would not add to cumulative impacts to biological resources beyond baseline or anticipated conditions as described in the GTA FEIS (JBLM YTC, 2010). Impacts to biological resources from construction and operation of projects on JBLM YTC, such as the Sniper Field Fire Range and the Washington Army National Guard Tactical Unmanned Aerial System Training Facility, were determined to be less than significant with use of the Sage-Grouse Management Plan and the Integrated Wildland Fire Management Program. The proposed MPMG range would be constructed and operated in an area previously disturbed to construct and operate Range 5. Cumulative impacts could be considered significant if previously undisturbed land were developed for use of a new range. Training restrictions as stated in the Sage-grouse Management Plan and for SGPAs would continue, which would protect the sage-grouse, sage-grouse habitat, and active leks. The Integrated Wildland Fire Management Program would continue to be implemented on JBLM YTC and would reduce the contribution to cumulative effects from construction and operation of the MPMG range to less than significant.

5.4 WILDLAND FIRE

The GTA FEIS concluded that significant impacts from fire on JBLM YTC would likely occur. The GTA FEIS also determined that a potential increase in fire risk due to an increase in training and development could occur. Construction and operation of the proposed MPMG range would not increase the risk of fire from conditions as stated in the GTA FEIS. The proposed MPMG range would be within the footprint of Range 5, an active firing range, and training would include use of the same type of gunnery. The elimination of off-road maneuvers at the proposed MPMG range would eliminate a potential ignition source at the range, which would have long-term benefits. The use of Range 5 included off-road maneuvers. The Proposed Action would contribute to cumulative wildland fire impacts at JBLM YTC, although the contribution would be less than significant and the same as that of the No Action Alternative. The Proposed Action would not impair JBLM YTC's ability to suppress fire if one were to occur. As stated in the GTA FEIS, cumulative effects of wildland fires would be significant as a result of increased training and development on JBLM YTC; however, the reuse of Range 5 for an MPMG range would not increase the level of cumulative effects from baseline conditions.

5.5 AIR QUALITY

An increase in development, population, and agriculture in the Yakima Valley has led to an increase in air pollutants. The primary sources of CO emissions in the area are car emissions and winter wood smoke. Cumulative effects to air quality from the Proposed Action would occur only during construction. The removal of vegetation and ground-disturbing activities could increase the potential for fugitive dust; however, construction BMPs such as wetting the ground or covering the ground with mulch would decrease the potential for fugitive dust. During operation, impacts on air quality would be the same as under current conditions because Range 5 is used as a range for similar training purposes. No change in air quality from operation of the Proposed Action would be expected.

5.6 NOISE

The Proposed Action would not interact with other past, present, and reasonably foreseeable projects to increase noise levels outside the boundaries of JBLM YTC because operational baseline noise levels are not expected to change as a result of the Proposed Action. Grow the Army and Combat Aviation Brigade activities would likely increase noise on JBLM YTC, but resulting impacts would be less than significant (JBLM, 2010). Noise from construction of the proposed MPMG range would contribute to elevated noise levels from baseline conditions; however, any cumulative effect from construction activities would be temporary and negligible. Long-term cumulative noise impacts from the Proposed Action would not be expected. The noise levels and frequency of noise on the proposed MPMG range as a result of the Proposed Action would likely be the same as those on Range 5. The same type of gunnery used at Range 5 would be used on the proposed MPMG range.

5.7 WATER QUALITY

Short-term cumulative effects from decreased water quality in the Selah Creek watershed could occur during construction of the proposed MPMG range during vegetation removal and other ground-disturbing activities, which could increase erosion. However, any impacts would be temporary and mitigated with the use of construction BMPs. During operation of the proposed MPMG range, the potential for erosion would decrease as exposed or disturbed ground would be revegetated with native species to the extent practicable. Long-term beneficial impacts to water quality could occur as a result of the elimination of off-road maneuvers at the proposed MPMG range. Recurring fires from use of the MPMG range would likely increase erosion and contribute to decreased water quality; however, continued implementation of the Integrated Wildland Fire Management Program would reduce the risk and severity of wildland fires. Range maintenance programs would emphasize the reestablishment of vegetation on impacted areas to reduce impacts from erosion. During operation, impacts to water quality from migration of metals found in munitions, such as lead, to surface waters could occur. However, the proposed MPMG range would be designed to limit lead in the soil and lead migration to surface waters using engineered solutions identified in the *Army Small Arms Training Range Environmental BMPs Manual* (Fabian and Watts, 2005) and the *Prevention of Lead Migration and Erosion from Small Arms Ranges* guidance document (USAEC, 1998). Additionally, due to the DOD Green Ammunition Program, it is likely that less toxic bullets would be used in the future to reduce and potentially eliminate the use of hazardous materials in small-caliber ammunitions. Stormwater flow paths would be maintained through use of culverts where placement of fill material could alter existing drainage paths. No long-term cumulative effects on water quality from operation of the proposed MPMG range would be expected.

6.0 CONCLUSION

The analysis presented in the EA indicates that no significant impacts from the construction and operation of the proposed MPMG range would be expected. While no significant impacts would be expected, JBLM YTC would implement measures to mitigate potential impacts and further reduce or prevent adverse environmental effects. The assessment of consequences and potential cumulative effects, including the evaluation of baseline conditions for the region presented in the GTA FEIS, indicates that an EIS is not warranted for this Proposed Action. The EA concludes that a Finding of No Significant Impact (FNSI) should be issued.

6.1 MITIGATION

To mitigate potential impacts from soil erosion and resulting water quality impacts, a Construction SWPPP would be developed in compliance with State of Washington requirements. A Construction Stormwater General Permit, which satisfies NPDES requirements and requires an SWPPP, would be obtained prior to initiation of construction. BMPs identified in the *Army Small Arms Training Range Environmental BMPs Manual* (Fabian and Watts, 2005) and the *Prevention of Lead Migration and Erosion from Small Arms Ranges* (USAEC, 1998) guidance documents would be implemented, as appropriate, to prevent impacts to soils and surface waters from lead in munitions. Range restoration programs would be implemented to prevent the establishment and spread of non-native grasses and to stabilize soils once the proposed MPMG range is operational.

Where fill would be placed across a drainage path, culverts would be installed to maintain flow paths for stormwater runoff and minimize the potential for soil erosion.

All proposed roads would be constructed with a hardened surface to limit erosion and rutting, which can be a problem on unimproved roads during wet periods.

Lighting on the proposed MPMG range would be directed away from leks to the extent practicable to reduce impacts on sage-grouse.

Elevated structures would include deterrents to limit opportunities for predators, such as raptors, to perch and prey on sage-grouse, and to prevent predators such as ravens from nesting on the structures.

Mitigation measures from the GTA FEIS to reduce impacts on sage-grouse would be applied to the Proposed Action (JBLM, 2010). Training restrictions for SGPAs would be continued, including temporal land use constraints during sage-grouse protection periods. During the sage-grouse breeding season, February 1 to May 15, all activities would be restricted within the SGPA between 12:00 a.m. and 9:00 a.m., and weapons firing would be allowed on established ranges only between 9:00 a.m. and 12:00 a.m. Construction and maintenance activities would occur outside of the nesting and brood rearing periods for sage-grouse and migratory birds to the extent practicable. Activities that must occur during the sage-grouse protection period would be reviewed by the JBLM YTC wildlife biologist to ensure that disturbances to sage-grouse are minimized and that habitat protection is maintained to the extent practicable.

Firebreaks would be constructed or updated as needed to augment the firebreaks provided by range roads. If needed, the Integrated Wildland Fire Management Program would be updated to account for changes in fire suppression measures, such as firebreaks. No additional fire suppression equipment is anticipated as a result of the Proposed Action. Additional fire suppression measures and fire suppression equipment to support increased training and development on JBLM YTC were identified in the GTA FEIS. These measures and equipment are sufficient to meet the needs of the Proposed Action.

7.0 LIST OF ACRONYMS AND ABBREVIATIONS

ADNL	A-weighted day-night level
ARRM	Army Range Requirements Model
BLM	Bureau of Land Management
BMP	best management practice
BPA	Bonneville Power Administration
CACTF	Combined Arms Collective Training Facility
CDNL	C-weighted day-night level
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CO	carbon monoxide
dB	decibel
dBA	A-weighted sound pressure level
dBC	C-weighted sound pressure level
DOD	Department of Defense
DPW	Directorate of Public Works
EA	Environmental Assessment
EIS	Environmental Impact Statement
EO	Executive Order
FNSI	Finding of No Significant Impact
GIS	geographic information system
gpd	gallons per day
JBLM	Joint Base Lewis-McChord
MBTA	Migratory Bird Treaty Act
MPMG	Multipurpose Machine Gun
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NPDES	National Pollutant Discharge Elimination System
OSHA	Occupational Safety and Health Administration
PM	particulate matter
PM ₁₀	particulate matter less than 10 micrometers in size
RCMP	Range Complex Master Plan
SDZ	Surface Danger Zone
SGPA	Sage-grouse Protection Area
SHPO	State Historic Preservation Office
SWPPP	Stormwater Pollution Prevention Plan
TC	Training Circular
TSCA	Toxic Substances Control Act
USACE	U.S. Army Corps of Engineers
USAEC	U.S. Army Environmental Command
USC	United States Code
USFWS	U.S. Fish and Wildlife Service
USDA	U.S. Department of Agriculture
WWTP	wastewater treatment plant
YTC	Yakima Training Center

8.0 LIST OF PREPARERS AND DISTRIBUTION LIST

8.1 LIST OF PREPARERS

Name	Degree	Years of Experience
Jesse Brown	M.S., Biology	3
David Dunagan	M.A., English	29
Josh Jamell	B.S., Ecology	12
Rich Reaves	Ph.D., Wetland and Wildlife Ecology	19

8.2 DISTRIBUTION LIST

- Washington Department of Fish and Wildlife
- NOAA Fisheries
- Yakama Indian Nation
- Public Utility District No. 2 of Grant County
- Washington State Department of Ecology
- Yakima County
- City of Selah
- Washington Department of Archaeology and Historic Preservation

9.0 REFERENCES

- Bureau of Land Management (BLM). 2013. Draft Environmental Impact Statement for the Vantage to Pomona Heights 230 kV Transmission Line Project. January 4.
- Council on Environmental Quality (CEQ). 1997. Considering Cumulative Effects Under the National Environmental Policy Act. January.
- Fabian, Gene and Kimberly Watts. 2005. Army Small Arms Training Range Environmental Best Management Practices (BMPs) Manual. February 12.
- Joint Base Lewis-McChord (JBLM). 2010. Final Environmental Impact Statement for the Fort Lewis Army Growth and Force Structure Realignment. July.
- Joint Base Lewis-McChord Yakima Training Center (JBLM YTC). 2002. Final Cultural and Natural Resource Management Plan for 2002-2006. January.
- Joint Base Lewis-McChord Yakima Training Center (JBLM YTC). 2012a. Initial Scope of Work Planning Package (ISOWPP) for the Multipurpose Machine Gun Range (MPMG).
- Joint Base Lewis-McChord Yakima Training Center (JBLM YTC). 2012b. Yakima Training Center Sage-Grouse Lek Monitoring. June 12.
- Joint Base Lewis-McChord Yakima Training Center (JBLM YTC). 2012c. Rare and Sensitive Plant Management Plan. January.
- Joint Base Lewis-McChord Yakima Training Center (JBLM YTC). 2012d. Integrated Wildland Fire Management Plan. June 8.
- Joint Base Lewis-McChord Yakima Training Center (JBLM YTC). 2013. Survey and Testing for the Proposed Improvement to the Multipurpose Machine Gun Range. June 21.
- Leingang, Colin. 2013. Personal communication: Comment Response Matrix for Draft Environmental Assessment for the Construction and Operation of a Multipurpose Machine Gun Range at Yakima Training Center, Washington.
- Oregon Department of Fish and Wildlife. 2013. Oregon Wildlife Species – Reptile Species of Oregon. <http://www.dfw.state.or.us/species/reptiles/>. Accessed July 19, 2013.
- Paige, Christine and Ritter, Sharon. 1999. Birds in a Sagebrush Sea, Managing Sagebrush Habitats for Bird Communities.
- Potomac-Hudson Engineering, Inc. 2012. Convoy Live Fire Range at Joint Base Lewis-McChord Yakima Training Center Environmental Assessment. December.
- Salstrom, D. and R. Easterly. 2012. Rare Plant Survey for the Proposed Convoy Live Fire Study Area, Yakima Training Center, Washington. July 16.
- Salstrom, D. and R. Easterly. 2013. Rare Plant Survey Multipurpose Machine Gun Range, Yakima Training Center, Washington (Joint Base Lewis McChord). September 5.
- U.S. Army Corps of Engineers (USACE). 2013. Multipurpose Machine Gun Range Volume I – Basis of Design, 95% Submittal. May.
- U.S. Army Environmental Command (USAEC). 1998. Prevention of Lead Migration and Erosion from Small Arms Ranges. August 13.
- U.S. Army Environmental Command (USAEC). 2012. Environmental Assessment, Sniper Field Fire Range Joint Base Lewis-McChord Yakima Training Center. February.

- U.S. Department of Agriculture (USDA). 2006. Soil Survey of Yakima Training Center, Parts of Kittitas and Yakima Counties, Washington.
- U.S. Department of Energy. 2012. Memorandum for Environmental Assessment Determination, Midway-Moxee Transmission Line Rebuild Project. December 12.
- U.S. Fish and Wildlife Service (USFWS). 2000. Loggerhead Shrike Status Assessment. November.
- U.S. Fish and Wildlife Service (USFWS). 2003. Status Assessment and Conservation Plan for the Western Burrowing Owl in the United States, Biological Technical Publication BTP-R6001-2003.
- U.S. Fish and Wildlife Service (USFWS). 2010. Bull Trout. <http://www.fws.gov/pacific/bulltrout/>. Last updated October 12.
- U.S. Fish and Wildlife Service (USFWS). 2013a. Listed and Proposed Endangered and Threatened Species and Critical Habitat; Candidate Species; and Species of Concern in Yakima County as Prepared by the U.S. Fish and Wildlife Service Central Washington Field Office. Revised April 24.
- U.S. Fish and Wildlife Service (USFWS). 2013b. Species Profile of the Ferruginous hawk (*Buteo regalis*). <http://ecos.fws.gov/speciesProfile/profile/speciesProfile.action?spcode=B06X>. Accessed July 19, 2013.
- U.S. Fish and Wildlife Service (USFWS). 2013c. Greater Sage-grouse. <http://www.fws.gov/mountain-prairie/species/birds/sagegrouse/>. Accessed May 7, 2013.
- Washington Department of Fish and Wildlife. 2013a. Washington State Species of Concern List. <http://wdfw.wa.gov/conservation/endangered/All/>. Accessed July 19, 2013.
- Washington Department of Fish and Wildlife. 2013b. Townsend's Ground Squirrel. http://wdfw.wa.gov/conservation/endangered/species/townsend's_ground_squirrel.pdf. Accessed July 19.
- Washington Department of Natural Resources. 2013. *Nicotiana attenuata* Steyd. <http://www1.dnr.wa.gov/nhp/refdesk/fguide/pdf/niat.pdf>. Accessed September 13, 2013.
- Washington Natural Heritage Program. 2013. List of Vascular Plants Tracked by the Washington Natural Heritage Program. <http://www1.dnr.wa.gov/nhp/refdesk/lists/plantrnk.html>. Accessed September 13, 2013.

APPENDIX A

Rare Plant Survey: Multipurpose Machine Gun
Range, Yakima Training Center, Washington
(Joint Base Lewis-McChord)

RARE PLANT SURVEY

MULTIPURPOSE MACHINE GUN RANGE

YAKIMA TRAINING CENTER, WASHINGTON

(JOINT BASE LEWIS MCCHORD)



September 5, 2013

Prepared by
Debra Salstrom and Richard Easterly
SEE Botanical Consulting
578 Whitecap Road
Bellingham, WA 98229
seebotanical@comcast.net

RARE PLANT SURVEY MULTIPURPOSE MACHINE GUN RANGE

YAKIMA TRAINING CENTER (JOINT BASE LEWIS MCCHORD)

Prepared by
Debra Salstrom and Richard Easterly
SEE Botanical Consulting
578 Whitecap Road
Bellingham, WA 98229
seebotanical@comcast.net



Submitted to CH2MHILL
Kira Zender, Richard Reaves
Atlanta, GA 30328
(678)530-4407
Purchase Order No 950948

All photos by Richard Easterly

September 5, 2013

TABLE OF CONTENTS

Introduction	1
Landscape Description	2
Disturbance History	3
Methods.....	5
Results	6
Discussion	11
Rare Plants.....	11
Ecological Condition.....	11
Recommendations.....	14
Acknowledgements	15
Literature Cited	16
Appendices	
A. WNHP Rare plant sighting forms	
1. <i>Pediocactus nigrispinus</i>	
2. <i>Tauschia hooveri</i>	
B. Species observed in the MPMG Range study area, Yakima Training Center, 2013.	
Tables	
1. Species tracked by the Washington Natural Heritage Program (2013) as having conservation status (or with the potential for rare plant status – Review Group 1), with the potential to occur on the proposed MPMG Range study area.	7
2. Summary of rare plant occurrences within the Multipurpose Machine Gun Range (MPMG) survey area, 2013.....	10
Figures	
1. Study area for the Multipurpose Machine Gun Range Vegetation Survey, 2013.	1
2. Pillow basalt, created when the basalt flowed into a wet area, in the Pickle Hills.	3
3. Names used in this report for sites within the 2013 vegetation survey area for the MPMG Range in Training Area 11, Yakima Training Center.	4
4. Map depicting fires since 1996 in the study area (YTC 2009). Note that some areas may have burned multiple times (earlier fires may be covered by the footprint of subsequent fires in this map depiction)	4
5. Areas searched during vegetation survey for the MPMG, 2013.	6
6. Locations of rare plants within the MPMG Vegetation Survey study area.....	9
7. One of the many clumps of antelope bitterbrush seedlings germinating from unharvested scatterhoards.....	12
8. Bare ground and high cover of Gray’s lomatium in the Pickled Hills	13

INTRODUCTION

Effective management of Army lands requires information about natural resource conditions. In accordance with compliance and stewardship responsibilities, this rare plant survey on the Yakima Training Center (YTC) was undertaken to comply with Army Regulation 200-1, which requires that consideration be given to plant species protected by state and federal laws before ground-disturbing activities are undertaken. In addition, the National Environmental Policy Act (NEPA) and YTC's Sensitive Plant Management Plan (YTC 2006) require surveys for rare and sensitive plants at proposed project sites prior to land disturbance activities or other significant projects.

The study area includes the terrain potentially affected by the proposed Multipurpose Machine Gun (MPMG) Range, which includes approximately 4,962 acres located in Training Area 11 (Figure 1). Approximately 500 acres of this site are within the construction footprint of the facility. The southern margin of the study area is defined by Cold Creek Road, the western margin is the Main Supply Route, the northern margin is the road at the south base of The Knuckles, and the eastern margin is the north-south fire break/access road (plus a tag of adjacent land to the northeast).

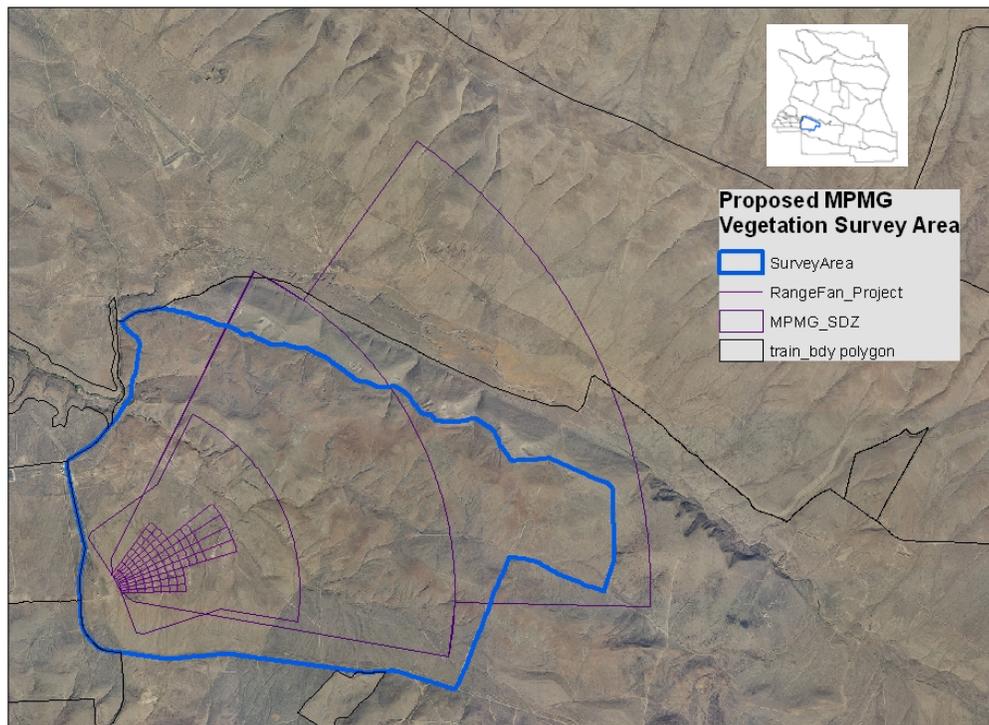


Figure 1. Study area for the Multipurpose Machine Gun Range Vegetation Survey, 2013. The portion of the MPMG SDZ not within this specific survey area was surveyed under the Convoy Life Fire plant survey (Salstrom and Easterly 2012). Inset map indicates the location of the project on the installation.

LANDSCAPE DESCRIPTION

The major Umtanum Ridge and Yakima ridge anticlines form the north and south edges (respectively) of the Selah Basin landform, in which the study area is located. These ridges rose over time, buckling along the dominant local east-west fault lines created by the Yakima fold belt. Uplift also occurred along the north-south Hog Ranch –Nanum Anticline, located immediately to the east. The study area is within the eastern portion of the basin formed between these anticlines (Selah Basin).

The ancestral Yakima River once flowed through the area, filling Selah Basin with volcanoclast-rich material and variously impacting the underlying weathered basalts (Smith 1988). An area within the Selah Basin was eventually uplifted by a minor anticline (Selah Butte; Smith 1988), and erosion subsequently removed overlying sediments and re-exposed the underlying basalt. The basalt, some of which was inherently weaker from encountering water during deposition (pillow basalts; Figure 2), was further degraded by having been buried by the sediments, resulting in highly erodible surfaces and forming a complex of hills, which are herein referred to as the 'Pickled Hills'. The basalt of the Pickled Hills comprises Wanapum Basalt flows (Schuster 1994), which are younger than Grand Ronde basalt flows exposed on the major anticlines of the Umtanum and Yakima ridges.¹ Throughout the Pickled Hills, non-basalt river stones provide evidence of the ancestral Yakima River. Over time, the historic Yakima River was forced to repeatedly reestablish its channel further to the west as the local anticlines (most notably the Hog Ranch –Nanum Anticline) continued to be uplifted.

The Pickled Hills have a complex and unusual assemblage of plant communities occupying its highly weathered geomorphology (see Easterly and Salstrom 2011). It is also the location of an active sage grouse lek site, with additional historic lek sites in the area (Dunham, personal communication).

A tributary to Selah Creek, herein called Little Selah Creek, is located along the southwest margin of Pickled Hills. Little Selah Creek drains most of the study area, including the Pickled Hills to the north and the gently north-sloping area with numerous tributaries to the south. Water was present in the stream bed of the lower reaches of Little Selah Creek during the 2013 survey. A tributary to Little Selah Creek from the north deftly bisects the Pickled Hills, and is herein referred to as Pickle Creek (Figure 3). Pickle Creek continues to erode the soft weathered basalt soils, creating numerous smaller creek valleys and drainage patterns in a valley named Hidden Valley by some troops who have trained here. A separate drainage with a spring drains the north side of Selah Butte in the western portion of the study area, trending northwest to

¹ The younger basalt has been eroded from those larger ridges, exposing the older, underlying basalts.

Selah Creek. In the lower reach of the creek is a segment of old stream bed with exposures of 'sandstone' apparently dominated by volcaniclast materials.

The geomorphology of the site and plant communities are described and mapped further in Easterly and Salstrom (2011).

DISTURBANCE HISTORY

The basin and lower slopes within the study area were historically disturbed by settlement, including numerous homesteads and livestock grazing (including horses, cattle and sheep; Owens 2005).

More recent impacts that have occurred from military use include target practice at established firing ranges, troop training, establishment of a network of roads and vehicle tracks. This results in increased fire intensity and frequency relative to that presumably experienced prehistorically (Figure 4).



Figure 2. Pillow basalt, created when the basalt flowed into a wet area, in the Pickle Hills.

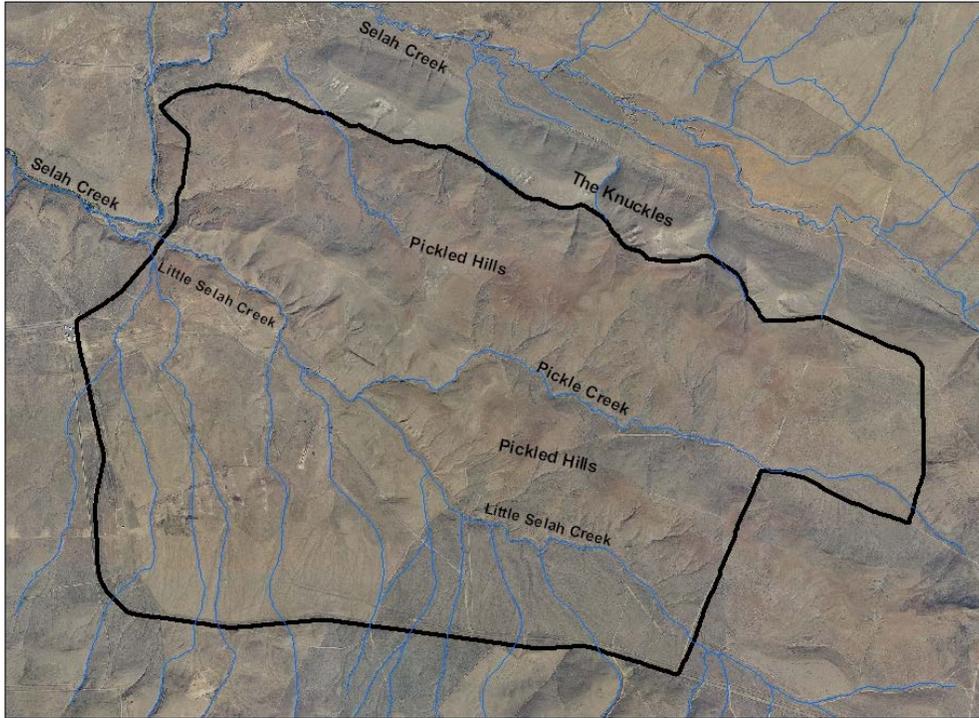


Figure 3. Names used in this report for sites within the 2013 vegetation survey area for the MPMG Range in Training Area 11, Yakima Training Center.

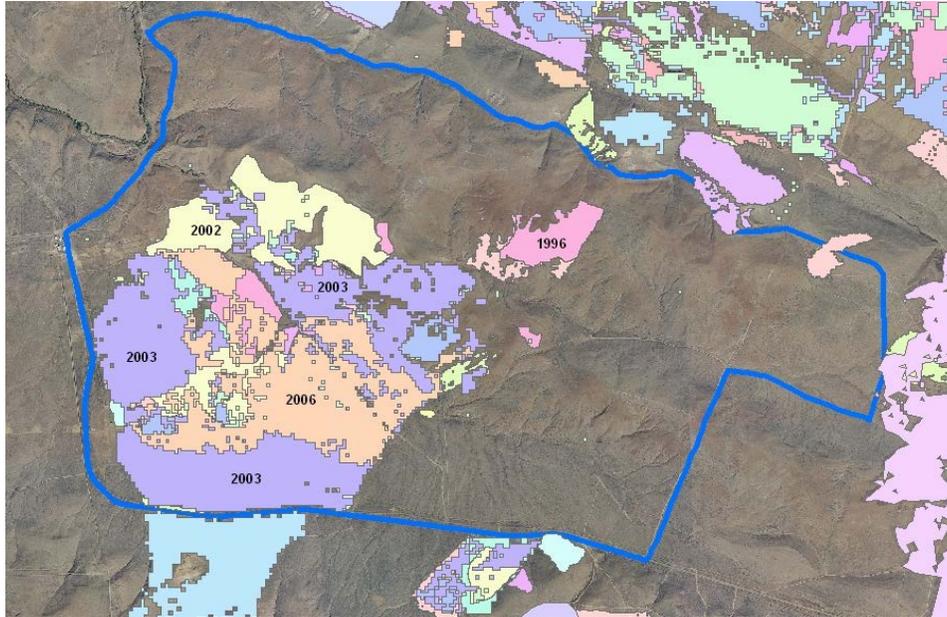


Figure 4. Map depicting fires since 1996 in the study area (YTC 2009). Note that some areas may have burned multiple times (earlier fires may be covered by the footprint of subsequent fires in this map depiction).

METHODS

The list of rare plant species tracked by the Washington Natural Heritage Program (WNHP 2013) was reviewed and the list of known and potential rare species on the Installation was updated (Table 1). This list provided the template on which the survey was planned.

The study area was surveyed between April 23 and July 2, 2013, during which time potentially suitable habitats for known rare plants were visited. Areas and habitats where known rare species occur include drainages, lithosols, rock outcrops and associated ecotonal zones. Portions of the study area less likely to support rare species (e.g., areas dominated by non-native species, having recently recovered from disturbance, apparently rehabilitated areas and areas with otherwise low species diversity) were surveyed less intensively.

The study area was surveyed during several survey periods to cover differing plant phenology: April 24-May 1, May 20-22, June 13-14, and June 27-July 2. The surveys were done by two people for a total of 38 person-days. To the degree possible, site visits were timed to coincide with optimal phenology for identification; many sites were visited more than once. The early survey was concentrated on shallow soils, which occur throughout the Pickled Hills. However, an active sage grouse lek within the study area was protected from disturbance until May 15 by a buffer of a one kilometer radius. That area was surveyed during the May 20-22 survey visit, which was a little later than ideal for the lithosols, but likely detected everything that would have been there earlier given the dryness of the early portion of the year (see Results). That area had been previously surveyed for *Taucshia hooveri* and several occurrences were known from the area.

The later surveys targeted drainages, along with general shrub steppe habitat and rock outcrops.

A map of the survey routes is presented in Figure 5. All plant species were identified using fruit or flowers when available, and a species list was compiled. Additionally, specimens were frequently collected and compared with published descriptions in order to detect variations in species characteristics.

Rare plant site locations were documented with a Garmin E-trek Venture and/or a Garmin GPS map 60CSx (UTM projection, Zone 10 North, WGS 1984 datum, WAAS enabled) GPS units with positional accuracy of less than 10 meters (usually less than four meters). Population and site data were recorded on Washington Natural Heritage Program Rare Plant Sighting Forms (WNHP 2013).

These survey methods comply with “Guidelines for Conducting and Reporting Botanical Inventories for Federally Listed, Proposed and Candidate Plants” (Yakima Training Center, 2000).

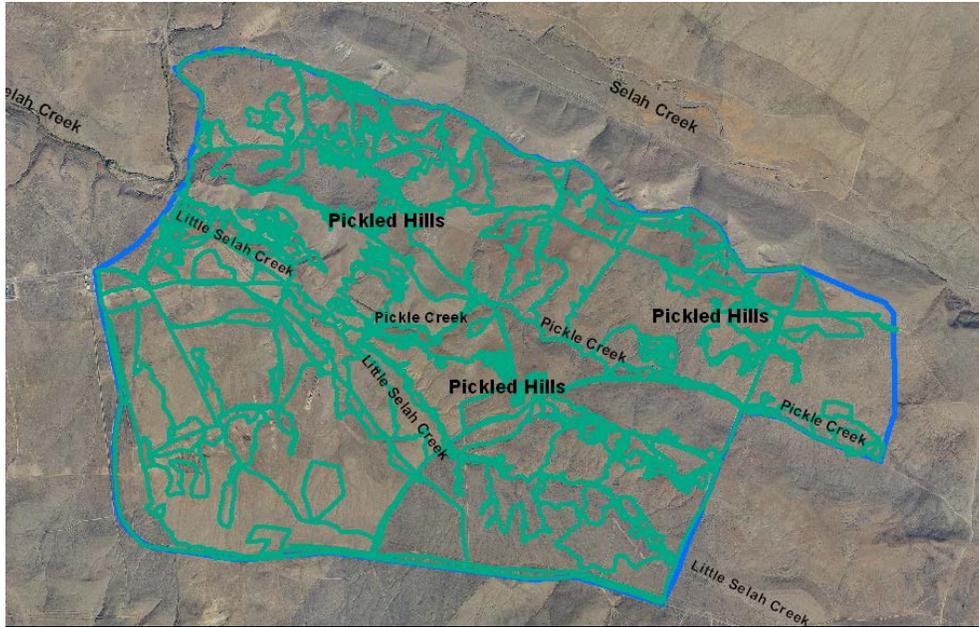


Figure 5. Areas searched during vegetation survey for the MPMG, 2013.

RESULTS

Federal and/or state rare or sensitive plant species found within the study area were the following: *Tauschia hooveri* was previously known to occur in the study area; *Pediocactus nigrispinus* was not previously reported within the study area, but was known from the general vicinity. Summaries of the occurrences are presented in Table 2; maps depicting the occurrences are presented in Figure 6. Details of each site are included on WNHP Rare Plant Sighting Forms and photographs in Appendix A.

In addition, an occurrence of eight plants of an annual species in the Polemoniaceae family was found in a roadway on June 30. Because the occurrence consisted of so few individuals, only a small piece of plant material was collected for later identification. After consulting our sources, we had not collected enough material to make a positive identification, and key characteristics were not visible in photos that we had taken. However, when the site was revisited a couple days later the road had been graded and no plants remained in the roadbed. Potential species

Table 1. Species tracked by the Washington Natural Heritage Program (2013) with conservation status (or with the potential for rare plant status – Review Group 1), and with the potential to occur on the proposed MPMG Range study area.

SPECIES	KNOWN ON YTC	COMMON NAME	WNHP STATUS	FEDERAL STATUS
<i>Aliciella leptomeria</i>	No	Great Basin gilia	T	
<i>Allium bisceptrum</i>	No	twincrest onion	S	
<i>Anthoxanthum hirtum</i>	No	common northern sweatgrass	R1	
<i>Artemisia borealis</i> var. <i>wormskioldii</i>	No	Wormskiold's northern wormwood	E	C
<i>Astragalus arrectus</i>	No	Palouse milk-vetch	T	
<i>Astragalus columbianus</i>	Yes	Columbia milkvetch	S	SC
<i>Astragalus misellus</i> var. <i>pauper</i>	Yes	pauper milk-vetch	S	
<i>Atriplex canescens</i> var. <i>canescens</i>	(Yes) ²	hoary saltbrush	R1	
<i>Chylismia scapoidea</i> ssp. <i>scapoidea</i> (<i>Camissonia scapoidea</i>)	Yes	naked-stemmed evening primrose	S	
<i>Cistanthe rosea</i>	No	rosy pussypaws	T	
<i>Collomia macrocalyx</i>	Yes	bristle-flower collomia	S	
<i>Cryptantha gracilis</i>	Yes	narrow-stem cryptantha	S	
<i>Cryptantha leucophaea</i>	Yes	gray cryptantha	S	SC
<i>Cryptantha rostellata</i>	Yes	beaked cryptantha	T	
<i>Cryptantha scoparia</i>	Yes	Miner's candle	S	
<i>Cryptantha spiculifera</i>	No	Snake River cryptantha	S	
<i>Eatonella nivea</i>	Yes	white eatonella	T	
<i>Eleocharis rostellata</i>	Yes	beaked spike-rush	S	
<i>Eremothera minor</i> (<i>Camissonia minor</i>) (<i>Eremothera minor</i>)	(Yes) ³	small-flowered evening-primrose	S	
<i>Eremothera pygmaea</i> (<i>Camissonia pygmaea</i>)	Yes	dwarf evening-primrose	S	
<i>Erigeron basalticus</i>	Yes	basalt daisy	T	SC
<i>Erigeron poliospermus</i> var. <i>cereus</i>	No	hairy-seeded daisy	R1	
<i>Eriogonum codium</i>	No	Umtanum desert buckwheat	E	PT
<i>Eriogonum maculatum</i>	No	Spotted buckwheat	X	
<i>Erythranthe washingtonensis</i> (<i>Mimulus washingtonensis</i>)	No	Washington monkey-flower	X	
<i>Erythranthe patula</i> (<i>Mimulus patulus</i>)	No	stalk-leaved monkeyflower	T	
<i>Erythranthe suksdorfii</i> (<i>Mimulus suksdorfii</i>)	Yes	Suksdorf's monkey-flower	S	
<i>Gilia inconspicua</i>	Yes	Shy gilia	R1	

² Personal observation from 2010; may not have yet been formally documented. Planted (Dunham, personal communication)

³ Personal observation from surveys during the 1990s; not formally documented from the site.

SPECIES	KNOWN ON YTC	COMMON NAME	WNHP STATUS	FEDERAL STATUS
<i>Hackelia diffusa</i> var. <i>diffusa</i>	No	diffuse stickseed	T	
<i>Hackelia hispida</i> var. <i>disjuncta</i>	No	sagebrush stickseed	S	
<i>Iliamna longisepala</i>	Yes	longsepal wild hollyhock	S	
<i>Lathrocasis tenerrima</i>	No	delicate gilia	R1	
<i>Lobelia kalmi</i>	Yes	Kalm's lobelia	E	
<i>Loeflingia squarrosa</i> ssp. <i>squarrosa</i>	No	loeflingia	T	
<i>Lomatium serpentinum</i>	No	Snake Canyon desert-parsley	S	
<i>Lomatium tuberosum</i>	Yes	Hoover's desert-parsley	S	SC
<i>Micromonolepis pusilla</i>	No	red poverty-weed	T	
<i>Microseris laciniata</i> ssp. <i>leptosepala</i>	No	cutleaf silverpuffs	R1	
<i>Mimetanthe pilosa</i>	(Yes) ⁴	false monkeyflower	R1	
<i>Minuartia nuttallii</i> ssp. <i>fragilis</i>	Yes	Nuttall's sandwort	T	
<i>Minuartia pusilla</i> var. <i>pusilla</i> (<i>Arenaria pusilla</i>)	No	annual sandwort	R1	
<i>Monolepis spathulata</i>	No	prostrate povertyweed	S	
<i>Muhlenbergia mexicana</i> var. <i>mexicana</i>	No	Mexican muhly	S	
<i>Nicotiana attenuata</i>	Yes	Coyote tobacco	S	
<i>Oenothera caespitosa</i> ssp. <i>caespitosa</i>	Yes	caespitose evening-primrose	S	
<i>Oenothera flava</i>	No	Long-tubed evening-primrose	X	
<i>Orobanche californica</i> ssp. <i>grayana</i>	No	California broomrape	E	
<i>Oxytropis campestris</i> var. <i>wanapum</i>	No	Wanapum crazyweed	E	SC
<i>Pediocactus nigraspinus</i>	Yes	snowball cactus	S	
<i>Pellaea glabella simplex</i>	No	smooth cliff-brake	R2	
<i>Penstemon eriantherus</i> var. <i>whitedii</i>	Yes	fuzzytongue penstemon	S	
<i>Phacelia tetramera</i>	No	dwarf phacelia	S	
<i>Physaria douglasii</i> ssp. <i>tuplashensis</i>	No	White Bluffs bladderpod	T	PT
<i>Polyctinium fremontii</i>	No	Fremont's combleaf	T	
<i>Polygonum austinae</i>	No	Austin's knotweed	T	
<i>Psilocarphus tenellus</i>	No	Slender woolly marbles		
<i>Ranunculus hebecarpus</i>	No	downy buttercup	R1	
<i>Rorippa curvipes</i>	No	Bluntleaved yellowcress	R1	
<i>Rumex hesperius</i>	No	western willow dock	R1	
<i>Salix monochroma</i>	No	one-color willow	R1	
<i>Sandbergia perplexa</i> (<i>Hamililobos perplexa</i> var. <i>perplexa</i>)	No	puzzling rockcress	T	
<i>Spiranthes diluvialis</i>	No	Ute ladies' tresses	T	LT

⁴ Personal observation from surveys during the 1990s; not formally documented from the site.

SPECIES	KNOWN ON YTC	COMMON NAME	WNHP STATUS	FEDERAL STATUS
<i>Tauschia hooveri</i>	Yes	Hoover's tauschia	T	SC
<i>Thelypodium sagittatum</i> var. <i>sagittatum</i>	No	arrow thelypody	S	
<i>Uropappus lindleyi</i>	No	Lindley's microseris	R1	
<i>Verbena stricta</i>	No	hoary verbena	R1	

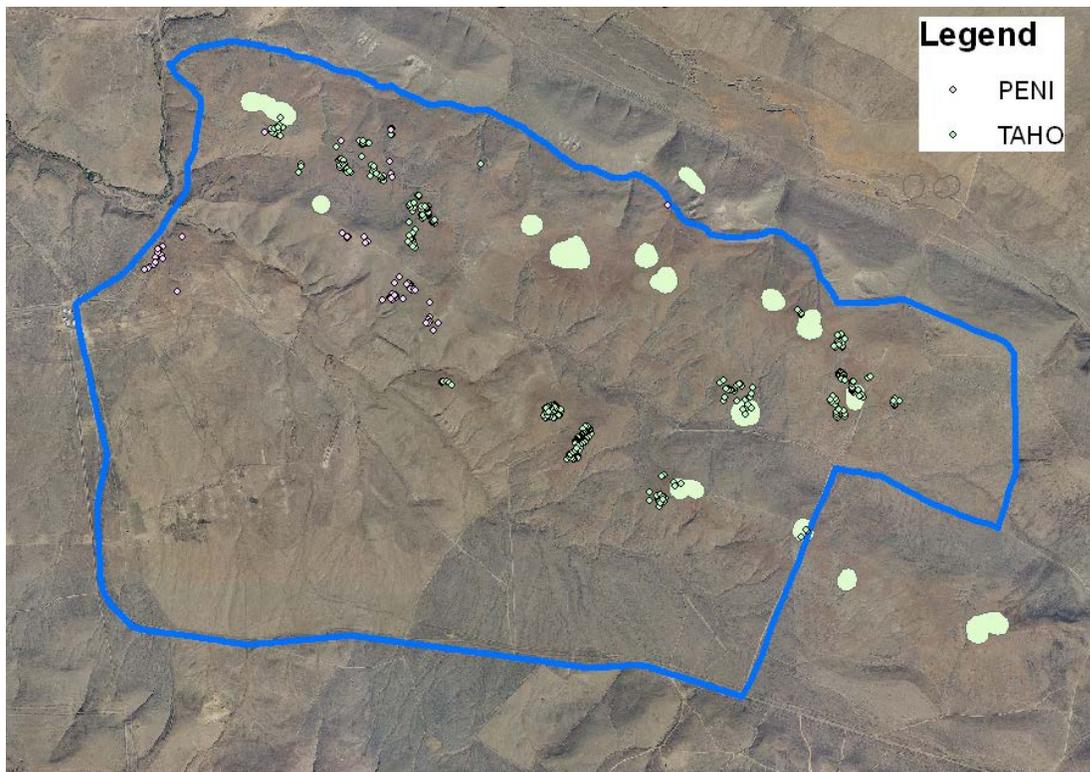


Figure 6. Locations of rare plants within the MPMG Vegetation Survey Area. PENI: *Pediocactus nigrispinus*, TAHO: *Tauschia hooveri*. *Tauschia hooveri* occurrences depicted as buffered polygons represent sites previously known from the area.

Table 2. Summary of rare plant occurrences within the Multipurpose Machine Gun Range (MPMG) survey area, 2013.

Scientific Name	Conservation Status WNHP/USFWS (WNHP 2013)	Site Name	Occurrence Summary	Protection Recommendations
<i>Gilia/Lathrocasis</i> sp.	Potential Review Group 1/None	Pickled Hills	Eight plants in roadway that was graded before positive identification could be made.	None at this time. Revisit to determine identification.
<i>Pediocactus nigrispinus</i>	Sensitive/None	Pickled Hills	Multiple sites within appropriate habitat throughout study area.	Protect from fire; protect pollinators.
<i>Tauschia hooveri</i>	Sensitive/Species of Concern	Pickled Hills	Extensive occurrence throughout appropriate habitat in study area.	Protect from direct disturbances, and from indirect effects of fire (and fire suppression) and erosion.

that it could have been include species in the *Gilia/Lathrocasis* group, some of which are potentially of conservation concern. That site will be visited in the future with the hopes that the grading acted as a seed-bed preparation and maintained the site as appropriate habitat; the plants had both mature fruits and flowers during the initial visit.

Precipitation during the winter and early spring preceding the survey was lower than normal, much reducing the potential for detecting the numerous rare plant species that are spring ephemerals. Thus, those species were looked for along with other surveys, but were not specifically targeted. However, precipitation increased beginning in mid-May, and it was relatively wet through the first three weeks of June; in addition, temperatures during that time were lower than normal. We hoped that it would have stimulated germination and development of the summer annual Coyote tobacco (*Nicotiana attenuata*, WNHP Sensitive) and possibly some of the other annuals that generally persist into late spring, such as some species of cryptantha (*Cryptantha* spp.) and the annual evening-primroses (*Eremothera* spp.; see Table 1). Thus some surveys were delayed until late June to allow for plants stimulated by the late rain to develop. However, additional germination did not appear to have been stimulated much (except for diffuse knapweed [*Centaurea diffusa*]), although many plants that had germinated early persisted and continued to develop. The moist, cool weather did prolong the growing and flowering period for several species, particularly perennials.

A list of all taxa identified during the inventory is found in Appendix B. All plants observed in the study area were identified to the degree possible with the material present (i.e., if flowers or fruit were not present for identification to the specific level).

DISCUSSION

RARE PLANTS

While *Tauschia hooveri* appears to tolerate certain disturbances on the ground surface, it is likely vulnerable to activities that would alter the hydrology of a site, such as vehicle tracks made through saturated soil. Severe erosion or grading by equipment would also negatively impact its habitat requirements. In addition, the species is likely vulnerable to disturbances that create higher vegetative cover, such as an increase in cheatgrass (*Bromus tectorum*) or bulbous bluegrass (*Poa bulbosa*), or even native vegetation such as largehead clover (*Trifolium macrocephalum*) or sagebrush violet (*Viola trinervata*). Most of the sites do not appear to be vulnerable to the direct effects of fire, but may be affected by secondary disturbances such as increased erosion from neighboring areas and the effects of fire suppression activities or application of chemicals for suppressing weedy species.

Pediocactus nigrispinus plants were scattered individually and in small patches of plants over portions of the rocky and lithosol components of the Pickled Hills in the study area. The low density of plants may reflect a strategy to avoid some type of predator or pathogen, or may be the result of limited but widespread suitable habitat. A high proportion of the plants flowered profusely for a very short period of time, which likewise may reflect a strategy for avoiding too much attention from potential predators, or may just represent the optimal window of opportunity to flower in the area. The species appears to be vulnerable to fire, as it was not found in the areas that had burned recently; occurrences within the area mapped as having burned (YTC 2009) were in pockets that did not burn, as evidenced by mature shrubs nearby. Mortality from fire may be due to tissue death and/or burned-off spines that create a breach in the physical defenses against predation.

ECOLOGICAL CONDITION

Some areas of Pickled Hills, particularly in the uplands in the northern and eastern portion, have high cover of the desirable antelope bitterbrush (*Purshia tridentata*) shrubs. As mentioned in other reports, bitterbrush shrubs often appear to support considerable diversity within this area, particularly of annual plants and insects in areas with shallow soil, which probably echoes out to other biotic strata. Interestingly, we observed many (hundreds) seedling bitterbrush plants from scatterhoards⁵ in the Pickled Hills (Figure 7), which is much more than anywhere

⁵ Scatterhoards are buried seed caches of heteromyid rodents. If the seeds are not retrieved, the scatterhoards may germinate and appear as dense clumps of seedlings (usually three to ten or more plants). Native plants that are adapted to being harvested and planted by heteromyid rodents include antelope bitterbrush and Indian ricegrass. Germination can increase dramatically after being handled by the animals; in the case of bitterbrush, germination is enhanced by the rodents removing the stigma from the seeds prior to caching (Young and Clements 2002). Those species are also adapted to grow in clumps

we've observed elsewhere in the Yakima Fold Belt and the Pasco Basin. The reasons for this are not known, nor is it known whether this is a regular occurrence in that area or the results of (a) particular event(s).

There is a relatively high incidence of bare ground, mostly reddish in color, in much of the Pickled Hills (Figure 8). While this may reflect degradation of the system as it is commonly measured in the greater (southern, Great Basin) shrub steppe ecosystem, another factor may include the friable nature of the basalt there and the ongoing uplift and erosion of the area created by both the Yakima Fold Belt and its dynamic location near the intersection with the Hog Ranch – Nanum Anticline. The unusual dominance of the tuberous-rooted Gray's lomatium (*Lomatium grayi*) plants there, together with the rare Hoover's tauschia, may reflect the plant life-strategy most adapted to the peculiarities of the site, rather than a degraded state of a formerly ideal situation in which microbiotic crust and vascular plants have a particular cover that reflects 'pristine' conditions.⁶



Figure 7. One of the many clumps of antelope bitterbrush seedlings germinating from unharvested scatterhoards.

of plants and to germinate at the approximate depth they are typically buried (1-2 inches; Young and Clements 2002). Ninety-nine percent of all seedling antelope bitterbrush plants were from scatterhoards over a four year period in a study in Nevada (Young and Clements 2002). Reasons that the seed caches are not harvested may include unusually abundant seed production the previous year, or predations of the rodents before the scatterhoards were consumed. The latter possibility may link successful plant regeneration to a dynamic population of predators.

⁶ The idea of the continued uplift, reflecting an on-going, ancient geomorphic process and the interaction with 'trend' may be reflected in the distribution of *Lomatium quintuplex* on the adjacent Umtanum Ridge, where it is narrowly endemic, but is without conservation status. The lack of conservation status is due to its vigorous response to disturbance.



Figure 8. Bare ground and high cover of Gray's lomatium in the Pickled Hills.

Another remarkable aspect of the Pickled Hills is the high cover of buckwheats, particularly the Blue Mountain buckwheat (*Eriogonum strictum* vars. *proliferum* and *strictum*), which can be found in relatively dense concentrations in some of the open sites. In addition, species of needlegrass are more common here than elsewhere, most commonly Thurbers needlegrass (*Achnatherum thurberianum*), but also, interestingly, western needlegrass (*A. occidentale* ssp. *californicum*). The distribution of the latter species on the Installation is not currently well understood.

The western portion of Little Selah Creek Basin in the study area has been partially burned. The unburned southeastern portion has remarkably high cover of Douglas' sedge (*Carex douglasii*)⁷ and microbial crust, especially near the creek. The site has a slight north aspect, and cheatgrass is relatively uncommon except where the soil surface is continually disrupted, as in the minor north-trending drainages on the site.

The western portion of the Little Selah Creek Basin in the study area burned in 2002, 2003, and/or 2006 (YTC 2009; see Figure 3). While weedy species such as tumblemustard (*Sisymbrium altissimum*) and diffuse knapweed are widespread and can be locally dominant, there is a

⁷ This is the most Douglas' sedge we have observed on the Installation.

remarkable complex and dominance of native forbs, including basalt milkvetch (*Astragalus filipes*) and western hawkbeard (*Crepis occidentalis*). Shrubs that sprout after fire, including green rabbitbrush (*Chrysothamnus viscidiflorus*) and spineless horsebrush (*Tetradymia canescens*), are present through that area.

Little Selah Creek is relatively diverse, especially in its lower reaches and in a tributary to the south where the topography of the surrounding basalt causes the water to be on the surface. Trees, including quaking aspen (*Populus tremuloides*), cottonwood (*P. balsamifera* ssp. *trichocarpa*) and willow (*Salix* spp.), are located in the lower reaches of Little Selah Creek, and provide cover and habitat for large mammals. Some aspen had obviously been used as rubbing objects for the antlers of the local deer population. While some of these tree occurrences had been reduced or eliminated by earlier fires, their importance to wildlife is still apparent.

The main weedy species in the study area were diffuse knapweed, bulbous bluegrass and kochia (*Kochia scoparia*). Kochia is mostly limited to along roads that have been treated with herbicides, where it can be thick. Tumblemustard was locally abundant, especially in the burned area and drainages. Houndstongue (*Cynoglossum officinale*) was present, and sometimes abundant, in the lower reaches of Little Selah Creek.⁸

It is not known the extent to which a potential increase in fire frequency associated with establishing the MPMG might weaken the ecosystem. While the current system has exhibited resiliency, and stand replacement fires have been limited to the area closest to the planned MPMG, larger fires into areas with little historic fire impacts could alter site dynamics for both flora and fauna, and especially for sage grouse and their habitat needs. Conditions under which long-lived species that currently occur within the area were established may or may not exist currently and/or into the future.

RECOMMENDATIONS

- **Control fire** in the area by limiting ignition to the degree practicable and creating/maintaining strategically defensible firelines. The existing firebreaks have been effective to some extent; continue to strategize to prevent frequent re-burning and to respond quickly to ignitions. Consider establishing and maintaining additional redundant firebreak roadways near to the MPMG's target area to minimize fire size, which may create areas for controlled backfires during fire events. Preventing fire from reentering the Little Selah Creek drainage to the north of the MPMG should be considered a high priority, both for preservation of quality riparian habitat for fauna and to allow complexity of the riparian and upland flora to continue to reestablish itself. Likewise, preventing fires from crossing the hardened road into the unburned sagebrush and bitterbrush communities to the east of the MPMG footprint is also a high priority.

⁸ This species appears to be spreading rapidly; we don't remember it from our early days on the Installation. While this is interesting to note, we don't recommend treatment at this time.

- **Revisit site of *Gilia/Lathrocasis* plants** that was disturbed by road grading before an identification of the species was made.
- Monitor and **restrict training activities, including road access, when the ground is saturated.**
- Assess the effects of previously applied **biocontrols** (and other methods) for diffuse knapweed and consider judicious retreatment.
- Continue to **record management** treatments. This provides a valuable resource for interpreting vegetation patterns on the landscape.
- Portions of this area appear to be particularly **susceptible to erosion**, especially after fire and from the network of **roads** in portions of the site. Avoid driving off hardened roads and consider closing or limiting access on some of the unimproved roads (especially under wet conditions); continue to construct and maintain water bars throughout the area.
- Look closely at the dominant Gray's lomatium on Pickled Hills, considering whether the form of the species there can be distinguished from the species as it is more broadly distributed; elsewhere, that species is generally found in openings around drainages.
- Continue to document the **unusual assemblage of species** on Pickled Hills.
- Continue to establish permanent **photo points** to detect trends in the structure and composition of the vegetation elsewhere on the site. Develop protocols for establishing photo points consistent with that developed by Easterly, so that points are quick to replicate and photos are filed for efficient access and retrieval.
- Assess plant **response to use of herbicides** along some roadways (apparent increase of kochia). Limit herbicide spraying to active roadways where noxious weed seed dispersal can be reduced or eliminated while minimizing chemical impacts on native flora and rare plant habitat.
- Consider mining information on plant preferences by butterflies in all their life stages available in 'Life History of Cascadia Butterflies' (James and Nunnallee 2011), which may prove to be an incredible resource and helpful management tool.

ACKNOWLEDGEMENTS

We are grateful for the extremely dedicated and effective folks that work at in the Department of Environment and Natural Resources at YTC, several of whom have been working there for decades, including Margaret Taaffe, Steve Kruger, Pete Nissen, Colin Leingang and Lisa Dunham. The overall habitat conditions have greatly improved on the installation since we started working there in the early 1990s, largely due to the efforts of these and other ED staff. Thanks also to Paul Erlandson and others at Range Control.

We appreciate the administration of the contract by our friends in Georgia at CH2MHill (Dr. Rich Reaves, Kira Zender and Josh Jamell) and the Army Corp of Engineers (Brian Peck). We

especially appreciate the stimulating question from Brian at an early meeting (to paraphrase): 'What is interesting/surprising about what you've observed so far'.

LITERATURE CITED

- Easterly, R.T. and D.L. Salstrom. 2011. 2010: Upland Vegetation Planning Level Survey, Southern Portion of the Yakima Training Center. Unpublished report submitted to the Yakima Training Center, Washington.
- Hitchcock, C.L. and A. Cronquist. 1973. Flora of the Pacific Northwest: An Illustrated Manual. University of Washington Press, Seattle.
- James, D.G., and D. Nunnallee. 2011. Life histories of Cascadia Butterflies. Oregon State University Press, Corvallis.
- Salstrom, D. and R. Easterly. 2012. Rare plant survey for the proposed Convoy Live Fire study area, Yakima Training Center, Washington. Unpublished report submitted to the Yakima Training Center, Washington. 40p.
- Schuster, J.E. [compiler]. 1994. Geologic Map of the East Half of the Yakima 1:100,000 Quadrangle, Washington. Division of Geology and Earth Resources, Washington DNR. Open File Report 94-12.
- Smith, G.A. 1988. Neogene synvolcanic and syntectonic sedimentation in central Washington. Geological Society of America Bulletin 100: 1479-1492.
- Washington Flora Checklist. 2013. Online list of Washington Flora with updated taxonomy. Maintained by the UW Burke Herbarium. (<http://biology.burke.washington.edu/herbarium/waflora/data.php>, August 2013.)
- WNHP (Washington Natural Heritage Program). 2013. List of Vascular Plants Tracked by the Washington Natural Heritage Program. (<http://www1.dnr.wa.gov/nhp/refdesk/lists/plantrnk.html>, last accessed August 10, 2013).
- Yakima Training Center. 2000. Guidelines for Conducting and Reporting Botanical Inventories for Federally Listed, Proposed and Candidate Plants. In: Yakima Training Center. 2006. Sensitive Plant Management Plan: Appendix A. Environment and Natural Resources Division, Yakima Training Center, Washington. 90p.
- Yakima Training Center. 2009. Fire-Out map. GIS map layer provided to SEE Botanical by L. Dunham in 2009.
- Yakima Training Center. 2011. Distribution of rare plants on the Yakima Training Center. GIS map layer provided to SEE Botanical by L. Dunham.
- Young, J.A. and C.D. Clements. 2002. *Purshia: The Wild and Bitter Roses*. University of Nevada Press, Reno.

APPENDIX A. WASHINGTON NATURAL HERITAGE PROGRAM RARE PLANT
SIGHTING FORMS FOR MPMG RANGE SURVEY, 2013

1. *Pediocactus nigrispinus*..... A-2
2. *Tauschia hooveri*..... A-5

Washington Natural Heritage Program
Rare Plant Sighting Form

Taxon Name: *Pediocactus nigrispinus*

Are you confident of the identification? **Yes**

Survey Site Name: **The Pickled Hills (NW portion of Training Area 11)**

Surveyor's Name/Phone/Email: **Debra Salstrom & R. Easterly /360 481-1786/SEEbotanical@comcast.net**

Survey Date: **13-04-24 to 12-06-14** (yr-mo-day) County: **Yakima**

Ownership (if known): **USDOD (Yakima Training Center)**

I used GPS to map the population: **Yes**

X Coordinates are in electronic file on diskette (preferred)

Description of what coordinates represent: **Points at center of occurrence.**

Point locations for plants/patches of plants.

GPS accuracy: **Garmin 60CSx**

x Uncorrected

GPS datum: **WGS 1984**

To the best of my knowledge, I mapped the entire extent of this population: **Yes, within this MPMG study area.**

Is a revisit needed? **No**

Population Size (# of individuals or ramets) or estimate: **240 plants.**

Population (EO) Data (include population vigor, microhabitat, phenology, etc): **Widely scattered individuals (less frequently, patches of individuals) over several hundred acres. 240 plants counted and mapped. Most individuals were of moderate to high vigor; widespread flowering during a portion of the survey (May, June). Scattered dead stems observed (no cause apparent; likely just persistent old plant carcasses). Many of the plants had multiple branches.**

Plant Association (include author, citation, or classification, e.g. Daubenmire): ***Artemisia rigida/Poa secunda, Eriogonum thymoides/Poa secunda***

Associated Species (include % cover by layer and by individual species for dominants in each layer):

Lichen/moss layer: **0-15**

Herb layer: ***Poa secunda, Balsamorhiza hookeri, Lithophragma glabrum, Phlox hoodii, Lomatium macrocarpum, Arabis cusickii, Penstemon gairdneri, Nestotus, stenophyllus***

Shrub layer(s): *Purshia tridentata*, *Artemisia rigida*

General Description (include description of landscape, surrounding plant communities, land forms, land use, etc.): **Lithosols and adjoining margins on south aspects on the Pickled Hills (S of the Knuckles) especially along hilltops and side ridges. Often near/in areas with surface rocks and/or basalt outcrops.**

Minimum elevation (ft.): 1960 Maximum elevation (ft.): 2490

Size (acres): Cumulatively, up to hundred acres Aspect: East to South to West Slope: **5 to >40 degrees**

Photo taken? **Yes**

Management Comments (exotics, roads, shape/size, position in landscape, hydrology, adjacent land use, cumulative effects, etc.): **Appears to be vulnerable to fire. Most of the areas mapped as burned within the past 15 years that included potential PENI habitat did not have PENI plants.**

Protection Comments (legal actions/steps/strategies needed to secure protection for the site): **Likely sensitive to increased frequency/intensity of wildfire and ground disturbance.**

Additional Comments (discrepancies, general observations, etc.): **The Pickled Hills are made up of weathered basalts impacted by the ancestral Yakima River that once flowed across and shaped this region of YTC. The deposition and subsequently eroded geology within the Selah Basin creates unusual habitats that support an interesting assortment of plant species.**





Washington Natural Heritage Program

Rare Plant Sighting Form

Taxon Name: *Tauschia hooveri*

Are you confident of the identification? **Yes**

Survey Site Name: **The Pickled Hills. (NW portion of Training Area 11)**

Surveyor's Name/Phone/Email: **Debra Salstrom & R. Easterly /360 481-1786/seebotanical@comcast.net**

Survey Date: **2013-04-24 to 2013-05-21** (yr-mo-day) County: **Yakima**

Township: **14N** Range: **20E** Section(s): **21, 22, 25, 26, 27, 35** 1/4 of 1/4: **SEofNE; SEofNW,SW,SE; S1/2of NW,SW; S1/2; SEofSE; NEofNW**

Ownership (if known): **USDOD (Yakima Training Center)**

I used GPS to map the population: **Yes**

Coordinates are in electronic file on diskette

Description of what coordinates represent: **Points at center of patch/occurrence**

GPS accuracy: **Garmin 60CSx**

Uncorrected

GPS datum: **WGS 1984**

To the best of my knowledge, I mapped the entire extent of this population: **Yes, within the MPMG study area.**

Is a revisit needed? **No**

Population Size (# of individuals or ramets) or estimate: **Thousands of plants**

Population (EO) Data (include population vigor, microhabitat, phenology, etc): **Located in lithosols and similar habitat, especially along hilltops and side ridges in the weathered and degrading soils of the Pickled Hills (S of The Knuckles). Overall, plants of moderate vigor, some plants in flower, some vegetative.**

Plant Association (include author, citation, or classification, e.g. Daubenmire):

Lichen/moss layer: **0-10%**

Herb layer: *Lomatium grayi*, *L. gormanii*, *L. macrocarpum*, *Draba verna*, *Achnatherum thurberianum*, *Ceratocephala testuclata*, *Bromus tectorum*, *Poa secunda* (10%), *Phlox hoodii*, *Lewisia rediviva*, *Nestotus stenophyllus*

Shrub layer(s): 1-10%. *Artemisia rigida*, *A. tridentata*, *Purshia tridentata*, *Eriogonum sphaerocephalum*, *E. strictum*.

General Description (include description of landscape, surrounding plant communities, land forms, land use, etc.): **Located in lithosols and similar habitat, especially along hilltops and side ridges in the weathered soils of the Pickled Hills (S of the Knuckles). The Pickled Hills are made up of weathered basalts impacted by the ancestral Yakima River that once flowed across and shaped this region of YTC. The deposition and subsequently eroded geology within the Selah Basin creates unusual habitats that support an interesting assortment of plant species, some of which are rare.**

Minimum elevation (ft.): **2300** Maximum elevation (ft.) **2480**

Size (acres): **Many sites, multiple acres total size over multiple acres** Aspect: **NE thru S to NW aspects** Slope: **0 to over 20 degrees**

Photo taken? **Yes**

Management Comments (exotics, roads, shape/size, position in landscape, hydrology, adjacent land use, cumulative effects, etc.): ***Bromus tectorum* and *Poa bulbosa* present. The sites are susceptible to degradation from military training activities, trampling, excessive erosion, fire (may have sufficient vegetation cover to carry fire) and fire-fighting efforts. Cover of *Poa bulbosa* appears to be increasing in the general area.**

Protection Comments (legal actions/steps/strategies needed to secure protection for the site): **Protect from ground disturbing activities, chemical applications and fire.**

Additional Comments (discrepancies, general observations, etc.): **Habitat for this species is widespread within the study area (Pickled Hills).**



APPENDIX B. SPECIES OBSERVED IN THE MPMG RANGE STUDY AREA, YAKIMA TRAINING CENTER, 2013.

The updated taxonomy is taken from the Washington Flora Checklist (2013).

Current name	Hitchcock and Cronquist (1973)	Habitat					
		Drainages	ARTR/ PSSP- HECO	ARTRP/ FEID	Disturbed sites	Rock outcrops	Lithosol
<i>Achillea millefolium</i> L		X	X		X		
<i>Achnatherum hymenoides</i> (Roemer & J.A. Schultes) Barkworth	<i>Oryzopsis hymenoides</i>		X				
<i>Achnatherum occidentale</i> (Thurb. ex S. Wats.) Barkworth ssp. <i>californicum</i> (Merr. & Burtt-Davey ex Hall) Barkworth		X	X				X
<i>Achnatherum thurberianum</i> (Piper) Barkworth	<i>Stipa thurberiana</i>		X				X
<i>Acroptelon repens</i>	<i>Centaurea repens</i>	X			X		
<i>Agastache occidentalis</i> (Piper) Heller		X					
<i>Agoseris grandiflora</i> (Nutt.) Greene			X				
<i>Agoseris heterophylla</i> (Nutt.) Greene		X	X				X
<i>Agropyron cristatum</i> (L.) Gaertn		X	X		X		
<i>Allium acuminatum</i> Hook.			X			X	X
<i>Allium</i> L.						X	X
<i>Alyssium alyssoides</i>		X					X
<i>Amaranthus albus</i> L		X	X				
<i>Amelanchier alnifolia</i> (Nutt.) Nutt. ex M. Roemer		X				X	
<i>Amsinckia lycopsoides</i> Lehm.		X	X				
<i>Amsinckia menziesii</i> (Lehm.) A.Nelson & J.F. Macbr. var. <i>intermedia</i> (Fisch & C.A. Mey.) Ganders		X					
<i>Amsinckia menziesii</i> var. <i>menziesii</i> (Lehm.) A. Nels. & J.F.	<i>Amsinckia retrorsa</i>		X				X

Current name	Hitchcock and Cronquist (1973)	Habitat					
		Drainages	ARTR/ PSSP- HECO	ARTRP/ FEID	Disturbed sites	Rock outcrops	Lithosol
Macbr.							
<i>Amsinckia tessellata</i> A. Gray var. <i>tessellata</i>		X	X				
<i>Antennaria dimorpha</i> (Nutt.) Torr. & Gray			X				X
<i>Aperta interrupta</i> (L.) Beauv.	<i>Agrostis interrupta</i>	X					
<i>Apocynum cannabinum</i> L.		X					
<i>Arabis cusickii</i> S. Wats.							X
<i>Arabis hoelboelii</i> var. <i>retrofracta</i>						X	X
<i>Arabis sparsiflora</i> Nutt. var. <i>subvillosa</i>						X	X
<i>Artemisia rigida</i> (Nutt.) Gray						X	X
<i>Artemisia tridentata</i> Nutt.		X	X		X		
<i>Artemisia tripartita</i> Rydb.				X			
<i>Asclepias speciosa</i> Torr.		X					
<i>Astragalus filipes</i> Torr. ex Gray			X	X			
<i>Astragalus leibergii</i> M.E. Jones			X				X
<i>Astragalus lentiginosus</i> var. <i>lentiginosus</i> Dougl. ex Hook		X	X				
<i>Astragalus lyallii</i> Gray			X	X			
<i>Astragalus purshii</i> Dougl. ex Hook.			X			X	X
<i>Astragalus sclerocarpus</i> Gray			X				
<i>Balsamorhiza careyana</i> Gray		X	X			X	X
<i>Balsamorhiza hookeri</i> Nutt.							X
<i>Berula erecta</i> (Huds.) Coville var. <i>incisa</i> (Torr.) Cronq.		X					
<i>Brickellia oblongifolia</i> Nutt		X					
<i>Bromus japonicus</i> Thunb. ex Murr.		X					
<i>Bromus secalinus</i> L.		X					

Current name	Hitchcock and Cronquist (1973)	Habitat					
		Drainages	ARTR/ PSSP- HECO	ARTRP/ FEID	Disturbed sites	Rock outcrops	Lithosol
<i>Bromus tectorum</i> L.		X	X		X	X	X
<i>Buglossoides arvensis</i> (L.) I.M. Johnston	<i>Lithospermum arvense</i>	X	X				
<i>Calochortus macrocarpus</i> Dougl.			X				
<i>Camelina microcarpa</i> DC.			X				
<i>Camelina sativa</i> (L.) Crantz		X	X				
<i>Carex douglasii</i> Boott		X	X				
<i>Carex filifolia</i> Nutt. var. <i>filifolia</i>			X	X			
<i>Carex nebrascensis</i> Dewey		X					
<i>Carex pellita</i> Muhl. ex Willd		X					
<i>Carex stipata</i> Muhl. ex Willd. var. <i>stipata</i>		X					
<i>Castilleja thompsonii</i> Pennel			X	X			
<i>Centaurea diffusa</i> Lam.		X	X		X		
<i>Chaenactis douglasii</i> var. <i>douglasii</i> (Hook.) Hook. & Arn.	<i>Chaenactis douglasii</i> var. <i>achillaeafolia</i>	X	X				X
<i>Chenopodium album</i> L.		X	X		X		
<i>Chenopodium leptophyllum</i> (Moq.) Nutt. ex S. Wats.			X		X		
<i>Chorispora tenella</i> (Pallas) DC.		X			X		X
<i>Chrysothamnus viscidiflorus</i> (Hook.) Nutt.		X	X		X		
<i>Cirsium arvense</i> (L.) Scop		X			X		
<i>Claytonia perfoliata</i> ssp. <i>perfoliata</i> Donn ex Willd.	<i>Montia perfoliata</i>	X	X	X		X	X
<i>Clematis ligusticifolia</i> Nutt.		X				X	
<i>Collinsia parviflora</i> Lindl.		X	X	X		X	X
<i>Collomia grandiflora</i> Dougl. ex Lindl.		X	X	X		X	X
<i>Collomia linearis</i> Nutt.		X	X			X	X

Current name	Hitchcock and Cronquist (1973)	Habitat					
		Drainages	ARTR/ PSSP- HECO	ARTRP/ FEID	Disturbed sites	Rock outcrops	Lithosol
<i>Comandra umbellata</i>			X				
<i>Conyza canadensis</i> (L.) Cronq		X	X		X		
<i>Crepis atribarba</i> Heller		X	X				X
<i>Crepis intermedia</i> Gray			X				
<i>Crepis</i> L.		X	X				X
<i>Crepis modocensis</i> Greene							X
<i>Crepis occidentalis</i> Nutt.			X				X
<i>Crocidium multicaule</i> Hook.							X
<i>Cryptantha ambigua</i> (Gray) Greene		X	X				
<i>Cryptantha circumscissa</i> (Hook. & Arn.) I.M. Johnson			X				X
<i>Cryptantha pterocarya</i> (Torr.) Greene		X	X	X	X		
<i>Cryptantha watsonii</i> (Gray) Greene		X	X				
<i>Cynoglossum officinale</i> L		X					
<i>Cystopteris fragilis</i> (L.) Bernh						X	
<i>Delphinium nuttallianum</i> Pritz. ex Walp			X			X	X
<i>Deschampsia danthonioides</i> (Trin.) Munro		X					
<i>Descurainia incana</i> ssp. <i>incana</i> (Bernh. ex Fisch. & C.A. Mey.) Dorn	<i>Descurainia richardsonii</i>	X	X				
<i>Descurainia incana</i> ssp. <i>viscosa</i> (Rydb.) Kartesz & Gandhi	<i>Descurainia richardsonii</i> var. <i>viscosa</i>	X	X				
<i>Descurainia sophia</i> (L.) Webb ex Prantl		X			X		
<i>Dipsacus fullonum</i> ssp. <i>sylvestris</i> (Huds.) Clapham	<i>Dipsacus sylvaticum</i>	X					
<i>Distichlis spicata</i> (L.) Greene		X	X				
<i>Draba verna</i> L.		X	X	X	X	X	X
<i>Elaeagnus angustifolia</i> L.		X					

Current name	Hitchcock and Cronquist (1973)	Habitat					
		Drainages	ARTR/ PSSP- HECO	ARTRP/ FEID	Disturbed sites	Rock outcrops	Lithosol
<i>Eleocharis palustris</i> (L.) Roemer & J.A. Schultes		X					
<i>Elymus elymoides</i> ssp. <i>elymoides</i> (Raf.) Swezey	<i>Sitanion hystrix</i>	X	X		X		
<i>Epilobium brachycarpum</i> K. Presl	<i>Epilobium paniculatum</i>	X	X				
<i>Epilobium</i> L.		X	X				
<i>Epilobium minutum</i> Lindl. ex Lehm.			X	X			
<i>Equisetum arvense</i> L.		X					
<i>Equisetum laevigatum</i> A. Braun		X					
<i>Eremopyron triceum</i>	<i>Agropyron triticeum</i>	X			X		
<i>Ericameria nauseosa</i> var. <i>nauseosa</i> (Pallas ex Pursh) Nesom & Baird	<i>Chrysothamnus nauseosus</i>	X	X	X	X		
<i>Ericameria resinosa</i> Nutt.	<i>Haplopappus resinosus</i>					X	
<i>Erigeron corymbosus</i> Nutt.		X	X	X			
<i>Erigeron divergens</i> Torr. & A. Gray			X				
<i>Erigeron filifolius</i> (Hook.) Nutt.			X				
<i>Erigeron</i> L.			X				
<i>Erigeron linearis</i> (Hook.) Piper			X				X
<i>Erigeron poliospermus</i> Gray			X				X
<i>Erigeron pumilus</i> Nutt.			X				
<i>Eriogonum douglasii</i> Benth		X					X
<i>Eriogonum heracleoides</i> Nutt.			X	X			X
<i>Eriogonum microthecum</i> Nutt. var. <i>laxiflorum</i> Hook.			X			X	
<i>Eriogonum niveum</i> Dougl.		X	X				
<i>Eriogonum sphaerocephalum</i> Dougl. ex Benth.			X			X	X
<i>Eriogonum strictum</i> Benth var. <i>proliferum</i>							X

Current name	Hitchcock and Cronquist (1973)	Habitat					
		Drainages	ARTR/ PSSP- HECO	ARTRP/ FEID	Disturbed sites	Rock outcrops	Lithosol
<i>Eriogonum strictum</i> Benth. var. <i>strictum</i>							X
<i>Eriogonum thymoides</i> Benth.							X
<i>Eriogonum vimineum</i> Douglas ex Bentham		X	X				X
<i>Eriophyllum lanatum</i> (Pursh) Forbes		X	X				X
<i>Erodium cicutarium</i> (L.) L'Hér. ex Ait		X	X		X		X
<i>Erucastrum gallicum</i> (Willd.) O.E. Schulz		X					
<i>Erysimum capitatum</i> (Douglas ex Hook.) Greene var. <i>capitatum</i>		X					
<i>Euphorbia glyptosperma</i> Engelm.		X	X		X		X
<i>Festuca idahoensis</i> Elmer				X			
<i>Fritillaria pudica</i> (Pursh) Spreng.			X				
<i>Galium aparine</i> L.		X	X	X		X	
<i>Galium multiflorum</i> Kellogg		X	X	X		X	
<i>Galium triflorum</i> Michx		X	X	X			
<i>Gallium</i> L.		X	X	X		X	
<i>Gilia sinuata</i> Dougl. ex Benth.			X				X
<i>Glyceria elata</i> (Nash ex Rydb.) M.E. Jones		X					
<i>Gnaphalium</i> L.		X					
<i>Grayia spinosa</i> (Hook.) Moq.			X				X
<i>Helenium autumnale</i> L.		X	X				
<i>Hesperostipa comata</i> ssp. <i>comata</i> (Trin. & Rupr.) Barkworth	<i>Stipa comata</i>	X	X				
<i>Heterocodon rariflorum</i> Nutt.		X					
<i>Holosteum umbellatum</i> L.		X	X	X	X	X	X
<i>Hypericum perforatum</i> L.		X	X		X		

Current name	Hitchcock and Cronquist (1973)	Habitat					
		Drainages	ARTR/ PSSP- HECO	ARTRP/ FEID	Disturbed sites	Rock outcrops	Lithosol
<i>Ipomopsis minutiflora</i> (Benth.) V. Grant	<i>Gilia minutiflora</i>	X	X				
<i>Iva axillaris</i> Pursh		X					
<i>Juncus acuminatus</i> Michx.		X					
<i>Juncus balticus</i> Willd. Ssp. <i>ater</i> (Rydb.) Snogerup		X					
<i>Juncus bufonius</i> L.		X					
<i>Kochia scoparia</i> (L.) Schrad.		X			X		
<i>Koeleria macrantha</i> (Ledeb.) J.A. Schultes	<i>Koeleria cristata</i>	X	X	X			
<i>Lactuca serriola</i> L.		X	X		X		
<i>Lagophylla ramosissima</i> Nutt.		X	X		X		
<i>Lappula occidentalis</i> var. <i>occidentalis</i> (S. Wats.) Greene	<i>Lappula redowskii</i>	X	X				
<i>Lathyrus lanszwertii</i> var. <i>lanszwertii</i>		X					
<i>Lemna minor</i> L.		X					
<i>Lepidium latifolium</i> L.		X					
<i>Lepidium perfoliatum</i> L.		X			X		
<i>Lewisia rediviva</i> Pursh							X
<i>Leymus cinereus</i> (Scribn. & Merr.) A. Löve	<i>Elymus cinerius</i>	X	X				
<i>Lithophragma glabrum</i> Nutt.							
<i>Lithospermum ruderale</i> Dougl. ex Lehm		X	X	X			
<i>Logfia arvensis</i> (L.) Holub	<i>Filago arvensis</i>	X					
<i>Lomatium dissectum</i> (Nutt.) Mathias & Constance			X			X	
<i>Lomatium farinosum</i> var. <i>hamblenii</i> (Mathias & Constance) Schlessman	<i>Lomatium hamblenii</i>						X
<i>Lomatium gormanii</i> (T.J. Howell) Coult. & Rose							X
<i>Lomatium grayi</i> (Coult. & Rose)		X	X				

Current name	Hitchcock and Cronquist (1973)	Habitat					
		Drainages	ARTR/ PSSP- HECO	ARTRP/ FEID	Disturbed sites	Rock outcrops	Lithosol
<i>Lomatium macrocarpum</i> (Nutt. ex Torr. & Gray) Coult. & Rose			X	X			X
<i>Lomatium triternatum</i> (Pursh) Coult. & Rose			X	X			X
<i>Lupinus arbustus</i> ssp. <i>calcaratus</i> (Kellogg) D. Dunn	<i>Lupinus laxiflorus</i> var. <i>calcaratus</i>			X			
<i>Lupinus bingenensis</i> var. <i>subsaccatus</i> Suksdorf	<i>Lupinus sulphureus</i> var. <i>subsaccatus</i>		X	X			
<i>Lupinus sericeus</i> Pursh var. <i>sericeus</i>			X				
<i>Machaeranthera canescens</i> (Pursh) Gray		X	X				
<i>Madia exigua</i> (Sm.) Gray		X	X				
<i>Madia glomerata</i> Hook.		X	X				
<i>Melilotus albus</i> Medik.					X		
<i>Melilotus officinalis</i> (L.) Lam.					X		
<i>Mentha</i> L.		X			X		
<i>Mentzelia albicaulis</i> (Dougl. ex Hook.) Dougl. ex Torr. & Gray		X	X				
<i>Mertensia</i> sp.			X	X			
<i>Mimulus floribundus</i> Lindl.		X					
<i>Mimulus guttatus</i> DC.		X				X	
<i>Myosotis</i> sp.		X					
<i>Myosurus</i> sp.							X
<i>Nama densum</i> J.G. Lemmon var. <i>parviflorum</i> (Greenm.) C.L. Hitchc.		X					X
<i>Nasturtium officinale</i> W. T. Aiton		X					
<i>Neoholmgrenia hilgardii</i> (Greene) W.L. Wagner & Hoch	<i>Oenothera hilgardii</i>		X				X
<i>Nepeta cataria</i> L.		X					
<i>Nestotus stenophyllus</i> (A. Gray) Urbatsch, R. P. Roberts & Neubig							X
<i>Nothocalais troximoides</i> (Gray) Greene	<i>Microseris troximoides</i>		X				X

Current name	Hitchcock and Cronquist (1973)	Habitat					
		Drainages	ARTR/ PSSP- HECO	ARTRP/ FEID	Disturbed sites	Rock outcrops	Lithosol
<i>Opuntia fragilis</i> (Nutt.) Haw.		X	X				
<i>Orobanche corymbosa</i> (Rydb.) Ferris			X				
<i>Orobanche fasciculata</i> Nutt.			X				
<i>Pediocactus nigrispinus</i> (Hochstatter) Hochstatter	<i>Pediocactus simpsonii</i> var. <i>robustior</i> (Coul.) L. Benson					X	X
<i>Penstemon gairdneri</i> Hook.							X
<i>Penstemon humilis</i> Nutt. ex Gray		X	X	X			
<i>Penstemon richardsonii</i> Dougl. ex Lindl.		X					
<i>Penstemon</i> sp. (<i>speciosus</i> variant)		X	X				
<i>Penstemon speciosus</i> Dougl. ex Lindl.		X	X				
<i>Perideridia gairdneri</i> (Hook. & Arn.) Mathias		X		X			
<i>Phacelia hastata</i> Dougl. ex Lehm.		X	X	X		X	X
<i>Phacelia linearis</i> (Pursh) Holz		X	X				X
<i>Phemeranthus spinescens</i> (Torr.) Hershkovitz							X
<i>Philadelphus lewisii</i> Pursh		X					
<i>Phlox gracilis</i> ssp. <i>gracilis</i> (Hook.) Greene	<i>Microseris gracilis</i>	X	X	X	X		X
<i>Phlox hoodii</i> Richards							X
<i>Phlox longifolia</i> Nutt.			X	X			
<i>Phoenicaulis cheiranthoides</i> Nutt.							X
<i>Plantago patagonica</i>			X				
<i>Plectritis macrocera</i> Torr. & Gray		X	X	X		X	X
<i>Poa bulbosa</i> L.		X	X		X		X
<i>Poa compressa</i> L.		X					
<i>Poa cusickii</i> Vasey			X	X			

Current name	Hitchcock and Cronquist (1973)	Habitat					
		Drainages	ARTR/ PSSP- HECO	ARTRP/ FEID	Disturbed sites	Rock outcrops	Lithosol
<i>Poa pratensis</i> L.		X					
<i>Poa secunda</i> J. Presl		X	X	X	X	X	X
<i>Poa secunda</i> J. Presl	<i>Poa juncifolia</i>	X	X		X		
<i>Polemonium micranthum</i> Benth.			X				X
<i>Polygonum aviculare</i> L.		X	X		X		
<i>Polygonum</i> L.		X			X		
<i>Polygonum majus</i> (Meisn.) Piper							
<i>Polypogon monspeliensis</i> (L.) Desf		X					
<i>Populus tremuloides</i> Michx		X					
<i>Populus trichocarpa</i> Torr. & Gray ex Hook.		X					
<i>Potentilla biennis</i> Greene		X					
<i>Potentilla</i> L.		X					
<i>Prunus virginiana</i> var. <i>melanocarpa</i> (A. Nels.) Sarg		X					
<i>Pseudoroegneria spicata</i> (Pursh) A. Löve	<i>Agropyron spicatum</i>	X	X	X	X	X	X
<i>Pteryxia terebinthina</i> var. <i>terebinthina</i> (Hook.) Coult. & Rose	<i>Cymopterus terebinthes</i>	X	X			X	
<i>Purshia tridentata</i> (Pursh) DC		X	X			X	X
<i>Ranunculus glaberrimus</i> Hook.			X	X		X	X
<i>Ranunculus</i> L.		X					
<i>Ranunculus testiculatus</i> Crantz		X	X	X	X	X	X
<i>Ranunculus testiculatus</i> (Crantz) Bess.	<i>Ranunculus testiculatus</i>	X	X		X	X	X
<i>Ribes aureum</i> Pursh		X	X	X			
<i>Ribes cereum</i> Dougl.		X	X	X			
<i>Rosa</i> L.		X					
<i>Rosa woodsii</i> Lindl. var. <i>ultramontana</i> (S. Wats.) Jepson		X					

Current name	Hitchcock and Cronquist (1973)	Habitat					
		Drainages	ARTR/ PSSP- HECO	ARTRP/ FEID	Disturbed sites	Rock outcrops	Lithosol
<i>Rumex crispus</i> L.		X					
<i>Rumex venosus</i>			X				
<i>Salix exigua</i> Nutt.		X					
<i>Salix</i> L.		X					
<i>Salsola tragus</i> L.	<i>Salsola kali</i>	X	X		X		
<i>Salvia dorrii</i> (Kellogg) Abrams		X	X			X	X
<i>Sambucus nigra</i> L. ssp. <i>caerulea</i> (Raf.) R. Bolli		X					
<i>Sarcobatus vermiculatus</i> (Hook.) Torr.		X					
<i>Schedonorus arundinaceus</i> (Schreb.) Dumort		X					
<i>Schedonorus pratensis</i> (Huds.) P. Beauv.		X					
<i>Schoenoplectus americanus</i> (Pers.) Volk. ex Schinz & R. Keller	<i>Scirpus americanus</i>	X					
<i>Scirpus microcarpus</i> J.& K. Presl		X					
<i>Scrophularia lanceolata</i> Pursh		X					
<i>Silene noctiflora</i> L.		X	X		X		
<i>Sisymbrium altissimum</i> L.		X	X		X	X	X
<i>Sisymbrium loeselii</i> L.		X	X		X		
<i>Solidago</i> L.		X					
<i>Stebbinsoseris heterocarpa</i> (Nutt.) Chambers, comb. nov. ined	<i>Microseris heterophylla</i>	X	X				X
<i>Stephanomeria minor</i> var. <i>minor</i> (Hook.) Nutt.	<i>Stephanomeria tenuifolia</i>	X	X				
<i>Stephanomeria paniculata</i> Nutt.		X					
<i>Symphoricarpos albus</i> (L.) Blake		X	X	X			
<i>Taraxacum officinale</i> Weber ex F.H. Wigg		X					
<i>Tauschia hooveri</i> Mathias & Constance							X
<i>Tetradymia canescens</i> DC.		X	X	X			

Current name	Hitchcock and Cronquist (1973)	Habitat					
		Drainages	ARTR/ PSSP- HECO	ARTRP/ FEID	Disturbed sites	Rock outcrops	Lithosol
<i>Townsendia florifer</i> (Hook.) Gray		X	X				X
<i>Toxicodendron rydbergii</i> (Small ex Rhdb.) Greene	<i>Rhus diversiloba</i>	X					
<i>Tragopogon dubius</i> Scop		X	X	X	X		
<i>Trifolium cyathiferum</i> Lindl		X					
<i>Trifolium macrocephalum</i> (Pursh) Poir.							X
<i>Trifolium</i> sp.		X					
<i>Triteleia grandiflora</i> Lindl.		X					
<i>Typha latifolia</i> L.		X					
<i>Urtica dioica</i> L.		X					
<i>Verbascum thapsus</i> L.		X			X		
<i>Verbena bracteata</i> Lag. & Rodr.		X			X		
<i>Veronica anagallis-aquatica</i> L.		X					
<i>Veronica</i> L.		X					
<i>Viola trinervata</i> (T.J. Howell) T.J. Howell ex Gray							X
<i>Vulpia bromoides</i> (L.) S.F. Gray	<i>Festuca bromoides</i>		X		X		
<i>Woodsia oregana</i> D.C. Eat.			X	X		X	
<i>Zigadenus venenosus</i> S. Wats.			X	X			

APPENDIX B

Comments and Responses



State of Washington

Department of Fish and Wildlife

*South Central Region – Ellensburg District Office, 201 North Pearl, Ellensburg, WA 98926
Phone: (509) 962-3421, Fax (509) 925-4702*

January 17, 2014

Margaret A. Taaffe
Chief, Environmental Division
Joint Base Lewis-McChord YTC
970 Firing Center Road
Yakima, WA 98901-9399

RE: Washington State Department of Fish and Wildlife (WDFW) comments on the EA for the Multi-Purpose Machine Gun Range - Joint Base Lewis-McChord Yakima Training Center (YTC)

Dear Margaret:

Thank you for the opportunity to provide comments on this proposal and environmental assessment. WDFW has reviewed the proposal and has the following comments at this time.

Purpose and Need

In section 1.3 of the environmental assessment, we find the following language:

1.3 PURPOSE OF THE PROPOSED ACTION

“The purpose of the Proposed Action is to provide year-round, comprehensive, and realistic training and range facilities to support recurring training requirements for units that train at JBLM YTC to meet basic marksmanship skills. The MPMG range would be used by Soldiers assigned to units that train at JBLM YTC.”

A Year-Round Facility

A lightly developed area demonstrating limited investment will be transformed into a formal and entirely modern range facility with this proposal. A use that could be moved without an appreciable loss of investment is proposed to become a modern facility at a fixed location representing a significant monetary commitment. Development of this nature is essentially

irreversible. This is an irretrievable irreversible commitment of resources because of the level of investment and the role it will play in the mission of the Army at JBLM YTC.

Leks and Nesting

Sage-grouse use in and around the proposed range is acknowledged.

On page 19 of the EA we read, *“The area around the Range 5 lek continues to be used by sagegrouse during the nesting/brood-rearing and early to mid-fall seasons, as evidenced by visual observations and telemetry locations of radio-marked sage-grouse (Leingang, 2013).”*

Critical information that would assist review is not included. The active lek location, telemetry and survey information are not disclosed and depicted on maps. Generally, it is a good practice to limit dissemination of sensitive species locations however, we are discussing information interior to a secure military facility. Inclusion of this information is essential. This lack of specific information paints an incomplete and inaccurate picture of the situation and frustrates analysis.

The sage-grouse population here in Washington is in a precarious state. Nationally, the greater sage-grouse population is warranted but precluded for listing as a threatened species. A permanent facility of this nature in a habitat that supports the bird should be carefully and cautiously evaluated. Actions that preclude conservation at important locations for sage-grouse are a significant cause for concern. We have no surplus birds and surplus occupied locations. The YTC is one of the few remaining locations supporting a population. This is where the birds have retracted to; these are the last places where the birds are found.

Federal Status Review

The Western States in the range of the greater sage-grouse are currently assembling information for the United States Fish and Wildlife Service (USFWS) on all on-going actions that affect sage-grouse. The USFWS will utilize this information from the States in their listing process to determine whether a federal listing of the sage-grouse will occur. Projects such as the MPMG Range and Vantage to Pomona Heights 230 kV Transmission Line will inform the listing decision. This range proposal in its current form is cause for concern because grouse conservation is not furthered by the proposed action.

Overhead Structure

There are perching structures and miles of artificial lineal features, such as transmission lines, that provide elevated perching habitat across the YTC. The YTC has considerable control over these features but does not appear to be exercising aggressive control or actively eliminating them even though the sage-grouse population is imperiled. To build the proposed range and increase the perching habitat for grouse predators in the vicinity of occupied habitat is a significant concern, particularly if it is not a major priority under pre-project conditions.

Efficacy of Perching Prevention

Perching prevention measures are proposed in the EA. Perching prevention measures have proven to be largely ineffectual. We can provide graphics depicting a wide variety of anti-perching measures intended to prevent or discourage perching. All the anti-perching measures in the graphic have birds, (raptors and corvids) perching on them. Proposals to install anti-perching devices are a measure that a well-meaning individual might propose, but they do not accomplish the stated or desired outcome.

Sage Grouse Protection Zone

The Sage-Grouse Protection Standards are proposed to be relaxed as part of this range proposal. It appears from the little sage-grouse utilization information that was provided, that these protection standards should be strengthened and apply to more hours of the day and more of the life history of the bird, from lek through to adult. There appears to be an overemphasis on just one portion of the life history of the bird with the current standard.

Reasonable Range of Alternatives

A reasonable range of alternatives was not provided. More than one viable alternative should have been explored.

Permanent Impact

Permanent impacts must be addressed by permanent mitigation. This loss at this location is not fully quantifiable based on the incomplete information provided. Mitigation must be of a type and at a scale commensurate with the circumstances.

Mitigation

The electrical transmission lines leading to range control that would also serve the new facility extend for miles along the paved road leading to range control. The infrastructure for this transmission lines represents artificial perching structure for raptors and corvids. These birds prey on sage-grouse. This transmission lines therefore contributes to sage-grouse mortality and impacts the quality of the habitat for sage-grouse use in the vicinity of the line route. The negative impacts of this line will persist for as long as the line is in place. This represents a chronic negative impact. An opportunity exists to ameliorate this impact as mitigation for the permanent commitment and habitat loss that the MPMG Range represents. The equipment mobilized for development of the proposed range could be utilized to bury significant lengths of the transmission line that services range control and the proposed MPMG Range. This would potentially represent a meaningful contribution to overall sage-grouse conservation on YTC. This should be investigated.

Conclusion

A reasonable range of alternatives was not provided. Because the EA lacks specificity with respect to sage-grouse use and fails to disclose where sage-grouse activity and active leks occur in and around the proposal, it is impossible for reviewers to accurately assess impacts to this species. The only reasonable conclusion is that the EA is incomplete and inadequate.

Thank you for the opportunity to provide these comments. If you have any questions regarding these comments please feel free to contact me. I can be reached at (509) 962-3421.

Sincerely,

A handwritten signature in cursive script that reads "Mark S. Teske".

Mark S. Teske, WDFW Habitat

CC: Perry Harvester, WDFW
Michael Livingston, WDFW



United States Department of the Interior



FISH AND WILDLIFE SERVICE

Washington Fish and Wildlife Office

Central Washington Field Office
215 Melody Lane, Suite 103
Wenatchee, WA 98801-8122

IN REPLY REFER TO:
USFWS Reference: 01EWF00-2014-CPA-0012
Hydrologic Unit Code: 17-03-00-01-07

January 17, 2013

Margaret A. Taaffe
Chief, Environmental Division
Joint Base Lewis-McChord Yakima Training Center
Yakima, WA 98901

Dear Ms. Taaffe,

The U.S. Fish and Wildlife Service (Service) appreciates the opportunity to review and provide comments on your Final Environmental Assessment (EA) for the proposed Multipurpose Machine Gun (MPMG) Range (Project) at Joint Base Lewis-McChord Yakima Training Center (JBLM YTC). The Project area is situated in south-central Washington State, on the southwest edge of the JBLM YTC boundary, near the city of Yakima, Washington. Two alternatives are considered in the Final EA: 1) No Action; and 2) Construction of a MPMG range within the footprint of Range 5, an existing weapons range. We provide these comments in accordance with the provisions of the National Environmental Policy Act (NEPA) (42 U.S.C. 4321 *et seq.*), as amended; the Fish and Wildlife Coordination Act (FWCA) (16 U.S.C. 661 *et seq.*), as amended; and the Endangered Species Act (ESA) (16 U.S.C. 1531 *et seq.*), as amended.

The Service has numerous concerns related to the proposed Project. Among these, the effect of the proposed Project on the greater sage-grouse (*Centrocercus urophasianus*; hereafter "sage-grouse") is one of our greatest. The sage-grouse is a candidate for listing under the ESA. Currently there are two relatively isolated sage-grouse populations remaining in Washington. One population is found predominantly on private lands in Douglas and Grant counties and the other population is located on JBLM YTC. The baseline condition of both populations is tenuous due to small population size, isolation from other populations, and other factors like habitat removal due to development and natural disturbances such as wildfire. The JBLM YTC, together with the Hanford site, comprises the largest block of shrub steppe remaining in Washington. This Project is located within two-miles of a sage-grouse lek and is within areas identified by the Service as priorities for sage-grouse conservation efforts (Priority Areas of Conservation [PAC]). The Project is also located in JBLM YTC's designated Sage-grouse Protection Areas (SGPA). Location within the SGPA, PAC, and overlap with a sage-grouse lek magnifies our desire to find ways to avoid or minimize the impact of the proposed Project on this candidate species.

We appreciate the Army's commitment to operational changes at the JBLM YTC with potential benefits for sage-grouse. In keeping with this commitment, we strongly recommend development and implementation of mitigation actions to be included in the proposed Project that will contribute to conserving the second largest population of sage-grouse (approximately 150 individuals) in the state of Washington. Our comments below are intended to provide specific ideas about what measures could be effective in minimizing Project effects on sage-grouse.

Limited Range of Alternatives in the Final Environmental Assessment

The Service is concerned with the limited range of alternatives analyzed in the EA. In the traditional mitigation sequence, avoidance of impacts either in space or in time is always the most desirable approach in Project planning, followed by impact minimization and compensatory mitigation. In the context of the proposed Project, an alternative should have been structured around a Project site that does not contain a lek location and is outside a SGPA. We suggest additional analysis of alternative locations for the MPMG that would either avoid or more effectively minimize impacts to sage-grouse through spatial avoidance.

Sage-grouse

We find that temporal avoidance measures provided for sage-grouse in the lone action alternative are not sufficient to minimize impacts of the Project to this species. The Service encourages the Army to consider implementation of the following recommendations to increase the effectiveness of temporal avoidance:

- 1. Relocation:** The Service cannot support a Project location in which either the footprint of the MPMG range or the Surface Danger Zone (SDZ) encompasses an active lek, a sage-grouse nest, or sage-grouse use during which live-fire overshoots could cause lek or nest abandonment, injury, or death to sage-grouse. We highly recommend including an alternative that locates the Project outside of any SGPA.
- 2. 24-hour Seasonal Restriction:** We appreciate the 9-hour daily timing restrictions on use of the MPMG Range during the lekking season (February 1 through May 15), to minimize disturbance to the lek. We do not feel, however, that this protection measure does enough to prevent adverse effects to sage-grouse. This conservation measure would only reduce Project effects to individuals on the lek while roosting and strutting, but it does not account for daytime use of the SDZ for foraging or for nesting by hens. During the breeding, nesting, and brood-rearing stages, sage-grouse are spatially concentrated and behaviorally adapted to remain near the site of breeding, which at JBLM YTC averages approximately 4-miles from lek of attendance (Cadwell

et al. 1994). After brood-rearing is complete, sage-grouse are more mobile and may move out of the SDZ to avoid impact. Neither the proposed 9-hour daily timing restriction nor the seasonal restrictions adequately provide protection from sage-grouse that may use the habitat within the SDZ. If the Project is to remain in its current location, we highly recommend including a protection measure for a seasonal restriction from use at MPMG at Range 5 from February 1 to June 15 to encompass the entire breeding and brood-rearing season.

3. **Elevated Protection Measures:** If relocation of the proposed Project or the seasonal restrictions are not feasible, the Service would like to, at a minimum, see the following additional protection measures be implemented to moderately mitigate the adverse effects that could be expected from use of the Range:
 - a. Increase the size of the seasonal buffers from training activities around active leks from a 0.6-mile radius to a 4-mile radius and extend the 9-hour (midnight to 9:00 am) timing restriction, changing restricted activity to 10:00 pm through 10:00 am from February 1 through May 15 to incorporate a more accurate portrayal of when sage-grouse are associated with the lek (i.e. roosting the night before, cessation of strutting, etc.). A 4-mile radius buffer should provide additional protection for nesting sage-grouse.
 - b. Monitor for sage-grouse nesting or presence within the SDZ. If nests are located, cease operation of the Range 5 MPMG until the nest either fails or hatches successfully. If non-nesting sage-grouse presence is observed, cease operation of the Range 5 MPMG until all sage-grouse have moved out of the SDZ.
 - c. Construction of any supporting facilities should be routinely inspected for use by common ravens (*Corvus corax*: hereafter "raven") or other members of the Corvidae family (hereafter "corvid"). Nests of corvids should be removed if found. Adding infrastructure upon which ravens are likely to nest may increase predation pressure on sage-grouse inhabiting areas near the Range 5 MPMG.
 - d. Supporting facilities include construction of fencing. Please reanalyze whether fencing is absolutely necessary, as collision with fencing is a known direct cause of sage-grouse mortality. If fencing is necessary to the site, then fencing should be marked with reflective wildlife markers such as that described in Stevens et al. (2011).

- e. Investigate the impact that distance, timing, levels, and recurrence of noise have on the sage-grouse population at JBLM YTC. If it appears that sudden noises during the nesting and brood-rearing season are causing nest or brood abandonment, relevant and appropriate remedies should be developed immediately to stabilize the JBLM YTC population of sage-grouse.

While the Service is optimistic that these protection measures are a reasonable approach to stabilizing and improving conditions for sage-grouse in the long-term, the existing baseline habitat and population conditions for the Columbia Basin DPS of sage-grouse is perilous.

Avian Predator Management Plan

There are no predator species that specialize on sage-grouse; however, environmental conditions that affect availability of primary prey (e.g. rodent populations) can shift avian predator foraging strategies, thereby increasing avian predator impact on sage-grouse or their nests. In a single population of sage-grouse, the raven, a generalist species, has been documented as the cause of approximately 50% of nest depredation (Lockyer et al. 2013). Historically, sagebrush-steppe habitats likely had relatively low raven population densities because of lack of natural nesting substrates (Leu et al. 2008). Ravens are documented to opportunistically forage on food that is available less than 1.5-km from their nests (Boarman and Heinrich 1999); therefore, management of raven nests on anthropogenic infrastructure within and adjacent to sage-grouse habitats can provide considerable conservation benefits.

Managing avian predation is complex and requires balancing the needs of competing species within the guidelines of the ESA and other federal laws, such as the Migratory Bird Treaty Act. We recommend developing an Avian Predator Management Plan as it pertains to sage-grouse nest depredation. This Plan would be the first step in the process of determining if raven nest removal activities on infrastructure constructed at JBLM YTC is needed to improve the productivity of the local sage-grouse population. This Plan could expedite issuance of the proper permits in order to decrease the higher presence of nesting substrate due to anthropogenic presence within sage-grouse habitat and thus likely decrease some predation pressure on nesting sage-grouse.

Compliance with Section 7 of the ESA

Section 7 of the ESA and its implementing regulations (at 50 CFR Part 402) require Federal agencies to review their actions at the earliest possible time to determine whether any action may affect listed species or critical habitat. Although not required by ESA, the Service encourages the formation of partnerships through Section 7(a)(4) to conserve candidate species. By definition, these species may warrant future protection under the ESA. The effects of the proposed action, while mitigated by conservation measures, are still anticipated to

result in a loss of shrub-steppe habitat and could result in the direct loss of individual sage-grouse, lek abandonment, and/or abandonment or loss of sage-grouse nests. Therefore, it is the Service's opinion that a formal conference should occur for this Project. The Army should prepare a Biological Assessment (BA) to evaluate the potential effects of the Project on sage-grouse and determine whether the action may be likely to jeopardize the continued existence of sage-grouse within the state of Washington.

The ESA does not preclude the Army from taking an action with adverse effects to the sage-grouse as a candidate species. However, if the sage-grouse is listed, the Army may be required to modify or suspend its on-going operations at this facility pending completion of formal consultation under section 7 of the ESA.

Summary Comments

Across the range of the sage-grouse, the Service has worked with a wide variety of partners to implement sufficiently broad and effective conservation measures that the sage-grouse would not need the additional protections provided by listing under the ESA. Considerable progress is being made in these efforts by a diverse team, all contributing to the broader mission of averting the listing of the sage-grouse. We look forward to working with staff of the JBLM YTC to enhance sage-grouse conservation and contribute to this range-wide conservation effort, starting with meaningful modifications of the proposed Project to reduce its impacts.

Thank you for your assistance in the conservation of species while providing for the defense of our Nation. Please contact Heather McPherron, Fish and Wildlife Biologist by phone at 509-665-3508 ext. 2011, or by e-mail at heather_mcperron@fws.gov for questions regarding our comments on the Project and all technical assistance questions regarding sage-grouse. Again, thank you for including us in the review of the Final EA.

Sincerely,



Ken S. Berg, Manager
Washington Fish and Wildlife Office

cc (via email):

Colin Leingang (colin.g.leingang.civ@mail.mil)

Mark Teske (Mark.Teske@dfw.wa.gov)

Mike Livingston (michael.livingston@dfw.wa.gov)

LITERATURE CITED:

- Boarman, W.I. and B. Heinrich. 1999. Common Raven (*Corvus corax*). In the Birds of North America 476 (A. Poole and F. Gill, Editors). Academy of Natural Sciences, Philadelphia, PA, USA, and American Ornithologists' Union, Washington, DC, USA.
- Cadwell, L.L., M.A. Simmons, J.L. Downs, and C.M. Sveum. 1994. Sage-grouse on the Yakima Training Center: A summary of studies conducted during 1991 and 1992. Pacific Northwest Laboratory, Richland, WA. 36 pp.
- Leu M., S.E. Hanser, S.T. Knick. 2008. The human footprint in the west: a large-scale analysis of anthropogenic impacts. *Ecological Applications* 18:1119-1139.
- Lockyer, Z.B., P.S. Coates, M.L. Casazza, S. Espinosa, D.J. Delehanty. 2013. Greater sage-grouse nest predators in the Virginia Mountains of northwestern Nevada. *Journal of Fish and Wildlife Management* 4: 242-254.
- Stevens, B.S., K. Reese, J. Connelly, D. Musil. 2011. Greater Sage-grouse and fences: does marking reduce collisions? *Wildlife Society Bulletin* 36: 297-303.



DEPARTMENT OF THE ARMY
INSTALLATION MANAGEMENT COMMAND
JOINT BASE LEWIS-MCCHORD YAKIMA TRAINING CENTER
970 FIRING CENTER ROAD
YAKIMA, WA 98901-9399

March 17, 2014

SUBJECT: Review of Final Environmental Assessment for the proposed Multipurpose Machine Gun Range Project at Joint Base Lewis-McChord Yakima Training Center

Mr. Mark Teske
Habitat Biologist
Washington State Department of Fish and Wildlife
South Central Region, Ellensburg District Office
201 North Pearl
Ellensburg, WA 98926

Dear Mr. Teske:

I am in receipt of your letter dated January 17, 2014 regarding your agency's comments on the Final Environmental Assessment (EA) for the proposed Multipurpose Machine Gun (MPMG) Range at Joint Base Lewis-McChord Yakima Training Center (JBLM YTC). This letter responds to these comments and is intended to address concerns raised in the letter.

JBLM YTC supports management of candidate species such as greater sage-grouse (*Centrocercus urophasianus*; hereafter "sage-grouse") as demonstrated by our long-term commitment of conservation efforts directed towards this species since 1989. A summary of these extensive management efforts can be found in the recent Washington Department of Fish and Wildlife's report, Draft: Sage-grouse Conservation in Washington: 2013 (Stinson and Schroeder 2014).

The Army recognizes that effective conservation efforts prior to having a species listed as threatened or endangered under the Endangered Species Act (ESA) maximizes management options for landowners, regulatory agencies, land management agencies, and the species; it minimizes the cost of recovery; and it reduces the potential for restrictive land-use policies. In addition, as threats are reduced and populations are increased or stabilized, priority for listing can be shifted to those species in greatest need of the ESA's protective measures.

In trying to strike a balance between the management of natural resources and military mission requirements, both agencies have a mutual interest in the success of candidate conservation for sage-grouse on YTC. In so much as the Army has the responsibility to further the goals of the ESA (Endangered Species Act, 1973, Sec.2.(c) (1)), the Sikes Act requires both state and federal agencies to work cooperatively to

sustain the capabilities of military installation lands to support the military mission while ensuring conservation of natural resources to include candidate species. Regulatory burdens on training lands associated with federally listing sage-grouse could result in significant training restrictions putting the installation's ability to support its military mission in jeopardy. Proactive management through cooperative means helps protect species and habitats, reduces the need for federal listing of the species, while helping the Army meet its military training mission.

JBLM YTC is also aware of its importance as occupied habitat for one of the two existing populations within the state and its regional significance of providing some of the last remaining large contiguous areas of shrub-steppe in the Columbia Basin. These situations, as well as, providing no net loss in the capability of installation lands to support the military mission, underscores the importance of YTC conservation efforts. By working together to ensure success in these conservation efforts, listing could be avoided and training flexibility maintained.

The following information responds to specific comments provided by WDFW on the EA:

Year-Round Facility

Concern: WDFW raised a concern that a lightly developed area will be transformed into a formal range at a fixed location and that such a development in their view represents an irreversible and irretrievable commitment of resources.

The installation does not agree with the WDFW's characterization of the area in which the MPMG Range is proposed as being "lightly" developed. The existing Range 5 (area proposed to be upgraded to a MPMG Range) has been a formal range operating year-round at this fixed location since 1955. It currently contains developed assets to include stationary armor targets, moving armor targets, firing positions, target berms, service roads, maneuver lanes, range signs, hardened parking areas, and an existing storage facility that is fenced. Current use at Range 5 includes live-fire small arms and machine gun training, tank and Bradley main gun firing, and dismounted and mounted maneuver. Training doctrine and standards evolve over time and the existing Range 5 does not meet the current training standards or range requirements as described in Department of Army Training Circular 25-8 (Training Ranges) necessitating the need for the proposed action. The proposed MPMG project constitutes an upgrade of the existing Range 5 and would, in the end, result in the cessation of maneuver and tank gunnery at this location. The EA further describes the differences between the existing Range 5 facility and that which is being proposed with the MPMG Range at the same location at page 7.

Leks and Nesting

Concern: WDFW raised a concern that additional critical information (e.g., active lek locations, telemetry, and survey information) would assist in review of the analysis and

since it was not included it results in an incomplete and inaccurate picture of the existing conditions and frustrates the impact analysis.

Response: Within the MPMG EA, YTC provided a complete and accurate depiction of the existing conditions for sage-grouse for use in the analysis. It described and disclosed information on active and inactive leks (breeding habitat), nesting/brood-rearing seasonal habitat (as indicated by sage-grouse use information; telemetry data and/or direct observation/incidental sightings), existing land-use, and potential impacts the proposed action would likely have on sage-grouse and their habitat. This treatment was sufficient to allow Army decision-makers to evaluate impacts of the range upgrade alternative. It was an appropriate level of detail given that training at the range would not increase above base levels under that proposal and the range has supported both military training and sage-grouse for many years.

Federal Status Review

Concern: WDFW raised concerns that the proposed MPMG project in its current form is cause for concern because grouse conservation is not furthered by the proposed action. This concern was given in the context of a current range-wide review of sage-grouse conservation actions taking place by various state and federal agencies and the consideration of that information during the USFWS's listing process.

Response: The installation acknowledges the current WDFW effort to assemble and review conservation actions within Washington State (Stinson and Schroeder 2014) and YTC has participated by providing a comprehensive list of its actions that further conservation of the species. YTC also participates annually during the US Fish and Wildlife Service's (USFWS) annual Candidate Notice of Review process which accounts for conservation actions implemented and potential impacts to sage-grouse on the installation and is familiar with the policy (Policy for Evaluation of Conservation Efforts When Making Listing Decisions; PECE process; USFWS 2003) the USFWS employs when evaluating agency's actions related to potential ESA listings.

Sage-grouse occur throughout much of the installation to include established ranges and the proposed MPMG project area. The proposed MPMG Range project was originally disclosed and generally analyzed during Final Environmental Impact Statement (FEIS) for the Fort Lewis Army Growth and Force Structure Realignment: hereafter "GTA EIS", (JBLM 2010) as an upgrade to the current Range 5 at JBLM YTC (Chapter 2, Table 2-4, Figure 2-7, Appendix A:Table A-2). WDFW participated in scoping for the GTA EIS and is aware of the extensive fire and sage-grouse related mitigation package that came as a result of that EIS and the associated Record of Decision (ROD).

The proposed MPMG, in its current form, is an upgrade of an existing range and although there are insignificant impacts to sage-grouse and habitat acknowledged in the EA, it is the opinion of the installation that co-locating this proposed range on an existing facility footprint, where similar impacts currently occur, should be viewed as minimizing

impacts to this species. Training already occurs at this site and any associated impacts from training would not increase under the preferred alternative. Any potential training-related impact remains at historical levels or decreases under the proposed option. In addition, with the extensive list of fire and sage-grouse related mitigation measures contained within the GTA EIS, and by association, their implementation as part of the proposed MPMG, conservation of this species is furthered by the proposed action. It is YTC's long-term implementation of such conservation actions and its continued commitment to do so that has allowed sage-grouse populations to continue to exist on the installation compared to adjacent public lands where suitable habitat exists but sage-grouse are absent.

Overhead Structure

Concern: WDFW expressed concerns over the inclusion of overhead structures (e.g., transmission lines) that would increase perching habitat for sage-grouse predators as part of the MPMG project. WDFW further expressed a view that there are miles of such features across YTC and the installation was not "exercising aggressive control or actively eliminating them even though the sage-grouse population is imperiled".

Response: The impact of overhead structures and how best to mitigate any potential impact is currently being addressed from an installation-wide perspective. Research is on-going. In the mid-1990's YTC conducted a study to better understand the ecology of ravens and their potential influence on sage-grouse on YTC (ENSR 1995). That effort and subsequent planning efforts resulted in YTC removing several range tower facilities, closing its active landfill, and establishing procedures at the waste transfer station to reduce utilization by ravens. YTC completed a more recent sage-grouse habitat and predator survey (Vernadero Group Inc., 2012) and is currently inventorying and further assessing anthropomorphic features on the installation and their contribution to sage-grouse predation risk. At the completion of this current assessment, recommendations will be made as to what structures can be removed thus further reducing risk of predation.

Efficacy of Perching Prevention

Concern: WDFW raised concerns over the efficacy of perch deterrents proposed as part of the MPMG. WDFW further stated that "Proposals to install anti-perching are a measure that a well-meaning individual might propose, but they do not accomplish the stated or desired outcome." WDFW also offered to provide graphics depicting instances where various anti-perching devices have failed.

Response: While perching by ravens and raptors may not be entirely prevented by the use of perch deterrents there is evidence these deterrents can reduce raptor and raven activity on and adjacent to power lines (Slater and Smith 2008). Lammers and Collopy (2007) also found that perch deterrents did not completely obviate the threat but did reduce the perching duration on transmission lines with deterrents when compared to other perching substrates. As such, the installation believes that reduced raven and

raptor use of associated infrastructure is not a useless or unreasonable mitigation measure. As mentioned above, additional opportunities to inventory, assess, and reduce potential anthropomorphic perching substrates are on-going and are expected to result in a net loss of man-made infrastructure that ravens and other raptors may use for perching on the installation.

Sage-grouse Protection Zone

Concern: WDFW raised concern with current sage-grouse protection measures in place at YTC and believes current measures overemphasizes one portion of the life history of the bird. WDFW further stated these protective measures would be relaxed as part of the proposed MPMG project. WDFW suggested protective measures should be strengthened and expanded to include more hours of the day and more of the life history history/life cycle of the bird.

Response: Current temporal protection measures strike a balance between providing protection for the species and supporting the installation's military training mission. The installation acknowledged in the MPMG EA that current protection measures at the proposed project location would be relaxed for the period of construction but would once again be applied once the range was operational. This is considered short-term in duration and small-scale (construction footprint) in nature. Further, during the construction period military training will not be taking place on the range. The intent of current temporal protection measures has never been to provide 24 hour/7 days a week protection throughout the entire SGPA, nor has it been the intent that every acre of the SGPA would provide for all seasonal life history requirements equally. This is especially true for existing and established ranges where habitat has been impacted by past land-use. Current temporal protection measures were developed to address military training activities and other land-uses that occur throughout the year at established ranges and for activities off established ranges but within the SGPA.

Past telemetry studies on the installation indicate that breeding and nesting occurs at rates similar to those in other populations throughout their range that are not subjected to military training thus indicating that current temporal protection measures are adequate to provide for lekking, breeding, and nesting activities. The installation acknowledges that reduced nest success and chick survival is likely limiting annual production and recruitment into the population and is currently assessing the role that habitat quantity and quality influences those attributes. The status (active, inactive) of leks in close proximity to the proposed MPMG (Range 5 and Knuckles Lek), screening afforded by topography (Knuckles lek), location of those leks outside the proposed construction project site, and the reduced habitat effectiveness of the proposed construction area (existing range) were discussed above and thus impacts to known active leks and other daily/seasonal activities would either not occur (inactive Range 5 lek), are reduced due to terrain features (active Knuckles lek), or would otherwise be minimized by a lack of suitable habitat (existing range). In addition, further protection was afforded to sage-grouse and all of its seasonal life history requirements as a result of increasing the total acres within the SGPA as mitigation contained within the GTA

EIS (2010) which accounts for training activities occurring at established ranges within the SGPA and further limits such activities on approximately another 33,100 acres of the installation.

The installation clarified its current level of protection afforded to sage-grouse and the SGPA to include both temporal and spatial protection measures. As a function of the current protection measures afforded, breeding and nesting activities on YTC is occurring at rates similar to those in other populations throughout the species range that are not subjected to military training. The installation does not agree that adding additional hours of daily timing restrictions would result in any further added or appreciable protection for sage-grouse that is not already being realized. Since the installation limits military training activities within the SGPA to only established ranges and designated roads from 1 February to 15 May to provide for breeding and nesting activities, and extends further protection within the SGPA through 15 June to account for nesting and brood-rearing activities, it does not agree that any further restriction of land-uses within the SGPA and outside of existing ranges that is not already occurring would result from increasing disturbance buffer protection distances. If disturbance related protection is increased to 4 miles and applied for 1 February – 15 May or 15 June, it would significantly reduce the capability of the installation to meet its training mission which is met under its current level of protection.

Reasonable Range of Alternatives

Concern: WDFW raised concerns that a reasonable range of alternatives was not considered and that more than one viable alternative should have been explored.

Response: In order for an alternative to be “viable” it must first satisfy the purpose and need of the proposed action as described in the Final MPMG EA (Chapter 1). A further description of the proposed action, criteria for evaluating alternative sites, alternatives considered but eliminated, and alternatives carried forward for further analysis is presented in (Chapter 2). It was determined that the preferred alternative (Alternative 2 – construction of a MPMG on the footprint of the existing Range 5) best met the purpose and need and the alternative screening criteria compared to two other alternatives considered (Range 10 and Range 1487A). The Range 1487A alternative, located outside of YTC’s Sage-grouse Protection Area (SGPA), was considered in the analysis however it did not meet the screening criteria due to Safety Danger Zone (SDZ) conflicts with existing ranges. Additionally, two other alternatives outside SGPA were initially considered but eliminated (Chapter 2, sections 2.3.1 and 2.3.2) for reasons described in the document.

As indicated in the response above YTC did consider other alternatives outside the SGPA. They ultimately were not viable alternatives that met the the criteria of the project. The preferred alternative minimizes impacts to sage-grouse by co-locating the proposed action on an existing range, existing protective measures continue to apply, and an extensive mitigation package from the GTA EIS (which included this project) further offsets any negative project impacts. Of particular note, one of the mitigations

from the GTA EIS increased the SGPA on YTC in excess of 33,100 acres which is far greater than the construction footprint of the proposed range.

Permanent Impact

Concern: WDFW expressed concerns that the permanent nature of impacts associated with the proposed MPMG project must be addressed by permanent mitigation and that it consist of a type and scale commensurate with the circumstances. WDFW suggested the loss at this location was not fully quantifiable based on the information provided.

Response:

YTC disagrees that the information provided in the EA was incomplete. Impacts at the proposed project area (existing Range 5) which has been in operation since 1955 can be permanent. Operating training ranges are of significant importance and long-term value to the Army. There is no increased impact from training over baseline historic levels. Impacts may even decrease as there will be no tank gunnery or maneuver training associated with the MPMG. Construction occurs in a very small portion of the analyzed project area in which the habitat for sage-grouse is already degraded from past human activity. The proposed project was one contemplated when the programmatic GTA EIS was completed and its associated extensive mitigation package applies to this project. This includes an increase of 33,100 additional acres in SGPA.

Mitigation

Concern: WDFW suggested YTC investigate burying significant lengths of the transmission line extending from the cantonment area to Range Operations as a means to mitigate the permanent commitment and habitat loss.

Response: YTC is currently assessing anthropomorphic structures as to their potential risk to sage-grouse and potential for removal or modification. The transmission line identified in WDFW's comment letter will be included in this assessment. The installation believes the inclusion of 33,100 additional acres within the SGPA and the other relevant and effective fire and sage-grouse related mitigation measures implemented as a requirement of the GTA EIS (2010) provides a greater than commensurate level of mitigation for the habitat impacts associated with the proposed MPMG Range.

Conclusion

Concern: WDFW concluded the EA is incomplete and inadequate since a reasonable range of alternative was not provided and because the EA lacked specificity in terms of sage-grouse use information resulting in an inability to accurately assess impacts to this species.

Response:

The installation disagrees with WDFW's characterization of the EA. The use of the area is not changing significantly or increasing, construction is limited to a small area that has long been devoted to training and does not contain high-quality sage-grouse habitat, and the project benefits from a package of significant sage-grouse protections arising out of the GTA EIS. Under these circumstances JBLM YTC believes the EA contains sufficient information to allow the decision-maker to assess potential impacts that could arise from the proposed alternatives.

The installation appreciates your review of the Final Environmental Assessment (EA) for the proposed Multipurpose Machine Gun (MPMG) Range. We noted your comments and they will be retained in our analysis file supporting this EA. The point of contact for this action is the undersigned, 509-577-3151, Margaret.a.taaffe.civ@mail.mil.

Sincerely,



Margaret A. Taaffe
Environmental Division Chief,
YTC Directorate of Public Works

cc (via email):

Jessica Gonzales (Jessica_Gonzales@fws.gov)

Perry Harvester (Perry.harvester@dfw.wa.gov)

Mike Livingston (Michael.livingston@dfw.wa.gov)

Literature Cited:

Endangered Species Act. 1973. Sec.2.(c) (1)). 16 U.S.C. 1531 *et seq.*

ENSR 1995. Ecology of Common Raven on the Yakima Training Center. United States Army, Yakima, Washington. Prepared by: Stuart Paulus, ENSR Consulting and Engineering and Devin Malkin, Raedeke Associates, Inc. May 1995. Document Number 9000-028-470.

JBLM 2010. Final Environmental Impact Statement (FEIS) for the Fort Lewis Army Growth and Force Structure Realignment. (GTA EIS).

JBLM 2013. Final Environmental Assessment (EA) for the proposed Multipurpose Machine Gun (MPMG) Range. 16 December 2013.

JBLM YTC 2010. Biological Assessment: Final Environmental Impact Statement (FEIS) for the Fort Lewis Army Growth and Force Structure Realignment. (GTA EIS). May, 2010.

Lammers, W.M. and M.W. Collopy. 2007. Effectiveness of Avian Predator Perch Deterrents on Electric Transmission Lines. *Journal of Wildlife Management*, Vol.71(8):2752-2758.

Sikes Act. 16 U.S.C. 670a-670o. 1960. As amended.

Slater, S.J. and J.P. Smith. 2008. Effectiveness of Raptor Perch Deterrents on an Electrical Transmission Line in Southwestern Wyoming. Report prepared by HawkWatch International Inc. (Salt Lake City, UT) for U.S. Department of Interior.

Stinson, C.M., and M.A. Schroeder. 2014. DRAFT Sage-grouse conservation in Washington:2013. Wildlife Program, Washington Department of Fish and Wildlife, Olympia, Washington.

Training Circular (TC) 25-8. Training Ranges. Headquarters. Department of Army. Washington, D.C. 20 May 2010.

USFWS Reference: 13410-2009-I-0519, June 25, 2010). USFWS concurrence letter regarding the Final Environmental Impact Statement (FEIS) for the Fort Lewis Army Growth and Force Structure Realignment (GTA EIS, JBLM 2010).

USFWS. 2003. Policy for Evaluation of Conservation Efforts When Making Listing Decisions; PECE process. *Federal Register*/Vol. 68, No. 60, March 28, 2003.

Vernadero Group Inc. 2012. Final 2012 Sage-grouse Habitat Assessment and Predator Survey at Joint Base Lewis McChord, Yakima Training Center.



DEPARTMENT OF THE ARMY
INSTALLATION MANAGEMENT COMMAND
JOINT BASE LEWIS-MCCHORD YAKIMA TRAINING CENTER
970 FIRING CENTER ROAD
YAKIMA, WA 98901-9399

March 17, 2014

SUBJECT: Review of Final Environmental Assessment for the proposed Multipurpose Machine Gun Range Project at Joint Base Lewis-McChord Yakima Training Center

Ms. Heather McPherron
Fish and Wildlife Biologist
U.S.D.I. Fish and Wildlife Service
Central Washington Field Office
215 Melody Lane, Suite 103
Wenatchee, WA 98801-8122

Dear Ms. McPherron:

I am in receipt of your letter dated January 17, 2013 regarding your agency's comments on the Final Environmental Assessment (EA) for the proposed Multipurpose Machine Gun (MPMG) Range at Joint Base Lewis-McChord Yakima Training Center (JBLM YTC). This letter responds to these comments and is intended to address concerns raised in the letter.

JBLM YTC supports management of candidate species such as greater sage-grouse (*Centrocercus urophasianus*; hereafter "sage-grouse") as demonstrated by our long-term commitment of conservation efforts directed towards this species since 1989. A summary of these extensive management efforts can be found in the recent Washington Department of Fish and Wildlife's report, Draft: Sage-grouse Conservation in Washington: 2013 (Stinson and Schroeder 2014).

The Army recognizes that effective conservation efforts prior to having a species listed as threatened or endangered under the Endangered Species Act (ESA) maximizes management options for landowners, regulatory agencies, land management agencies, and the species; it minimizes the cost of recovery; and it reduces the potential for restrictive land-use policies in the future. In addition, as threats are reduced and populations are increased or stabilized, priority for listing can be shifted to those species in greatest need of the ESA's protective measures.

In trying to strike a balance between the management of natural resources and military mission requirements, both agencies have a mutual interest in the success of candidate conservation for sage-grouse on YTC. In so much as the Army has the responsibility to further the goals of the ESA (Endangered Species Act, 1973, Sec.2.(c) (1)), the Sikes Act requires our agencies to work cooperatively to sustain the capabilities

of military installation lands to support the military mission while ensuring conservation of natural resources to include candidate species. Regulatory burdens on training lands associated with federally listing sage-grouse could result in significant training restrictions putting the installation's ability to support its military mission in jeopardy. Proactive management through cooperative means helps protect species and habitats, reduces the need for federal listing of the species, while helping the Army meet its military training mission.

JBLM YTC is aware of its importance as occupied habitat for one of the two existing populations within the state and its regional significance of providing some of the last remaining large contiguous areas of shrub-steppe in the Columbia Basin. These situations, as well as, providing no net loss in the capability of installation lands to support the military mission, underscores the importance of YTC conservation efforts. By working together to ensure success in these conservation efforts, listing could be avoided and training flexibility maintained.

The following information responds to specific comments provided by the Service on the EA:

Limited Range of Alternatives in the Final Environmental Assessment

Concern: The Service raised a concern over the limited range of alternatives considered and suggested additional alternatives be considered that either avoids or more effectively minimizes impacts to sage-grouse.

Response: In order for an alternative to be "viable" it must first satisfy the purpose and need of the proposed action as described in the Final MPMG EA (Chapter 1). A further description of the proposed action, criteria for evaluating alternative sites, alternatives considered but eliminated, and alternatives carried forward for further analysis is presented in (Chapter 2). It was determined that the preferred alternative (Alternative 2 – construction of a MPMG on the footprint of the existing Range 5) best met the purpose and need and the alternative screening criteria compared to two other alternatives considered (Range 10 and Range 1487A). The Range 1487A alternative, located outside of YTC's Sage-grouse Protection Area (SGPA), was considered in the analysis however it did not meet the screening criteria due to Safety Danger Zone (SDZ) conflicts with existing ranges. Additionally, two other alternatives outside SGPA were initially considered but eliminated (Chapter 2, sections 2.3.1 and 2.3.2) for reasons described in the document

As indicated in the response above, YTC did consider other alternatives outside the SGPA. They ultimately were not viable alternatives that met the criteria of the project. The preferred alternative minimizes impacts to sage-grouse by co-locating the proposed action on an existing range, with the Army continuing to apply existing protective measures and an extensive mitigation package identified in the Final Environmental Impact Statement (FEIS) for the Fort Lewis Army Growth and Force Structure Realignment (GTA EIS). Of particular note is the mitigation which increased the SGPA

on YTC in excess of 33,100 acres which is far greater than the construction footprint of the proposed range.

Sage-grouse

Concern: The Service raised concern that YTC's current temporal avoidance measures are not sufficient to minimize impacts of the proposed project to sage-grouse and requested consideration of additional recommendations to increase the effectiveness of temporal avoidance.

Response: An increase in temporal avoidance measures is not required to mitigate impacts associated with the proposed project as training levels at the MPMG will not increase above historic levels as a result of the project and there are no significant impacts to sage-grouse.

Current temporal protection measures strike a balance between providing a certain level of protection for the species as well as allowing the installation to meet its military training mission. The intent of current temporal protection measures has never been to provide 24 hour/7 days a week protection throughout the entire SGPA, nor has it been the intent that every acre of the SGPA would provide for all seasonal life history requirements equally. This is especially true for existing and established ranges where habitat has been impacted by past land-use. Current temporal protection measures were developed to address military training activities and other land-uses that occur throughout the year at established ranges and for activities off established ranges but within the SGPA. Although population trends on YTC exhibit an overall decrease over time, sage-grouse still exist on the installation compared to other adjacent lands with sufficient suitable habitat in which military training activities do not occur. Similar declining population trends are exhibited by other populations within WA and throughout the species range where military land-use does not occur. This suggests there are likely other more proximate factors impacting sage-grouse (e.g., habitat loss/fragmentation from wildland fire) and influencing populations than disturbance related impacts. The installation's extensive fire and sage-grouse related mitigation package implemented as part of the GTA EIS (2010) addresses these more proximate factors.

Relocation

Concern: The Service raised concern over the proposed project location being within the SGPA and the possibility of impacts to active leks, nest abandonment, and direct mortality from training related activities.

Response: Multiple alternatives were explored but not carried forward in the EA because they did not satisfy the screening criteria for the proposed action. Alternative locations were considered, but there was not another existing range at JBLM YTC or other nearby DoD installation that could accommodate training logistics and support machine gun training to the required Department of the Army Technical Circular 25-8

(Training Ranges) requirement. See EA sections 2.2, 2.3, and Table 1 for additional discussion on this topic. As described above, the proposed MPMG Range project entails an upgrade to an existing range (Range 5) where live-fire training occurs now and has since 1955. Although the existing and proposed range are within the SGPA, habitat within both the associated range footprints and portions of their SDZs have been heavily impacted by past land-use and resultant wildland fires have reduced its suitability and effectiveness as sage-grouse nesting and brood-rearing habitat, and overall utilization by sage-grouse. Further, the proposed range is within the primary fire containment area for the existing Range 5 which has a management expectation that training related fires will occur on an annual basis but be contained within the designated area. In other words, there is no long-term vegetation resource objective to develop late seral shrub-steppe (i.e., suitable sage-grouse nesting/brood-rearing habitat) conditions within the primary fire containment area. The closest lek (Range 5 Lek) is located outside of the proposed MPMG Range construction footprint but does fall within the associated SDZ. This lek has not been active since 2006. The next closest lek (Knuckles Lek) is located outside the proposed MPMG Range construction footprint but also falls within the associated SDZ. This lek continues to be active, demonstrating compatibility with the military's use of the existing Range 5 and adjacent Ranges (Range 4 and 6). This continued use, although the lek is within associated SDZs of existing ranges, is likely due in part by the distance (approximately 2 miles) and screening afforded by topography eliminating this lek from line of sight of the existing Range 5.

Not all acreage within the SGPA provide for every critical seasonal habitat requirement equally and thus, there are areas within the SGPA that exhibit reduced habitat effectiveness for nesting and brood rearing activities. This is especially true for existing ranges, which due to their use and associated impacts (i.e., live-fire training, maneuver, wildland fire), exhibit early seral vegetative conditions and lower habitat effectiveness for sage-grouse. These areas of reduced habitat quality (existing ranges) exhibit a lower incidence of nesting compared to others areas within the SGPA outside of established ranges that exhibit a higher degree of suitability for nesting and brood-rearing life history requirements. None the less, the analysis disclosed limited nesting and brood-rearing activities within proposed MPMG Range area demonstrating that current protection measures provide those opportunities on less than ideal habitat conditions of existing ranges.

There is also no evidence of direct injury or mortality from live-fire training (i.e., birds accidentally being shot) on established ranges based on data collected during four telemetry studies conducted on YTC since 1989.

24-hour Seasonal Restriction

Concern: The Service raised concern that the current 9-hour (2400-0900) timing restriction during the lekking season does not provide adequate protection for other daily sage-grouse activities (i.e., roosting, foraging associated with leks) and does not encompass all of the potential nesting and brood-rearing season (i.e., 1 February –

June 15). The Service recommended a 24 hour protection measure from February 1 to June 15.

Response: Apart from limited short-term construction activity, the preferred alternative does not increase disturbance from training over baseline levels. Because there is no increased disturbance from training activity under the preferred alternative, the suggested enhanced restrictions are not needed to avoid significant project impact.

YTC restricts military training activities within the SGPA and within 1 km of active leks from 1 February to 15 May to established ranges and designated roads only. The current daily timing restriction applies to established ranges within the SGPA which allows birds to conduct breeding activities during the times they are most frequently occurring at active leks. It also allows 15 hours of training related activities to occur at those sites from 1 February to May 15 striking a balance between allowing birds to breed and providing for the military training mission. All other land-use activity within the SGPA from 1 February to 15 June is restricted. This provides areas outside of established ranges but within the SGPA for other sage-grouse daily and seasonal activities to occur. In addition, the designation of SGPA (land designation depicted on a map) does not exclude sage-grouse use of additional areas outside of SGPA for their daily and seasonal activities to occur. Past telemetry studies on the installation indicate that breeding and nesting occurs at rates similar to those in other populations throughout their range that are not subjected to military training thus indicating that current temporal protection measures are adequate to provide for lekking, breeding, and nesting activities.

Elevated Protection Measures

Concern: The Service proposed five additional protection measures for consideration in the event that relocation of the proposed project or proposed increases in seasonal restrictions is not feasible.

Response: The installation has addressed the location of the project and suggested increase in seasonal temporal restrictions above. This response will focus on the five additional protection measures proposed.

Size of Seasonal Protection Buffers

Concern: The Service recommends increasing the size of seasonal buffers from 0.6 miles (1km) to 4 miles (6.4km) and increasing the daily timing restriction from 2400-0900 to 2200-1000.

Response: Apart from limited short-term construction activity, the preferred alternative does not increase disturbance from training over baseline levels. Because there is no increased disturbance from training activity under the preferred alternative, the suggested enhanced protection buffers are not needed to avoid significant project impact.

The information above clarifies the installation's current level of protection afforded to sage-grouse and the SGPA include both temporal and spatial protection measures. As a function of the current protection measures afforded, breeding and nesting activities on YTC is occurring at rates similar to those in other populations throughout the species range that are not subjected to military training. The installation does not agree that adding three more hours of daily timing restrictions would result in any further added or appreciable protection for sage-grouse. Since the installation limits military training activities within the SGPA from 1 February to 15 May to only established ranges and designated roads it does not agree that any further restriction of land-uses within the SGPA and outside of existing ranges that is not already occurring would result from increasing disturbance buffer protection distances. If protection is increased to 4 miles and applied for 1 February – 15 May it would significantly reduce the capability of the installation to meet its training mission which is met under its current level of protection. The installation has increased the total acres contained within the SGPA as mitigation contained within the GTA EIS (2010) which accounts for training activities occurring at established ranges within the SGPA and further limits such activities on approximately another 33,100 additional acres of the installation. The Service has provided two different disturbance buffer recommendations to YTC in recent years. In the concurrence letter for the GTA EIS (2010) the Service recommended a 3.1 mile (5km) disturbance buffer and is now (2014) recommending a 4-mile (6.4km) buffer in their review of the proposed MPMG Range. The installation has concerns over adopting frequent and ever-changing protection measures and proposes that it work with the Service's technical assistance capacity during the revision of the installation's sage-grouse management plan to further assess potential disturbance protection measures for long-term implementation thus providing some consistency and predictability in which to allow our military training mission to occur.

Monitoring of Sage-grouse

Concern: The Service recommends monitoring for sage-grouse nesting and presence within the proposed MPMG SDZ and ceasing operations if nesting or presence is found until successful hatching, nest failure, or grouse have moved from the area.

Response: This level of monitoring and subsequent restriction on activity is not feasible given the scope, scale, and intensity of searches that would be required to satisfy this recommendation. It is also not practical to expect a military unit scheduled for training at the MPMG, or any other established range within the SGPA, be subject to such a daily conditional requirement and still meet their mission requirements. Training units are allotted a set amount of time to complete training requirements and no such flexibility exists in the scheduling procedures for daily conditional constraints as proposed. The installation also does not agree with the Service's determination of risk of potential adverse impacts from military training within the MPMG SDZ due to the reasons explained above (i.e., reduced habitat effectiveness, no evidence of nest abandonment or direct mortality related to military training on established ranges or in their associated SDZs, etc.).

Facility Inspections for Corvids

Concern: The Service recommends that supporting facilities be routinely inspected for use by corvids and remove any nests that are found.

Response: YTC currently routinely inspects its supporting facilities and removes nests that are found.

Fencing

Concern: The Service recommends reanalyzing the requirement for fencing and, if found to be necessary, suggests marking the fence to increase its visibility to sage-grouse.

Response: The installation confirmed the requirement of the fence is valid and is a force protection and security requirement. The proposed fence is a six foot chain link fence around the associated structures which differs from the typical kind of fences (barb wire livestock fences) that are commonly considered to be a collision risk for sage-grouse. Due to the type of fence and its location around facilities which do not represent suitable habitat for grouse, the installation believes that it, and the associated facilities, are visually apparent to sage-grouse and does not pose a risk of collision.

Noise Study

Concern: The Service recommends investigating the impact that distance, timing, levels, and recurrence of noise have on sage-grouse populations on YTC.

Response: Sage-grouse have occurred on YTC through the entire duration that the installation has existed (early 1940s). Increases in ambient noise levels due to military training are a common occurrence on the installation. There would be no appreciable difference in the level of training related noise occurring at the existing Range 5 compared to what would occur with the proposed MPMG at the same location. As such, there is no appreciable change in the amount, levels, timing, and type of noise, (with the exception of tank gunnery which occurs now at the existing Range 5 but would cease at the MPMG Range) from baseline conditions. The installation suggests working with the Service in their technical assistance capacity to develop such a proposed project and secure cooperative funding in the future.

Avian Predator Management Plan

Concern: The Service recommends developing an Avian Predator Management Plan as it pertains to sage-grouse nest depredation.

Response: The installation agrees with this recommendation and has already implemented an effort to develop such a plan. In 2012, YTC completed a sage-grouse

habitat assessment and predator survey (Vernadero Group Inc., 2012) as part of an effort to gather baseline information on potential sage-grouse predators and habitat conditions. The installation acquired funding in 2013 and awarded a contract that will continue efforts in developing such a plan which will include additional corvid surveys, an assessment of anthropomorphic features that may provide predator perch/nest substrate and subsequent evaluation of their removal, an artificial nest predation study, a comprehensive predation related bibliography, and further habitat mapping and modeling efforts. The installation conducted a planning meeting in 2013 and solicited information from members of the Washington Sage-grouse Working Group, which included the Service, and would welcome any further interest and involvement in the effort. Presently, facilities are inspected annually for corvids and when nest are found they are removed. The installation also has an established policy in place for the operation of its waste transfer station which reduces its use by corvids. In the past, the installation removed several range towers no longer required from a mission standpoint and has closed its land-fill which was an attractant for corvids.

Compliance with Section 7 of the ESA

Concern: The Service informed the installation of the ESA requirement to review federal actions at the earliest possible time and that it encourages the formation of partnerships to conserve candidate species. The Service suggested that the proposed MPMG would adversely impact sage grouse and further recommended that a formal conference occur for the project. It suggested the installation prepare a Biological Assessment (BA) and make a determination as to whether the action would likely jeopardize the continued existence of sage-grouse in Washington. It also informed the installation that there is no regulatory requirement for the candidate species recommendation they made and clarified that if sage-grouse were listed at a later date, the Army may be required to modify or suspend its on-going operation at the MPMG pending completion of formal consultation under section 7 of the ESA.

Response: In regards to the Service's recommendation of earlier involvement and early review of projects, the installation agrees that opportunities exist for more effective and early coordination of installation proposed projects with the Service should occur given the sage-grouse listing decision expected in FY15. The installation proposes that as part of its required annual Integrated Natural Resource Management Plan (INRMP) coordination meeting with the Service that planned projects, their status and details, are provided to the Service to give advance notification of projects being proposed. The installation also suggests that project specific notification to the Service be made earlier in the Army's NEPA process to further facilitate coordination.

Specific to the formation of partnerships for candidate conservation, the installation was instrumental in developing the South Central Washington Shrub-steppe Collaborative Partnership which includes as a conservation objective sustaining sage-grouse populations within the four county (Yakima, Kittitas, Benton, Grant) focal area. The Army has funded a coordinator position for this partnership on two different occasions and participates regularly in the partnership's collaborative efforts. The

installation is also a regular participant in the Washington Sage-grouse Working group furthering conservation actions for sage-grouse through the implementation of the WDFW's Sage-grouse Recovery Plan. YTC has also worked collaboratively with the Yakama Nation in funding a habitat assessment of their tribal lands and has provided training and technical support for their on-going reintroduction efforts.

In regards to the suggestion the installation conduct a MPMG project specific BA and a formal conference occur, the installation suggests that it has provided an adequate level of analysis in both the MPMG EA and the GTA EIS (and its associated BA) to determine impacts of the various actions proposed. The installation suggests that it continue to implement its current level of protection and management for sage-grouse that includes the extensive fire and sage-grouse management mitigation package as a result of the GTA EIS and coordination with the Service. Most importantly, the installation recommends that the Service and YTC work together on the revision of its sage-grouse management plan, INRMP revision and the Service's Distinct Population Segment analysis in advance of the required FY15 listing decision. It is at this scale that YTC believes that a BA and a formal conference would be more meaningful for both the Service and the installation.

Summary Comments

The installation recognizes the Service's role and efforts in working with partners in comprehensive efforts to avert the need for a federal listing of sage-grouse under ESA. YTC has been at the forefront, with the Service, and has been instrumental in implementing effective conservation measures for sage-grouse in Washington. The installation is committed to working with the Service in these efforts and as a result will implement the following:

- It will continue to implement its current level of protection and management for sage-grouse that includes the extensive fire and sage-grouse management mitigation package as a result of the GTA EIS (JBLM 2010).
- It will work together with the Service on the revision of the installation's Sage-grouse Management Plan, the revision of the Integrated Natural Resource Management Plan (INRMP), and the Service's Distinct Population Segment analysis in advance of the required FY15 listing decision. This will include working with the Service's technical assistance capacity during the revision of the installation's sage-grouse management plan to further assess potential disturbance protection measures for long-term implementation thus providing some consistency and predictability in which to allow our military training mission to continue to occur.
- YTC will continue to routinely inspect existing facilities for corvids and remove nests that are found.

- The installation would consider further marking the proposed fence associated with the MPMG Range project to increase its visibility if deemed necessary.
- The installation suggests working with the Service in their technical assistance capacity to develop a proposal for a noise study that evaluates the impact that distance, timing, levels, and recurrence of noise may have on sage-grouse populations at YTC and cooperatively fund such a venture in the future.
- The installation will continue its efforts to conduct a sage-grouse predator assessment and develop an associated management plan. YTC welcomes any further interest and involvement of the Service in the effort.
- To further facilitate early involvement by the Service on installation proposed projects, YTC suggests that as part of its required annual Integrated Natural Resource Management Plan (INRMP) coordination meeting it include a presentation of all planned future projects, their status and details, as well as what conservation measures for sage-grouse have been implemented for sage-grouse. The installation also suggests that project specific notification to the Service be made earlier in the Army's NEPA process to further facilitate coordination.

The installation appreciates your review of the Final Environmental Assessment (EA) for the proposed Multipurpose Machine Gun (MPMG) Range. We noted your comments and they will be retained in our analysis file supporting this EA. The point of contact (POC) for this action is the undersigned, 509-577-3151, Margaret.a.taaffe.civ@mail.mil.

Sincerely,



Margaret A. Taaffe
Environmental Division Chief,
YTC Directorate of Public Works

cc (via email):

Jessica Gonzales (Jessica_Gonzales@fws.gov)

Mark Teske (Mark.Teske@dfw.wa.gov)

Mike Livingston (Michael.livingston@dfw.wa.gov)

Literature Cited:

Endangered Species Act. 1973. Sec.2.(c) (1)). 16 U.S.C. 1531 *et seq.*

ENSR 1995. Ecology of Common Raven on the Yakima Training Center. United States Army, Yakima, Washington. Prepared by: Stuart Paulus, ENSR Consulting and Engineering and Devin Malkin, Raedeke Associates, Inc. May 1995. Document Number 9000-028-470.

JBLM 2010. Final Environmental Impact Statement (FEIS) for the Fort Lewis Army Growth and Force Structure Realignment. (GTA EIS).

JBLM 2013. Final Environmental Assessment (EA) for the proposed Multipurpose Machine Gun (MPMG) Range. 16 December 2013.

JBLM YTC 2010. Biological Assessment: Final Environmental Impact Statement (FEIS) for the Fort Lewis Army Growth and Force Structure Realignment. (GTA EIS). May, 2010.

Lammers, W.M. and M.W. Collopy. 2007. Effectiveness of Avian Predator Perch Deterrents on Electric Transmission Lines. *Journal of Wildlife Management*, Vol.71(8):2752-2758.

Sikes Act. 16 U.S.C. 670a-670o. 1960. As amended.

Slater, S.J. and J.P. Smith. 2008. Effectiveness of Raptor Perch Deterrents on an Electrical Transmission Line in Southwestern Wyoming. Report prepared by HawkWatch International Inc. (Salt Lake City, UT) for U.S. Department of Interior.

Stinson, C.M., and M.A. Schroeder. 2014. DRAFT Sage-grouse conservation in Washington:2013. Wildlife Program, Washington Department of Fish and Wildlife, Olympia, Washington.

Training Circular (TC) 25-8. Training Ranges. Headquarters. Department of Army. Washington, D.C. 20 May 2010.

USFWS Reference: 13410-2009-I-0519, June 25, 2010). USFWS concurrence letter regarding the Final Environmental Impact Statement (FEIS) for the Fort Lewis Army Growth and Force Structure Realignment (GTA EIS, JBLM 2010).

USFWS. 2003. Policy for Evaluation of Conservation Efforts When Making Listing Decisions; PECE process. *Federal Register*/Vol. 68, No. 60, March 28, 2003.

Vernadero Group Inc. 2012. Final 2012 Sage-grouse Habitat Assessment and Predator Survey at Joint Base Lewis McChord, Yakima Training Center.