Environmental Assessment

Land Rehabilitation and Maintenance (LRAM) Erosion Control Project at Training Areas 6, 11, and 12, and the Multi-Purpose Range Complex Surface Danger Zone (SDZ)

Yakima Training Center, Washington

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October 2008

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Table of Contents

CHAPTER 1 PURPOSE AND NEED 1
1.1 Introduction 1
1.1.1 Location 1
1.1.2 Mission 1
1.1.3 Background 2
1.2 Purpose and Need for the Proposed Action 2
1.3 Objectives, Decision to be Made, and Scope 2
1.4 Regulatory Compliance 3
1.5 Public Involvement Process 3
1.6 Issues, Concerns, Opportunities, Issues Eliminated 3
1.6.1 Air 3
1.6.2 Noise 4
1.6.3 Soils 4
1.6.4 Water 4
1.6.5 Land Use 4
1.6.6 Socioeconomics 4
1.6.7 Human Health 4
1.6.8 Infrastructure 4
1.6.9 Solid Waste 4
1.6.10 Hazardous Materials/Waste 4
1.6.11 Cultural Resources 4
1.6.12 Vegetation 5
1.6.13 Wildlife/Fish 5
1.6.14 Fire 5
1.6.15 ICOs Eliminated from Further Discussion or Analysis 5

CHAPTER 2 DESCRIPTION OF THE PROPOSED ACTION 6
2.1 Proposed Action 6
2.2 Alternatives Considered 6
2.2.1 Continue Current Management (No Action Alternative) 6
2.2.2 Proposed Action Alternative 1 6
2.2.2.1 Combat Road/Trail Improvements 6
2.2.2.2 Stream Channel Crossing Features 8
2.2.2.3 Erosion Control Structures 12
2.2.2.4 Road Closure 13
2.2.2.5 Cattle Guard Removal 13
2.2.2.6 SDZ Gates 14
2.2.2.7 Development of Water Resources 15
2.2.2.8 Follow-up Restoration or Rehabilitation 16
2.2.3 Proposed Action Alternative 2 (Spring Water Development Only) 16
2.2.4 Proposed Action Alternative 3 (Well Water Only Development) 17
2.3 List of Required Permits 17
2.4 Summary of Consequences 17

CHAPTER 3 AFFECTED ENVIRONMENT 19
3.1 Air Quality 19
3.2 Noise 19
3.3 Geology, Topography, and Soils 19
3.4 Water 20
3.4.1 Surface Water 20
3.4.2 Groundwater 22
3.5 Land Use 22
3.5.1 Surrounding Lands 22
3.6 Socioeconomics 23
3.6.1 Environmental Justice 23
3.6.2 Protection of Children 24
3.7 Human Health 24
3.8 Infrastructure 24
3.9 Solid Waste 25
3.10 Hazardous Materials/Waste 25
3.11 Cultural Resources 26
3.12 Biological Resources 26
3.12.1 Upland Vegetation 26
3.12.2 Riparian Vegetation 27
3.12.3 Wildlife/Fish 28
3.12.4 Threatened and Endangered Species 29
3.12.4.1 Wildlife/Fish 30
3.12.4.2 Plants 36

CHAPTER 4 ENVIRONMENTAL CONSEQUENCES 39
4.1 Air Quality 39
4.2 Noise 40
4.3 Geology, Topography, and Soils 40
4.4 Water 41
4.4.1 Surface Water 41
4.4.2 Groundwater 42
4.5 Land Use 43
4.6 Socioeconomics 44
4.7 Human Health 44
4.8 Infrastructure 45
4.9 Solid Waste 46
4.10 Hazardous Materials/Waste 47
4.11 Cultural Resources 47
4.12 Biological Resources 48
4.12.1 Upland Vegetation 48
4.12.2 Riparian Vegetation 50
4.12.3 Wildlife/Fish 51
4.12.4 Threatened and Endangered Species 53

CHAPTER 5 CUMULATIVE EFFECTS AND CONCLUSIONS 56
5.1 Cumulative Effects to Identified Resources 56

5.1.1 Air Quality 56
5.1.2 Noise 57
5.1.3 Geology, Topography, and Soils 57
5.1.4 Water 58
5.1.4.1 Surface Water 58
5.1.4.2 Groundwater 58
5.1.5 Land Use 59
5.1.6 Socioeconomic 59
5.1.7 Human Health 60
5.1.8 Infrastructure 61
5.1.9 Solid Waste 61
5.1.10 Hazardous Materials/Waste 61
5.1.11 Cultural Resources 61
5.1.12 Biological Resources 62
5.2 Cumulative Effects Conclusions 63

CHAPTER 6 CONCLUSIONS REGARDING THE IMPACTS OF THE PROPOSED ACTION 64

CHAPTER 7 REFERENCES 67

CHAPTER 8 LIST OF PREPARERS AND CONTRIBUTORS 70

CHAPTER 9 AGENCIES AND INDIVIDUALS CONTACTED 71
10.1 Glossary 72
10.1.1 Context 72
10.1.2 Intensity (thresholds) 72
10.1.3 Significance 72
10.2 Acronyms 72

List of Figures

Figure 1-1 Locations of Fort Lewis and Yakima Training Center 1
Figure 2-1 Location of roads in the MPRC SDZ and TA 6 to be improved..... 7
Figure 2-2 Location of roads and crossing features in the Selah Creek area to be improved. 8
Figure 2-2 Holmes Ranch Road channel crossing features 10
Figure 2-3 Range 15 Road and Selah Creek channel crossing features 10
Figure 2-4 105mm SDZ Road channel crossing features 11
Figure 2-5 Sourdough Creek Road channel crossing features..... 11
Figure 2-6 Erosion control structures proposed for the Upper Alkali Watershed. 12
Figure 2-7 Road closures in the MPRC SDZ and TA 6. 13
Figure 2-8 Location of Cattle Guards to be removed 14
Figure 2-9 Example of Gates to be installed along MPRC SDZ 14
Figure 2-10 Placement Locations of SDZ Gates 15
Figure 2-11 Location of Springs for Possible Development 16
Figure 3-1 Yakima Training Center Watershed Complexes..... 21

List of Tables

Table 2-1 Summary of Combat Roads/Trails improvements with quantities and distances……..7
Table 2-2 Summary of Crossing Feature Repairs with Quantities and Distances...…….. 9
Table 2-3 Comparison of Environmental Consequences for Each Alternative……... 17
Table 3-1 Common Cultural and Religious Uses and Ceremonies
Conducted at Yakima Training Center……...……..... 26
Table 3-2 Threatened and Endangered Species at Yakima Training Center……..... 29

Chapter 1 Purpose and Need

1.1 Introduction

The United States Army (Army) at Yakima Training Center (YTC) proposes to do erosion control projects in Training Areas 6, 11, and 12 (TA6, TA11, TA12), and the Multi-Purpose Range Complex (MPRC) surface danger zone (SDZ). These projects include improving combat roads and trails, closing unnecessary roads, improving or replacing crossing features, and removing cattle guards. These projects are consistent with the Army's Land Rehabilitation and Maintenance (LRAM) component of the Integrated Training Area Management (ITAM) program.

1.1.1 Location

YTC, approximately 327,231 acres in area, is located in Yakima and Kittitas Counties approximately seven miles northeast of the city of Yakima in central Washington (Figure 1-1). The installation provides facilities and training lands primarily to support military units stationed at Fort Lewis but also supports other Army and non-Army elements including the Navy, Air Force, and Marines, allied nations armed forces, and local law enforcement agencies.

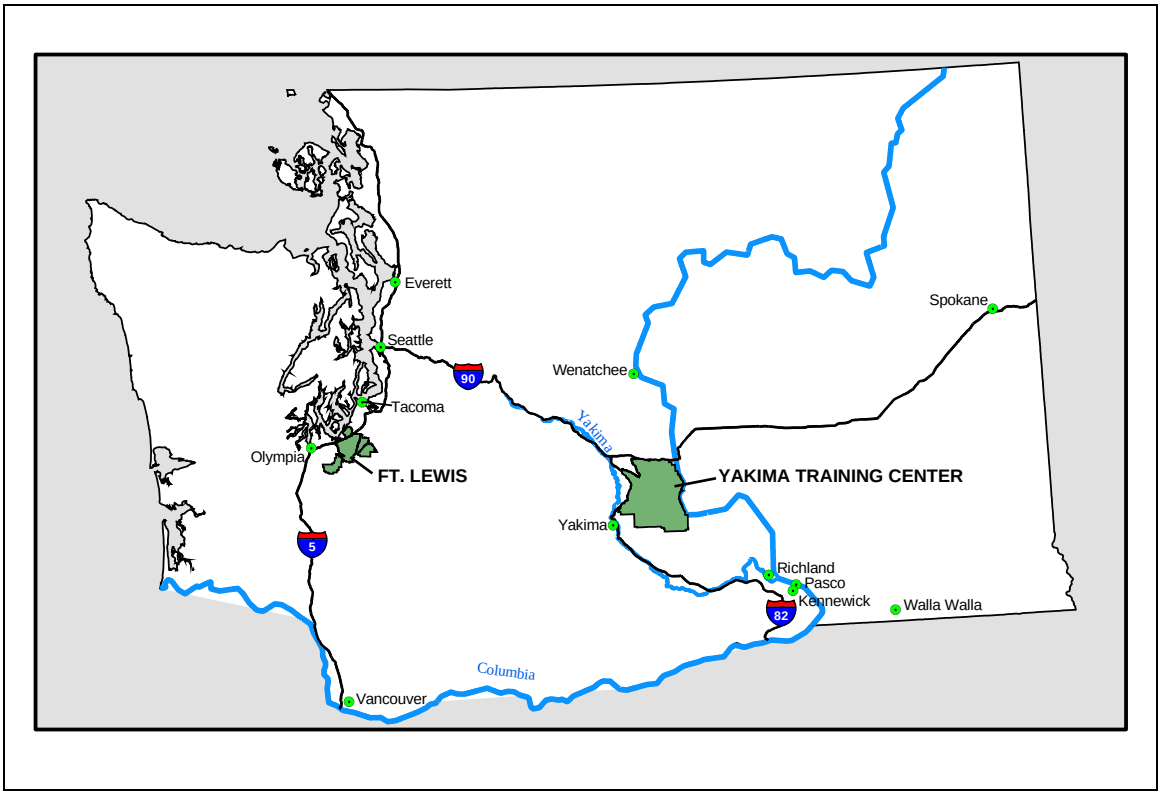

Figure 1-1 Locations of Fort Lewis and Yakima Training Center

1.1.2 Mission

YTC supports tough, realistic combined arms, joint and coalition forces training for U.S. and allied military units in order to enhance unit readiness by sustaining training lands, range complexes, and support facilities capable of meeting all present and future training requirements.

1.1.3 Background

Since the 1940's, YTC has been used for military training maneuvers that incorporate a number of wheeled and tracked vehicles. Because of this, YTC has numerous roads providing access to training areas. These roads vary from well-established, hardened roads to graveled roads to rarely used trails.

Roads on YTC are evaluated periodically using techniques outlined in U.S. Army Technical Manual 5-626 (Army 1995) in accordance with the YTC Cultural and Natural Resource Management Plan (Army 2002). Those found to be superfluous, in poor physical condition, unsafe, or that pose a risk to cultural or natural resources may be closed. These roads are blocked off and may be ripped and reseeded for reclamation for training. Other roads may need to be upgraded. The LRAM program upgrades those roads to improve access and reduce erosion. Where these roads cross drainages, crossing features are installed to minimize impacts to riparian habitats and water quality.

The actions described in this EA are outlined in the CNRMP as Management Action Descriptions (MADs). Road closures, road upgrades, riparian restoration, and fire suppression activities are all covered in the CNRMP. Those activities, along with others, are examined together in this EA to facilitate the analysis of impacts by the combined projects and their cumulative effect.

1.2 Purpose and Need for the Proposed Action

There is a need at YTC to periodically upgrade roads, install and/or repair stream crossing features, close superfluous roads, and build erosion control structures. Roads and stream crossings have been identified within Training Areas 6, 11, 12, and the MPRC SDZ that are in poor physical condition, unsafe, or pose a risk to cultural or natural resources. The purpose of the action is to improve or re-route combat roads and trails, repair stream and channel crossings, close unnecessary roads, construct erosion control structures, and remove and recover cattle guards at various locations within this area. Accomplishing these tasks will help attain the following goals of the LRAM program: maintain and improve training area access and realistic training conditions, reduce fire danger by providing improved access and firebreaks, minimize erosion, stabilize degraded stream channel crossings, and restore riparian habitats.

1.3 Objectives, Decision to be Made, and Scope

The objectives of the proposed action are as follows:

- Improve or re-route combat roads or trails.
- Repair stream channel crossings.
- Close unnecessary roads.
- Construct erosion control structures.
- Remove and recover cattle guards

The decision to be made is how best to accomplish the stated objectives without adding significant risk to the environment, training mission, or surrounding communities.

The scope of this Environmental Assessment (EA) is to evaluate potential environmental consequences in the context of the stated objectives and associated action alternatives presented. Environmental aspects evaluated are: Air Quality, Noise, Soils, Water, Land Use, Socioeconomics, Human Health, Infrastructure, Solid Waste, Hazardous Materials/Waste, Cultural Resource, Upland Vegetation, Riparian Vegetation, Wildlife/Fish, and Threatened and Endangered Species. Included herein are descriptions of the alternatives to the proposed action, the affected environment, and consequences associated with the proposed action alternatives.

1.4 Regulatory Compliance

This EA was prepared in compliance with the National Environmental Policy Act (NEPA), Council on Environmental Quality (CEQ) Regulations at 40 Code of Federal Regulations (CFR) 1500 et seq., and 32 CFR Part 651, *Environmental Effects of Army Actions*.

1.5 Public Involvement Process

An interdisciplinary team developed a list of primary stakeholders related to the proposed action to include interested or potentially affected agencies, organizations, and individuals. Each stakeholder was sent a scoping letter (July 7, 2008). The letter briefly introduced the proposed action, and described the need to perform the road upgrades, closures, and erosion control projects. In addition, a solicitation for public comment was published twice in the legal classified section of the two local newspapers (Yakima Herald Republic and Ellensburg Daily Record) on July 16 and 19, 2008.

All comments received during this initial scoping, whether received via phone, mail, or email were entered into the analysis file and reviewed for substantive input. This initial scoping is in addition to the required minimum 30 day public review and comment period. Initial scoping resulted in one letter from the Confederated Tribes and Bands of the Yakama Nation.

1.6 Issues, Concerns, Opportunities, Issues Eliminated

A decision making process such as NEPA must begin with a clear statement of objectives and description of problems that are trying to be solved. The information in Sections 1.1, 1.2, and 1.3 provides a clear, concise depiction of the objectives the Army is striving to achieve and the problems the Army is seeking to address with this EA. The next step is to identify issues, concerns, and potential opportunities (ICOs) pertaining to the environmental resources as a result of the objectives of the proposed action being met and problems being resolved. Identification of ICOs helps focus the remaining analysis and aids in development of a range of viable alternatives.

New information in the form of ICOs was obtained through the scoping process, both internal and external, and is listed below. Similar ICOs obtained from multiple sources were combined. Only those ICOs found to be substantive in nature, within the scope of the decision to be made, or that aid in the development of a range of viable alternatives will be analyzed in further detail. All other ICOs will be eliminated from further discussion and analysis.

1.6.1 Air

Issue – Short-term impacts to air quality expected from rock crushing and road construction.

Concern – Short-term impacts to air quality from possible operation of two rock crushers for D-MPRC construction and LRAM project construction.

1.6.2 Noise

Issue – Short-term impact due to vehicle and equipment operation.

1.6.3 Soils

Opportunity – Road improvements and erosion control features would halt and reverse degradation over time.

1.6.4 Water

Opportunity – Stream crossing features will improve water quality, decrease erosion, improve riparian habitats, and improve road use and area access.

1.6.5 Land Use

Opportunity – Military training opportunities will be enhanced through improved training area access.

1.6.6 Socioeconomics

No comments related to potential ICOs pertaining to socioeconomics were received or identified.

1.6.7 Human Health

Opportunity – Addition of gates on roads leading into MPRC 105mm SDZ will improve safety by preventing accidental entry into the area during training exercises.

Opportunity – Improved fire protection within the affected areas as a result of improving road conditions.

Opportunity – Removal of cattle guards will improve soldier safety.

1.6.8 Infrastructure

Opportunity – Road improvement will enhance access to training areas and increase safety for trainers and Soldiers.

Opportunity – Improved fire suppression resources (e.g., improved roads that act as firebreaks as well as roads, and improved water resources to support fire suppression).

1.6.9 Solid Waste

No comments related to potential ICOs pertaining to solid wastes were received or identified.

1.6.10 Hazardous Materials/Waste

No comments related to potential ICOs pertaining to hazardous material/waste were received or identified.

1.6.11 Cultural Resources

Opportunity – Native American access in TA6 and MPRC SDZ will be improved as a result of roadway improvements.

1.6.12 Vegetation

Opportunity – Improved upland vegetation conditions as a result of improving roads that act as firebreaks and fire suppression access routes, and through improved availability of fire suppression water.

1.6.13 Wildlife/Fish

No comments related to potential ICOs pertaining to wildlife or fish were received or identified.

1.6.14 Fire

Opportunity – Wildland fire pre-suppression and suppression assets (e.g., water sources) could be developed as a result of the proposed action, or as follow up actions.

1.6.15 ICOs Eliminated from Further Discussion or Analysis

Concern – Yakama Nation expressed the concern that the cattle guards that are removed be disposed of in a timely manner. It is the intent of YTC to remove the guards to a designated location where they will be disposed of either by reuse through assignment to another agency or metal recycling.

Chapter 2 Description of the Proposed Action

This chapter describes the proposed actions in detail, alternatives being considered, and provides a comparison of environmental consequences by alternative.

2.1 Proposed Action

The Army proposes to improve or re-route combat roads or trails, repair stream channel crossings, close unnecessary roads, construct erosion control structures, and remove and recover cattle guards at various locations within YTC. Additional water resources will also be developed for construction and firefighting activities. Accomplishing these tasks will help attain the following goals of the LRAM program: maintain and improve training area access and realistic training conditions, reduce fire danger by providing improved access and firebreaks, minimize erosion, stabilize degraded stream channel crossings, and restore riparian habitats.

2.2 Alternatives Considered

A core principle of NEPA is that an agency should consider reasonable alternatives to a proposed action. Considering alternatives helps to avoid unnecessary impacts and allows for analysis of reasonable ways to achieve the stated purpose. To warrant detailed evaluation, an alternative must be reasonable. To be considered reasonable, an alternative must be immediately executable for decision making (any necessary preceding events having taken place), affordable, capable of implementation and satisfactory with respect to meeting the purpose and need for the action. The following identifies the alternatives considered by the Army with respect to this action.

2.2.1 Continue Current Management (No Action Alternative)

The No Action Alternative serves as a baseline against which the impacts of the proposed action and alternatives can be evaluated. Under the No Action Alternative, the roads and trails would not be improved, no roads would be closed, erosion control structures would not be constructed, stream channel crossing would not be improved, and cattle guards would remain in-place. Degradation of roads and trails would continue from vehicle use and erosion. Fire danger would increase due to degraded access to areas and inadequate firebreaks. Water quality at degraded stream crossing sites would be impacted, and riparian habitats would not be restored.

2.2.2 Proposed Action Alternative 1

Under this alternative, selected combat roads or trails in Training Areas 6, 11, 12, and the MPRC SDZ would be improved or re-routed and erosion control structures constructed. Crossings at stream channels will be repaired, and unnecessary roads would be closed. Cattle guards would be removed at various locations on YTC and gates erected along the MPRC SDZ. A well and/or springs will be developed as water resources for construction and firefighting. Accomplishing these tasks would help attain the following goals of the LRAM program: maintain and improve training area access and realistic training conditions, reduce fire danger by providing improved access and firebreaks, minimize erosion, stabilize degraded stream channel crossings, and restore riparian habitats.

2.2.2.1 Combat Road/Trail Improvements

The proposed action would improve the roads/trails to a well defined footprint that would support all weather access, and reduce effects on nearby resources such as upland and riparian

vegetation, soil, and surface water quality. This alternative would also improve access by trainers to remote training areas, and wildland fire management would be improved through improved access routes for pre-suppression and suppression activities.

Unimproved combat roads/trails would be improved to a width of 14 feet from ditch bank to ditch bank. After the subgrade is prepared and compacted, a 6" lift of wearing course (1 1/2"-minus finely graded material) will be added and compacted to an approximate 95% compaction. The contractor would re-establish drainage ditches, crossing features, and water turnouts associated with the affected roads. Rock would be hauled from existing stockpiles at the MPRC, Selah Airstrip East, Range Control, Cow, East Hanson, and/or OP 6 quarries. Rock crushing may be needed to provide enough rock to accomplish road improvement activities. Existing combat roads/trails included in this action are identified in Table 2-1. Figures 2-1 and 2-2 illustrate the location of each road identified in Table 2-1.

Table 2-1 Summary of Combat Roads/Trails Improvements with Quantities and Distances.

Roads	Distance (feet)	Distance (miles)
Holmes Ranch Road	17,350	3.29
105mm SDZ Road.	8,300	1.57
Wanapum Road	2,150	0.41
Stuart Ranch Road	6,700	1.27
Sourdough Creek Road	9,300	1.76
Range 15 Road	4,000	0.76

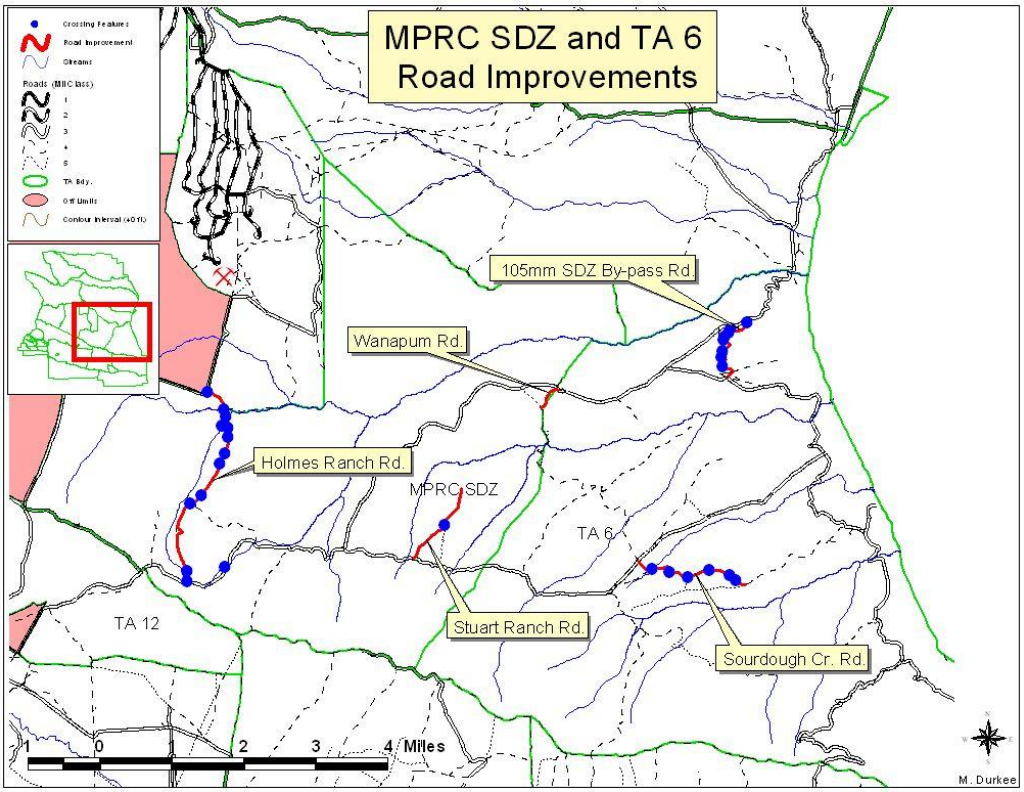

Figure 2-1 Location of roads in the MPRC SDZ and TA 6 to be improved.

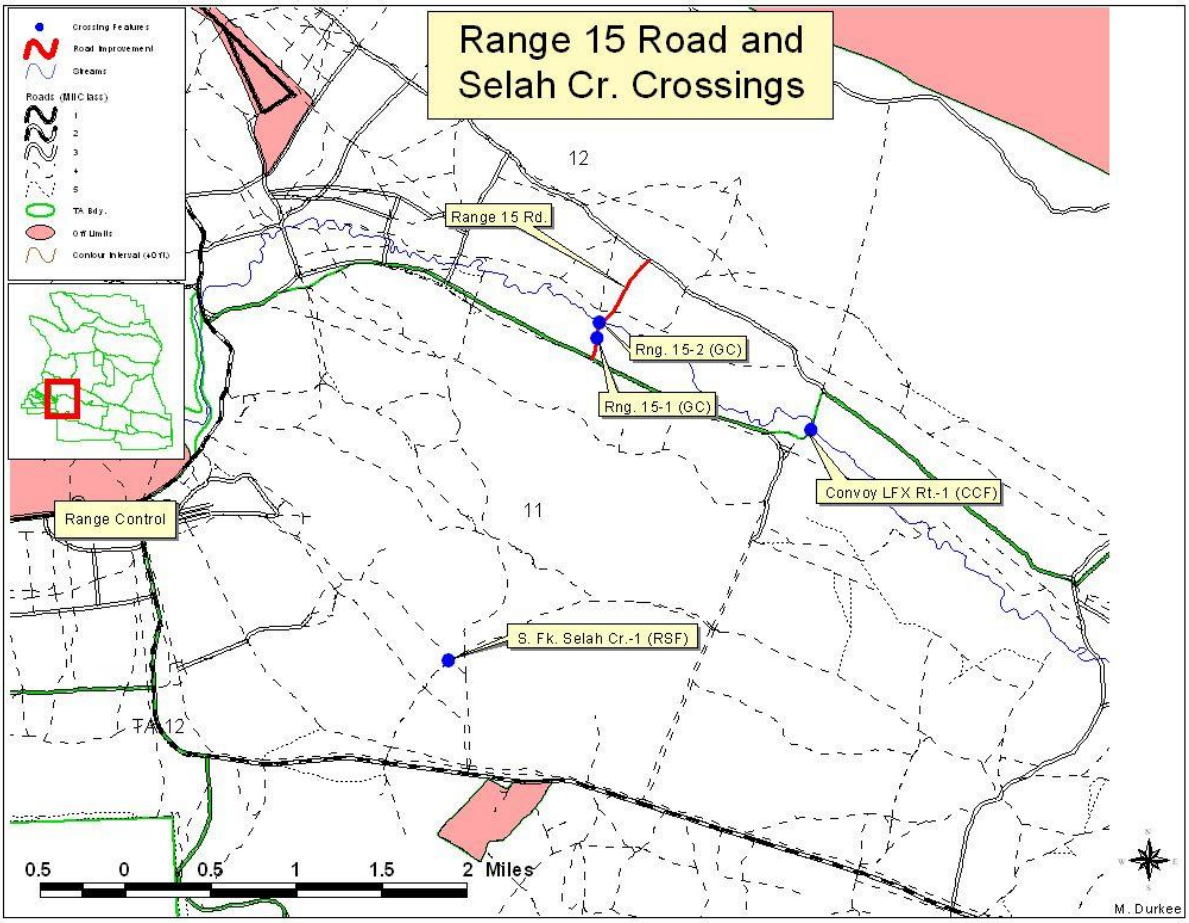

Figure 2-2 Location of roads and crossing features in the Selah Creek area to be improved.

2.2.2.2 Stream Channel Crossing Features

The existing crossing sites included in Alternative 1 are currently degraded and are negatively effecting other resources such as surface water quality (degraded due to increased sedimentation), soil (increased erosion), riparian habitats (degraded vegetation), land use (degraded conditions are preventing use of some roads), and wildland fire management (unable to access areas to conduct pre-suppression or suppression activities). The repairs are designed to provide improvements at each site to correct the deficiencies, and to provide a maintainable crossing feature that supports long term (sustained) use of the area for military training.

Crossing feature improvements would include installation of corrugated metal pipe culverts, cable concrete mattresses, geo-cell fabric, and rock spall fords. Armoring of crossing features with large rock spalls (12 inch-minus) and/or bank barbs would also occur as needed. Table 2-2 lists the crossing features to be improved. Figures 2-2 through 2-5 illustrate the location of crossing features identified in Table 2-2.

Table 2-2 Summary of Crossing Feature Repairs with Quantities and Distances.

Channel Crossings	Location	Crossing Type	Length(ft.)	Width/Diameter
Holmes Ranch-1	SDZ	Cable Concrete	60	16 ft
Holmes Ranch-2	SDZ	Cable Concrete	100	16 ft
Holmes Ranch-3	SDZ	Culvert	40	24 in
Holmes Ranch-4	SDZ	Cable Concrete	40	16 ft
Holmes Ranch-5	SDZ	Rock Spall Ford	30	14 ft
Holmes Ranch-6	SDZ	Rock Spall Ford	30	14 ft
Holmes Ranch-7	SDZ	Rock Spall Ford	30	14 ft
Holmes Ranch-8	SDZ	Rock Spall Ford	30	14 ft
Holmes Ranch-9	SDZ	Rock Spall Ford	30	14 ft
Holmes Ranch-10	SDZ	Rock Spall Ford	30	14 ft
Holmes Ranch-11	SDZ	Rock Spall Ford	30	14 ft
Holmes Ranch-12	SDZ	Rock Spall Ford	30	14 ft
Holmes Ranch-13	SDZ	Rock Spall Ford	30	14 ft
Range 15-1	TA 12	Geo-Cell	60	14 ft
Range 15-2	TA 12	Geo-Cell	80	14 ft
Convoy LFX Route-1	TA 12	Cable Concrete	100	16 ft
South Fork Selah Cr.-1	TA 12	Cable Concrete	30	16 ft
Cemetery Spring-1	TA 6	Geo-Cell Repair	40	14 ft
105mm SDZ	TA 6	Rock Spall Ford	30	14 ft
105mm SDZ-2	TA 6	Rock Spall Ford	30	14 ft
105mm SDZ-3	TA 6	Rock Spall Ford	30	14 ft
105mm SDZ-4	TA 6	Rock Spall Ford	30	14 ft
105mm SDZ-5	TA 6	Rock Spall Ford	30	14 ft
105mm SDZ-6	TA 6	Culvert	40	24 in
105mm SDZ-7	TA 6	Rock Spall Ford	30	14 ft
105mm SDZ-8	TA 6	Culvert	40	24 in
Sourdough Cr.-1	TA 6	Rock Spall Ford	30	14 ft
Sourdough Cr.-2	TA 6	Rock Spall Ford	30	14 ft
Sourdough Cr.-3	TA 6	Rock Spall Ford	30	14 ft
Sourdough Cr.-4	TA 6	Rock Spall Ford	30	14 ft
Sourdough Cr.-5	TA 6	Rock Spall Ford	30	14 ft
Sourdough Cr.-6	TA 6	Rock Spall Ford	30	14 ft
Stuart Ranch-1	SDZ	Rock Spall Ford	30	14 ft

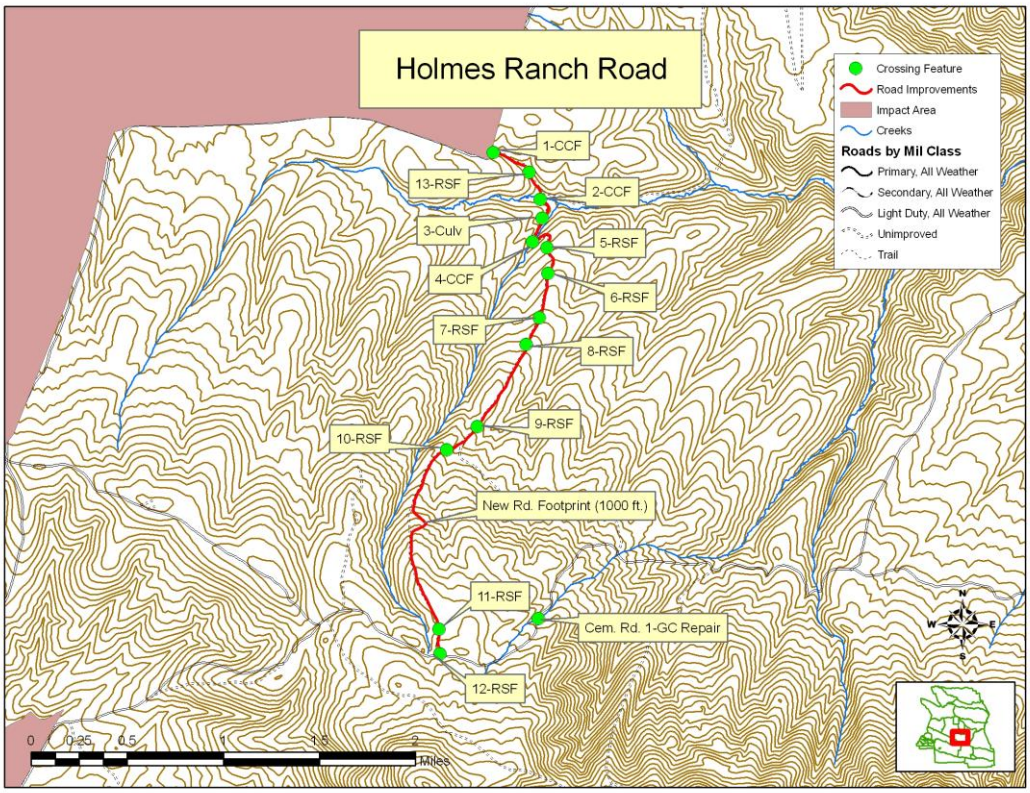

Figure 2-2 Holmes Ranch Road channel crossing features

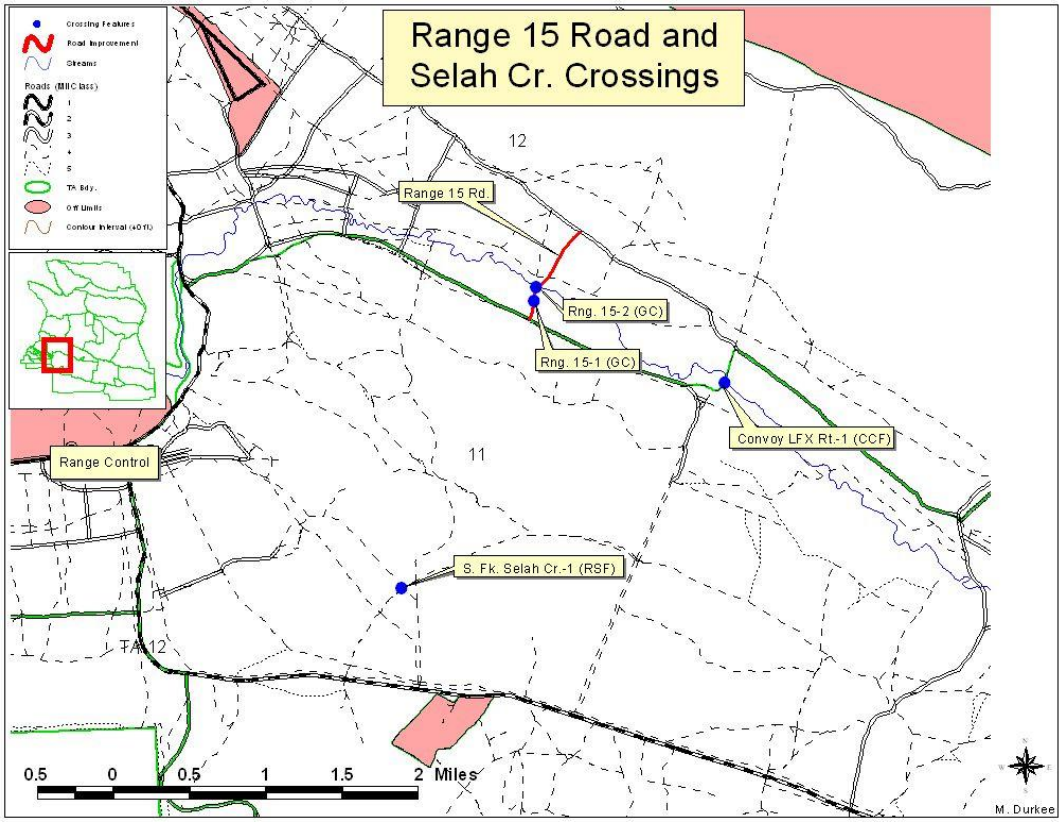

Figure 2-3 Range 15 Road and Selah Creek channel crossing features

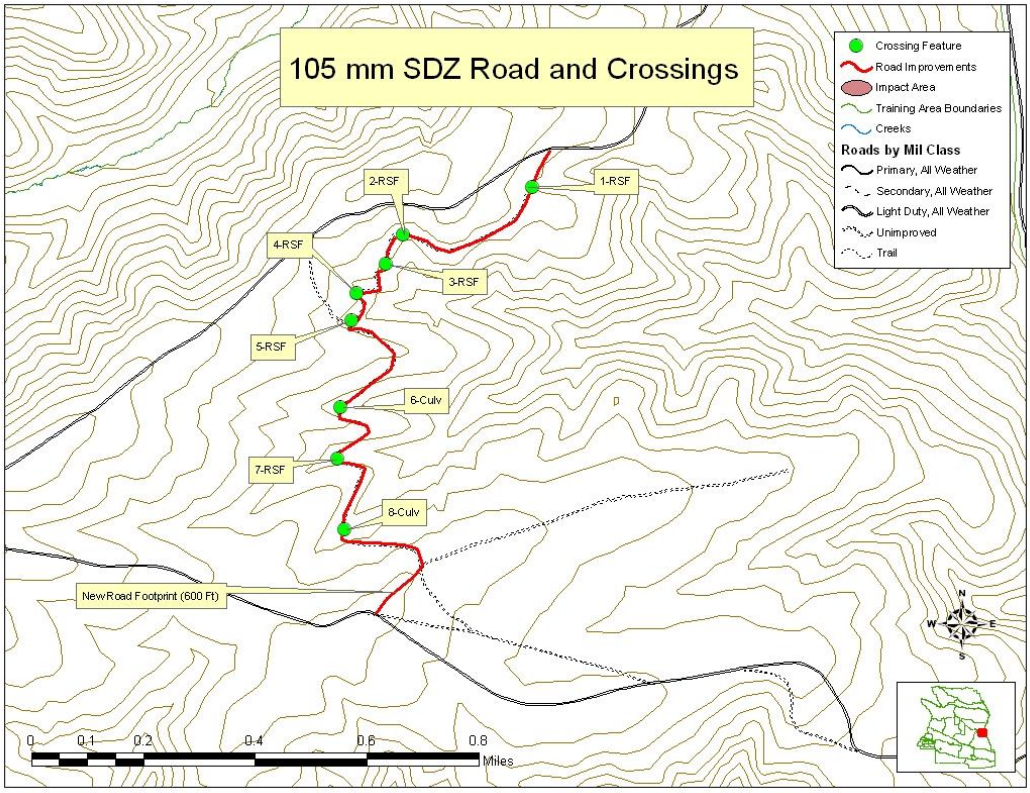

Figure 2-4 105mm SDZ Road channel crossing features

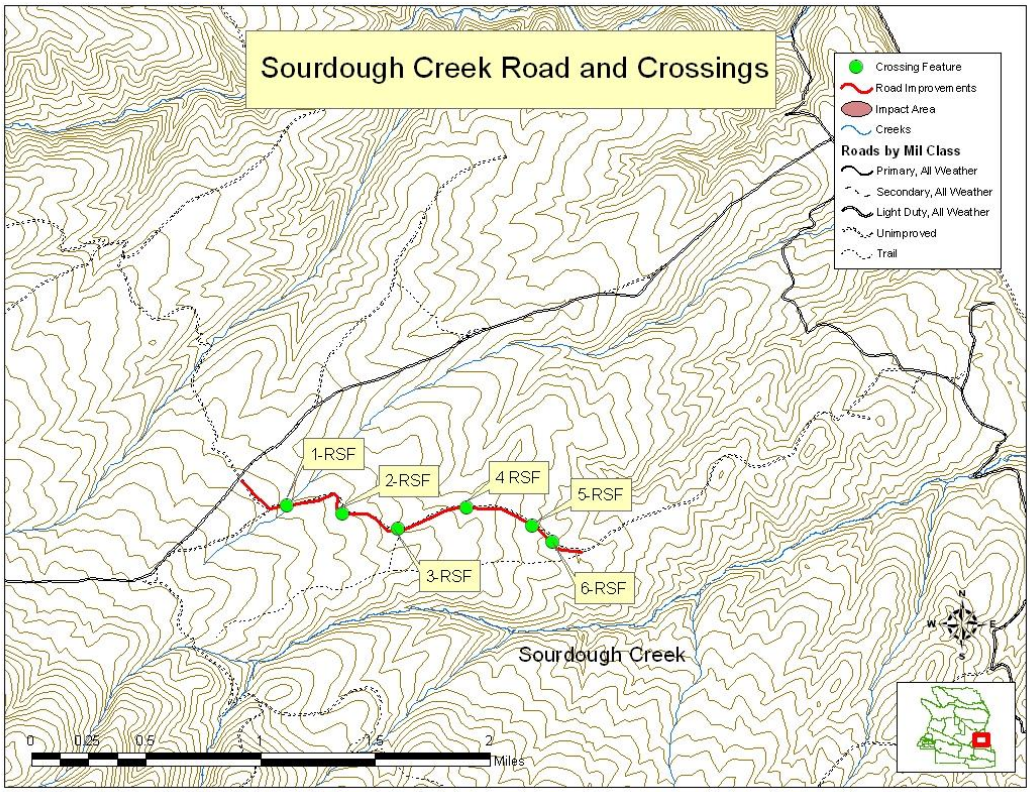

Figure 2-5 Sourdough Creek Road channel crossing features

2.2.2.3 Erosion Control Structures

Previous wildland fires and effects of existing degraded roads have caused eroded conditions to develop in areas within the MPRC SDZ and TA6. Erosion control repairs are designed to use a "soft-touch" approach that would install loose rock features at key locations to halt and reverse current conditions. Other resources affected by current conditions are riparian resources (degraded vegetation), surface water quality (degraded during run off events), soil (increased erosion and worsening of existing conditions), and land use safety by trainers. The action is designed to put measures in place to halt and reverse degraded conditions over time.

The contractor would construct erosion control structures and bank barbs at up to 15 designated locations within the Alkali watershed (MPRC SDZ). The structures are associated with the improvement of the Holmes Ranch Road. Structures would be of a loose rock design to minimize site disturbance. These structures would protect the proposed road during high flow, re-establish the stream channel along its natural course and stabilize the main-stem of Alkali Creek directly upstream and downstream of the Holmes Ranch Road crossing. Locations of erosion control sites are illustrated in Figure 2-6.

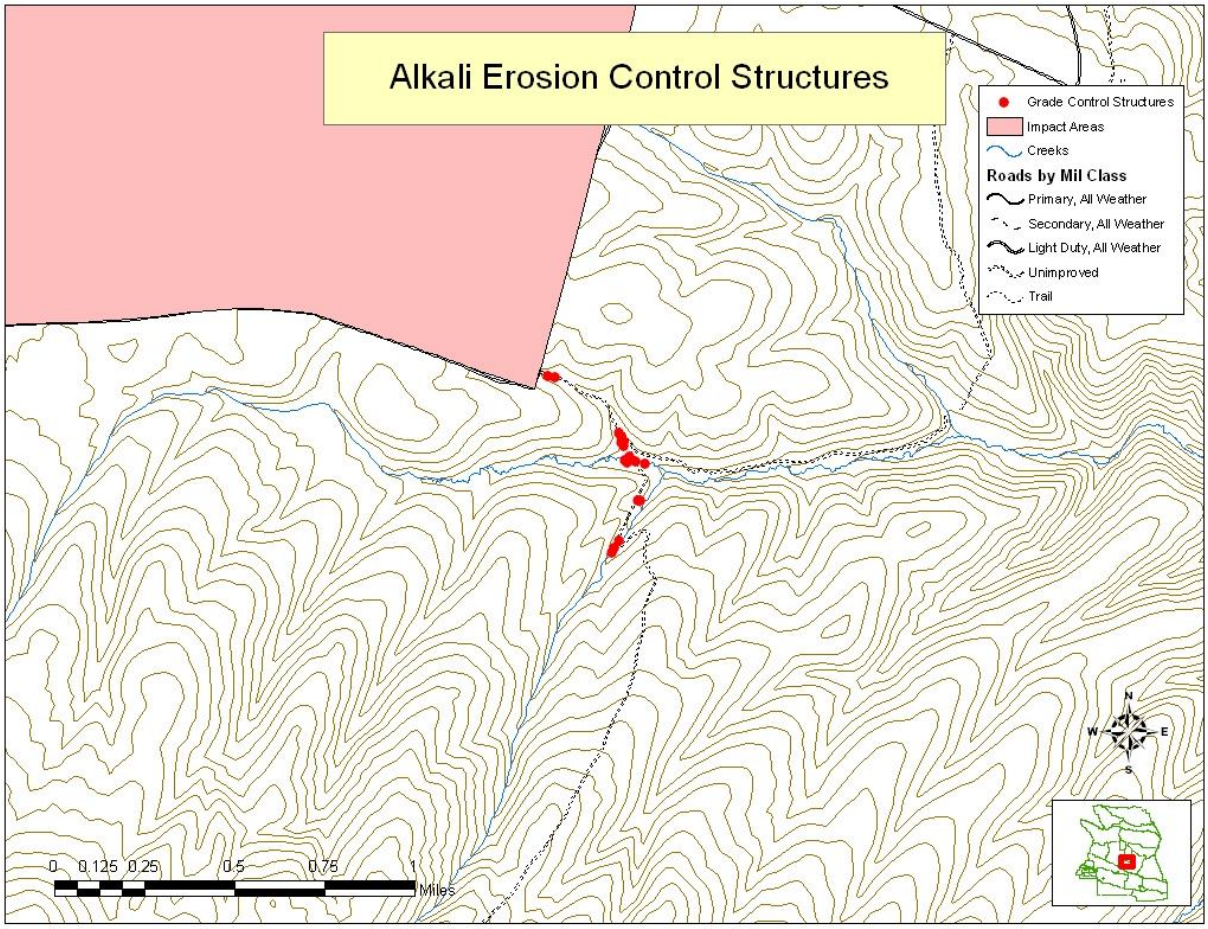

Figure 2-6 Erosion control structures proposed for the Upper Alkali Watershed.

2.2.2.4 Road Closure

Unnecessary roads within the MPRC SDZ and TA6 cause impacts to the surrounding resources. Closure is necessary to reverse the effects, and to promote improved conditions for trainers that use the area. Effects to other resources include upland and riparian vegetation (noxious weeds), soil (increased erosion), surface water quality (degraded conditions), and land use (degraded roads become hazards on the landscape). The project will put closure measures in place through blocking and ripping of surfaces to allow YTC to reseed and reclaim areas for future training.

Seven designated roads within TA 6 and the MPRC SDZ, totaling approximately 15,000 lineal feet (approximately 4.8 acres based on average road width of 14 feet), would be closed by the contractor. Roads would be closed by placing large boulders and berms at each end. Selected roads may be ripped for rehabilitation depending upon site conditions. Figure 2-7 illustrates the location of roads planned for closure.

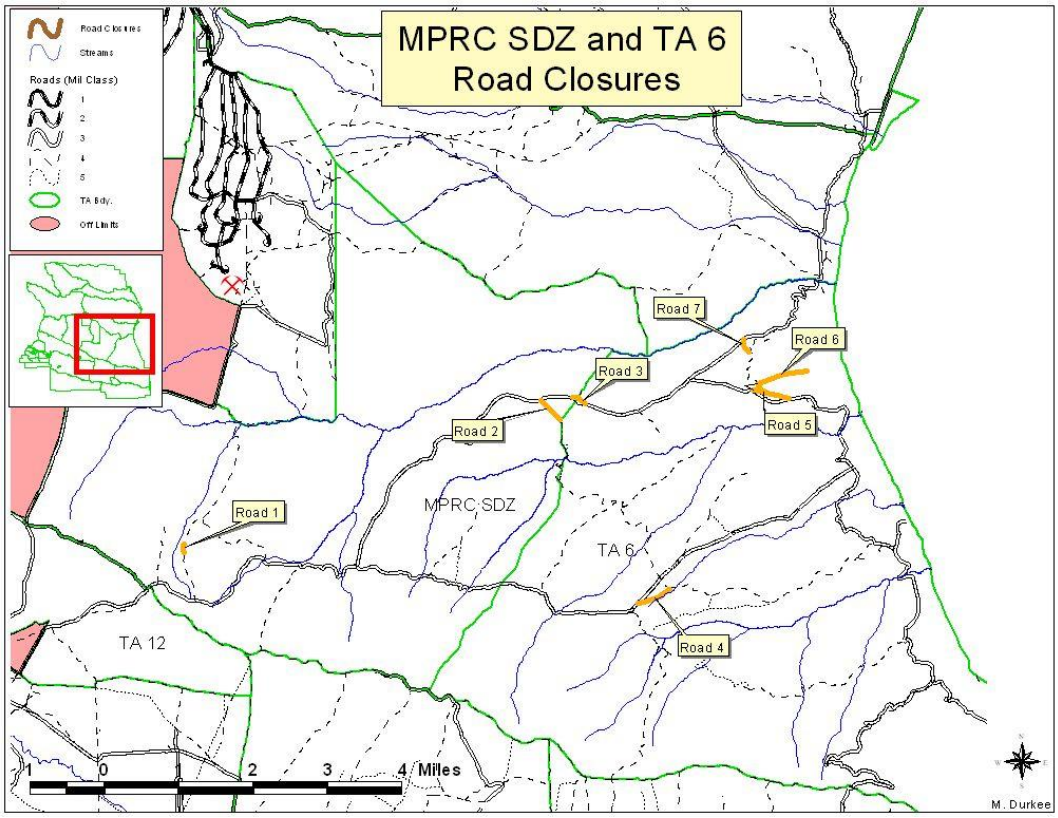

Figure 2-7 Road closures in the MPRC SDZ and TA 6.

2.2.2.5 Cattle Guard Removal

Cattle guards exist within Training Areas that are no longer needed. In most instances, they are now hazards on the landscape to trainers, and cause additional maintenance requirements on roadways. The proposed action would allow the removal of cattle guards and repair of road surfaces after their removal. Cattle guards would be collected at a designated location to enable ready disposal at a future date (either through reuse through assignment to another agency or metal recycling).

Fourteen designated cattle guards from range areas would be removed. The Contractor would then repair the roads at the sites following removal. Figure 2-8 illustrates the location of the cattle guards identified for removal.

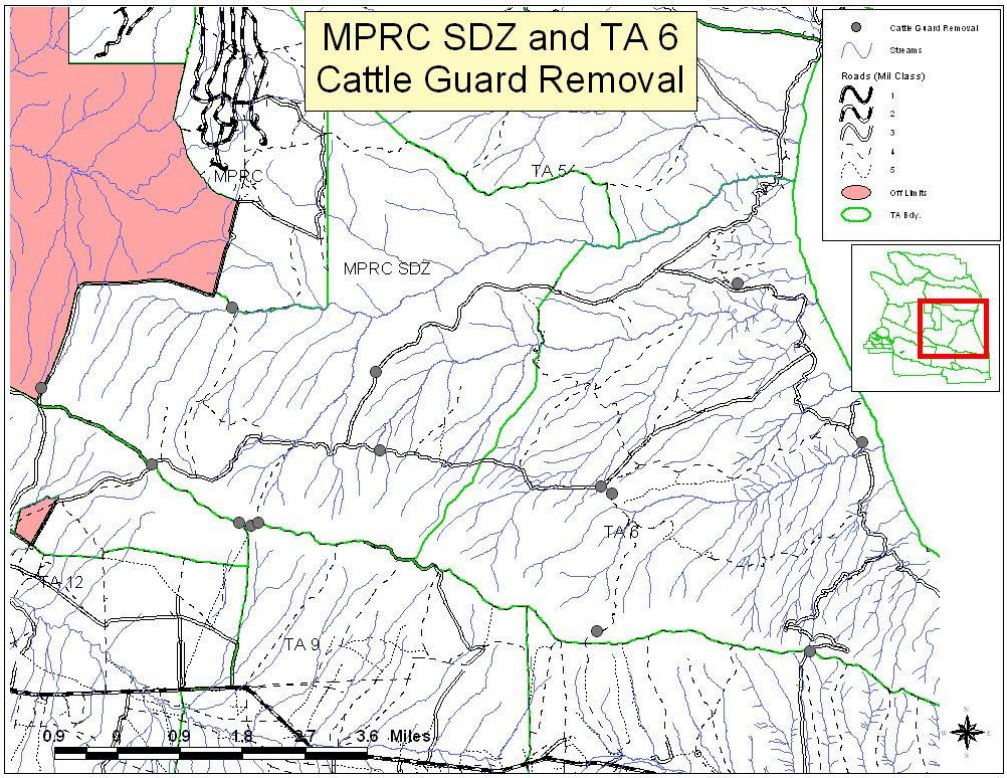

Figure 2-8 Location of Cattle Guards to be removed

2.2.2.6 SDZ Gates

The road that extends along the eastern edge of YTC through TA 6 is Route Black and is the main north-south road in that area. Five gates would be placed at road crossings that lead west into the MPRC's 105mm SDZ from Route Black. These gates would be used to close access to the SDZ from Route Black during training that includes use of 105mm weapons.

The gates are constructed of tubular steel and are attached to 8-inch diameter steel tubing attached to a concrete base. Figure 2-9 shows a similar set of gates. Figure 2-10 illustrates the locations of the gates.

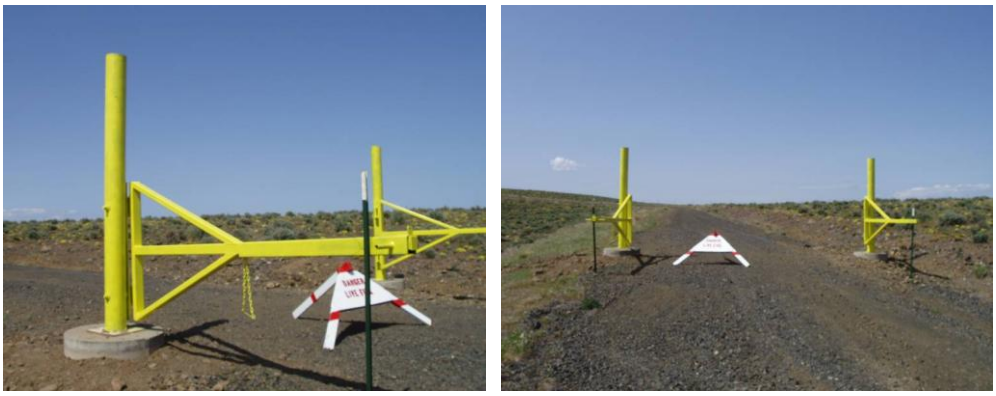

Figure 2-9 Example of Gates to be installed along MPRC SDZ

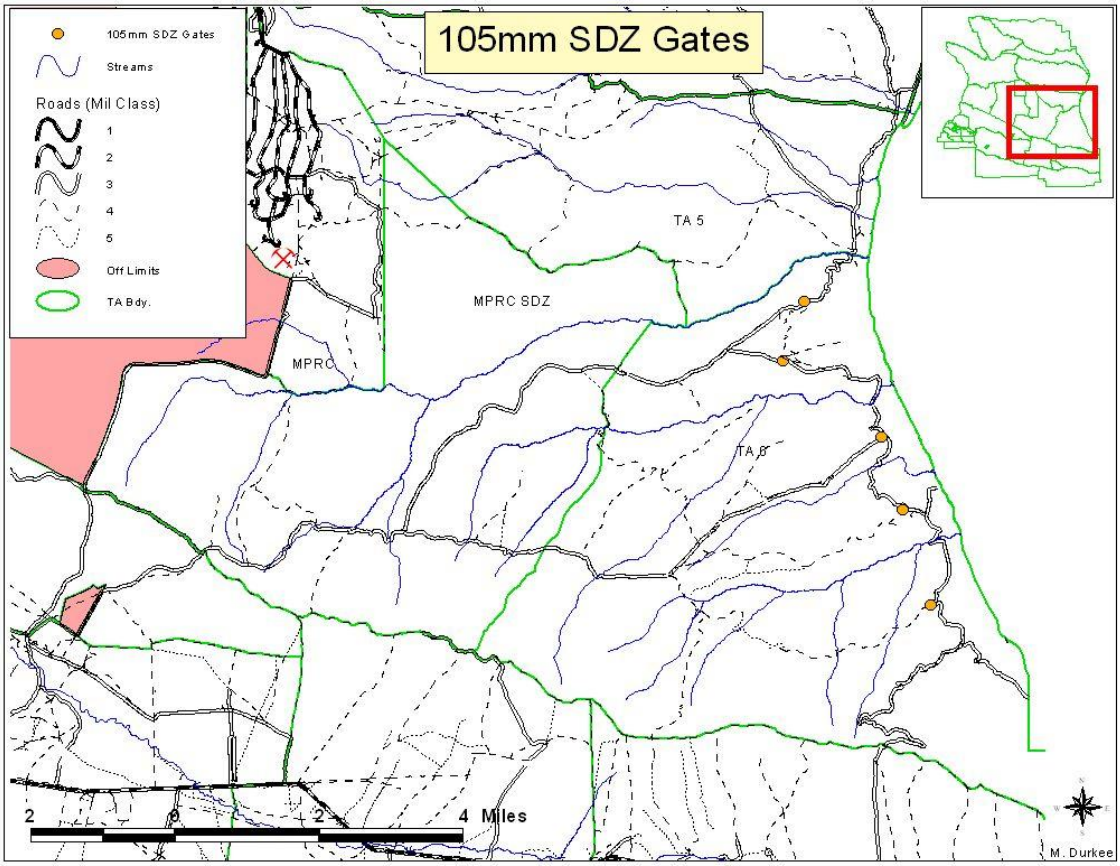

Figure 2-10 Placement Locations of SDZ Gates

2.2.2.7 Development of Water Resources

Water for construction purposes would either be provided by development of springs using storage tanks with overflow return to the source drainage, or through the drilling or development of wells. Springs in the MPRC and TA6 that may be developed for such purpose are Buffalo Wallow, Cross Road, Artesian, and Homestead Spring. Some or all of these springs may be developed. A tank and dip point may also be located near the Range Operations Control Area (ROCA) of the MPRC. Drilling of a well is another option for the development of water resources in this area. A well would be drilled and plumbed to a holding tank. Water from these sources could also be used in firefighting to fill tanks on ground vehicles and developed as aerial dip points by installing open top tanks at each site.

Springs would be developed by installing collection boxes and piping water to a holding tank located down slope from the spring. Tank fill would be done by gravity flow. From the tank, piping would run to a fast fill for filling ground vehicles. An overflow pipe would return water from the holding tank to the source drainage. If developed as an aerial dip point, piping will go from the storage tank down slope to the dip point. Flow into the tank would be controlled by a float valve so that the dip point is filled first, then the storage tank. Figure 2-11 illustrates the locations of springs proposed for development.

A well is proposed for the area near Cross Roads Spring (Figure 2-11). The well would be drilled and a pump installed. Water from the well would be pumped into a storage tank and the tank plumbed into a fast fill. If an aerial dip point is developed at the well, it would be plumbed

into the storage tank as described for the development of springs. Target flow for this well would be at least 20 gallons per minute (GPM).

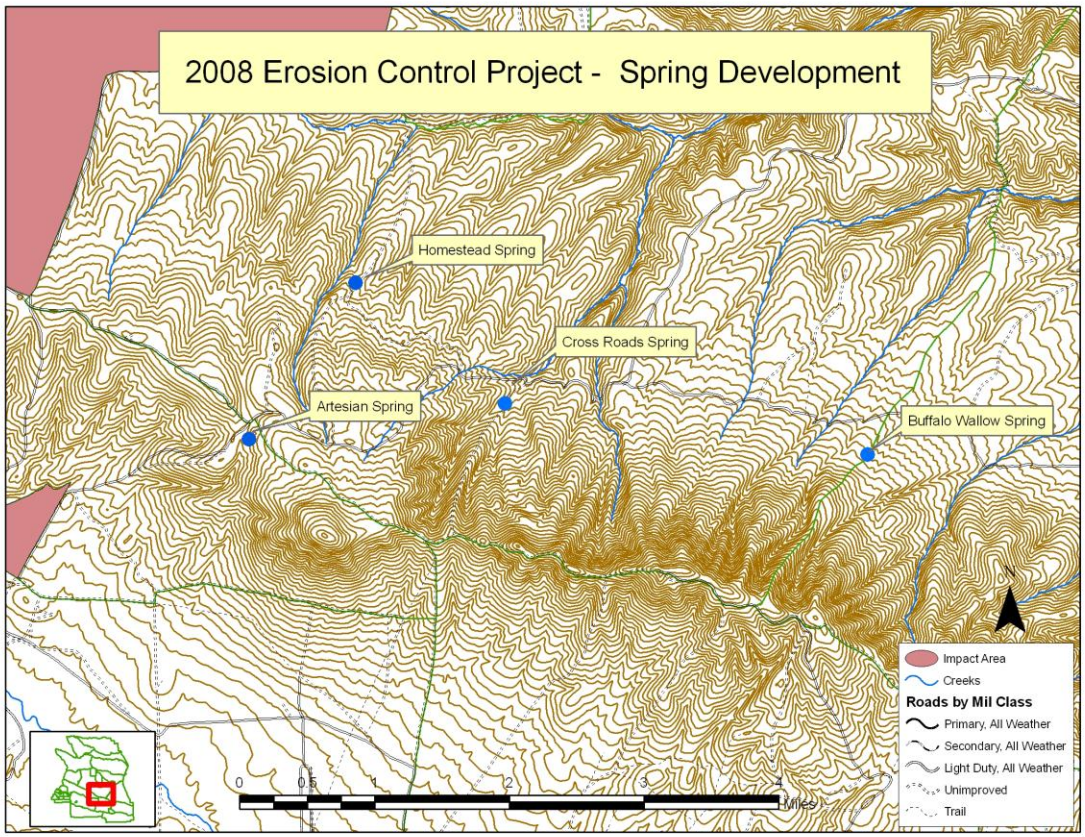

Figure 2-11 Location of Springs for Possible Development

2.2.2.8 Follow-up Restoration or Rehabilitation

Disturbance associated with this action would be included in the 2008 and 2009 Fall Upland Rehabilitation Plan. Seed mixture and application method selection would follow the Upland Rehabilitation Protocol. Any affected riparian area would be included in the 2009 Riparian Restoration Plan. Improved roads would be added to future herbicide application plans to control noxious weed propagation.

2.2.3 Proposed Action Alternative 2 (Spring Water Development Only)

In this alternative action, development of water sources for construction and fire suppression activities would be limited to springs in the project area. Up to four springs in the area may be developed. Water would be piped from the spring to a storage tank with overflow return to the source drainage. Dip points for aerial firefighting would possibly be developed at each site. No wells would be drilled and developed for this action. Combat roads would be improved, stream channel crossings repaired, unnecessary roads closed, erosion control structures constructed and cattle guards removed and recovered as described in Alternative 1. Restoration or rehabilitation for this action would be included in the 2008 and 2009 Fall Upland Rehabilitation Plan, and the 2009 Riparian Restoration Plan.

2.2.4 Proposed Action Alternative 3 (Well Water Only Development)

In this alternative action, development of water sources for construction and fire suppression activities would be limited to a well drilled near Cross Roads Spring (Figure 2-11). Water from the well would be pumped into a holding tank. A dip point for aerial firefighting may also be developed at the site. No springs for water sources would be developed. Combat roads would be improved, stream channel crossings repaired, unnecessary roads closed, erosion control structures constructed and cattle guards removed and recovered as described in Alternative 1. Restoration or rehabilitation for this action would be included in the 2008 and 2009 Fall Upland Rehabilitation Plans, and the 2009 Riparian Restoration Plan.

2.3 List of Required Permits

Permits required for each of the alternatives are listed in Table 2-3. The table also lists the agency or agencies responsible for issuance of the permit.

Table 2-3 List of Required Permits for Each Alternative

Permit	Agency	Alternative 1	Alternative 2	Alternative 3	No Action
NPDES Construction General Permit	USEPA	Yes	Yes	Yes	No
Joint Aquatic Resource Permit Application	USACE, WDOE, WDFW	Yes	Yes	Yes	No
Well Drilling Start Card	WDOE	Yes	No	Yes	No
Notice of Construction Air Quality Permit	WDOE	Yes	Yes	Yes	No

USEPA-U.S. Environmental Protection Agency; USACE-U.S. Army Corps of Engineers; WDOE-Washington State Department of Ecology; WDFW-Washington State Department of Fish and Wildlife.

2.4 Summary of Consequences

A summary and comparison of the environmental consequences of each alternative is presented in Table 2-4. Refer to Section 10.1.2 for the definitions of the intensity thresholds.

Table 2-4 Comparison of Environmental Consequences for Each Alternative

Environmental Issues/Consequences	Alternative 1	Alternative 2	Alternative 3	No Action
Air Quality	minor to moderate	minor to moderate	minor to moderate	negligible
Noise	negligible	negligible	negligible	negligible
Geology, Topography, Soils	minor	minor	minor	moderate
Surface Water	minor	minor	minor	moderate
Groundwater	negligible	negligible	negligible	negligible
Land Use	minor (positive)	minor (positive)	minor (positive)	moderate
Socioeconomics	negligible	negligible	negligible	negligible
Human Health	moderate (positive)	moderate (positive)	moderate (positive)	moderate

Table 2-4 Comparison of Environmental Consequences for Each Alternative (cont.)

Environmental Issues/Consequences	Alternative 1	Alternative 2	Alternative 3	No Action
Infrastructure	moderate (positive)	moderate (positive)	moderate (positive)	minor to moderate
Solid Waste	negligible	negligible	negligible	negligible
Hazardous Waste/Materials	negligible	negligible	negligible	negligible
Cultural Resources	minor	minor	minor	moderate
Biological Resources				
Upland Vegetation	negligible	negligible	negligible	minor
Riparian Vegetation	minor	minor	minor	negligible
Wildlife/Fish	minor	minor	minor	negligible
Threatened and Endangered Species	negligible	negligible	negligible	minor

Chapter 3 Affected Environment

YTC is located in the Columbia Basin; northeast of the city of Yakima, southeast of Ellensburg, and adjacent to and west of the Columbia River. The area lies in the rain shadow of the Cascade Mountain Range and can be described as open country with shrub-steppe-covered rolling hills and flats. Thin bands of trees and shrubs occur in the bottoms of canyons and along creeks. Rock outcrops, talus slopes, and cliffs are visible along the ridge tops, canyon walls, steep hills, and drainages. The installation is bounded on the north by Interstate 90 and Badger Pocket and on the east by the Columbia River. The southern boundary is south of Yakima Ridge, and most of the western boundary follows Interstate 82. The northern half of YTC lies within Kittitas County and the southern half lies within Yakima County. Surrounding land use includes rangelands, agricultural lands, urban areas, and state and federal wildlife and recreation areas.

3.1 Air Quality

YTC is registered with Yakima Regional Clean Air Agency (YRCAA) as a Complex Minor Source and is regulated by YRCAA in Yakima County and by Washington State Department of Ecology (WDOE) in Kittitas County. Air quality is generally considered good. YTC is in compliance with National Ambient Air Quality Standards (NAAQS), which are set by the U.S. Environmental Protection Agency. These standards specify maximum concentrations for carbon monoxide, nitrogen dioxide, ozone, lead, and particulate matter less than 10 micrometers in size (PM_{10}). Pollutants of concern from the action alternatives would be carbon monoxide and volatile organic compounds (VOCs) from vehicle operation and PM_{10} from rock crushing activities and vehicle movement during construction. Particulate matter pollutants at YTC tend to disperse quickly as a result of the prevailing westerly winds.

3.2 Noise

The dominant source of noise on YTC and lands immediately adjacent to the installation is military training operations. Weapon fire and explosive-type noise are produced during gunnery and demolition training. Other types of noise are associated with aviation, and movement of tracked and wheeled vehicles. Existing noise levels at YTC vary with location, time of measurement, and the types of activities and training underway. Noise levels within the cantonment area, range offices, and temporary barracks, are at or below 65 decibels adjusted day-night level (dBA DNL). Firing points, demolition ranges, and impact areas are the only areas with noise levels above 75 dBA DNL**.** Land use adjacent to YTC includes undeveloped, agricultural, rural residential, and recreation land. Nearby major towns and communities include Yakima, Terrace Heights, Selah, Moxee City, Ellensburg, and the Badger Pocket Area. Existing noise levels are expected to vary from below 40 dBA DNL for the rural areas to 70 dBA DNL near commercial and industrial areas.

3.3 Geology, Topography, and Soils

Topography at YTC varies from low plains and rolling hills to escarpment. Five basaltic ridges (anticlines) cross the installation in a northwest-southeast orientation: Yakima Ridge, Umtanum Ridge, Manastash Ridge, the Saddle Mountains, and the Boylston Mountains. The ridges form rounded hills to mountains, with slopes varying from 8 to 60 percent. Steepest slopes occur along crests of ridges. Topography tends to be more rugged in the eastern portion of the installation, along Corral Canyon, in Alkali Canyon, and along bluffs bordering the Columbia

River. Steep escarpments occur along the western end of Selah Creek. Elevations vary from about 500 ft. above sea level at the banks of the Columbia River to an elevation of 4,191 ft. above sea level along Yakima Ridge in the southeast portion of YTC.

Most of YTC and much of the surface of the Columbia Plateau were covered with basalt flows in the Miocene era (13 -16 million years ago), which was followed by a period of loess (wind - blown silt) deposition in the early Pleistocene. Later Pleistocene glaciations resulted in a mixture of soil parent materials, including glacial outwash, loess, residuum, alluvium, and basaltic colluviums distributed throughout the landscape. A predominance of silt loams in surface horizons is characteristic of arid to semiarid climates. Soils are fragile and easily eroded or broken down by vehicle traffic. In addition, there are some minor areas of bottomland or alluvial soils, primarily near the Columbia River and in the cantonment area.

3.4 Water

3.4.1 Surface Water

Surface water within the boundaries of YTC is managed as 10 management units or "watershed complexes" (see Figure 3-1) which are further divided into 28 watersheds. These watersheds drain into the Columbia River basin to the east, and the Yakima River basin to the west. Streams on YTC are fed by direct runoff of precipitation and in some cases by discharge of groundwater. As a consequence of its location in an arid region and the occurrence of occasional precipitation and snowmelt that produces relatively high runoff, the streams at YTC have high variation in flows. Upper reaches of streams that are normally dry may carry in excess of 50 cubic feet per second of flow during extreme events (Bain 1991). Infrequent high flows cause erosion in all reaches of streams, and carry sediment eroded from the land surface by the rapid runoff. Although the major streams on YTC have not been explicitly classified by the State of Washington, they are considered to be Class A (excellent) water quality by virtue of the provisions of state regulations (WAC 173-201A). The remaining surface water drainages on YTC are intermittent and do not flow in the summer. Five man-made ponds on YTC are artificially maintained to support fire-fighting activities, wildlife habitat, and recreation (YTC 2002).

YTC contains 17 major streams with intermittent or perennial stream flow and more than 200 springs, many of which have surface water flow. Within the project area there are the ephemeral and/or intermittent upper reaches of three drainages (Alkali, No Name, and Cottonwood Creeks) and surface water associated with Juniper Springs. A degraded crossing exists downstream of Juniper Springs and an opportunity exists to improve it with this project.

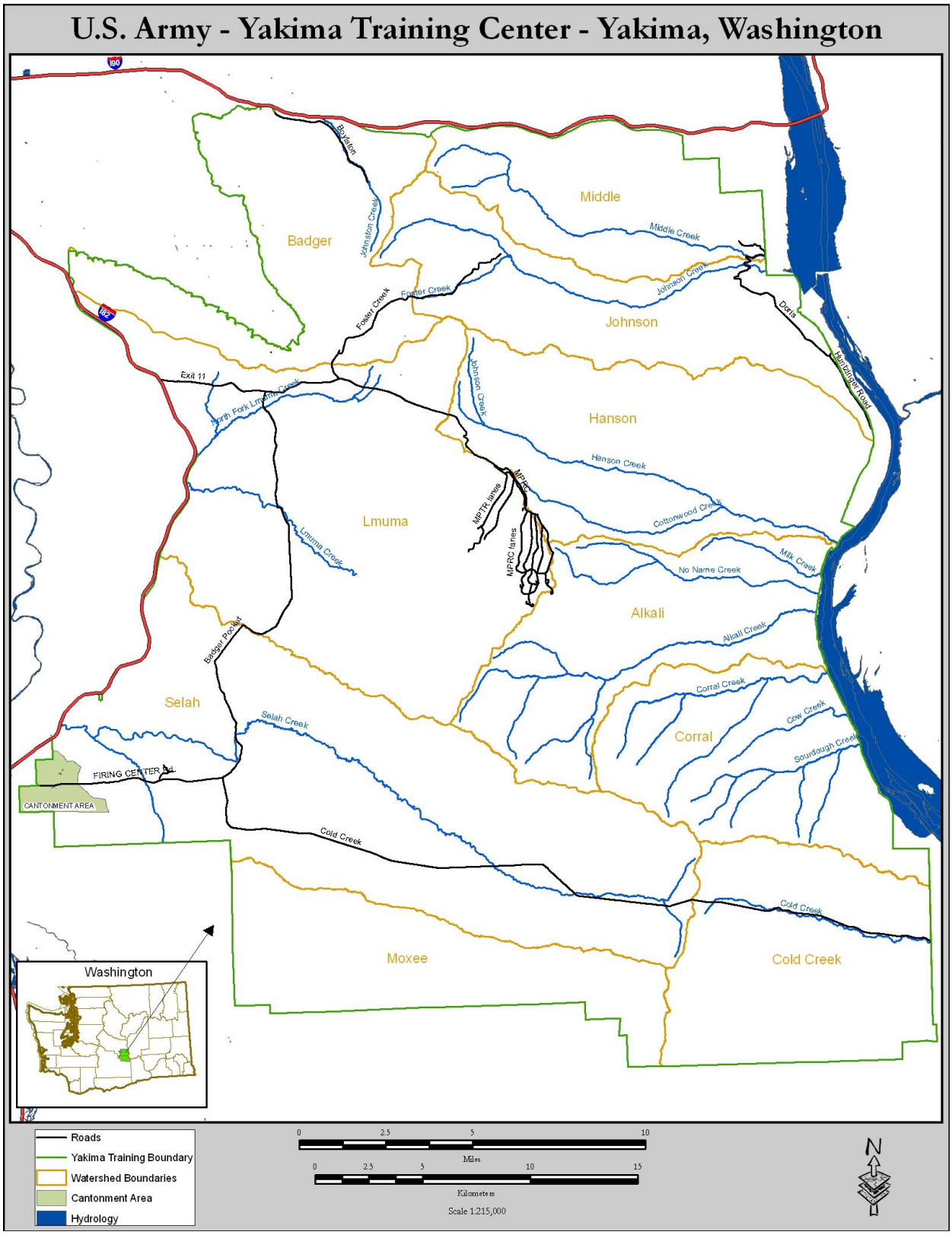

Figure 3-1 Yakima Training Center Watershed Complexes

3.4.2 Groundwater

Groundwater in the vicinity of YTC occurs within four principal aquifers: surficial sedimentary units (principally Ellensburg Formation), Saddle Mountains Basalt, Wanapum Basalt, and Grande Ronde Basalt (Ecology and Environment 1993). Shallow surficial aquifers are largely recharged from precipitation falling directly within the boundary of the installation while deeper basalt aquifers are recharged over broader areas, particularly to the west of YTC. Because shallow groundwater supply is entirely dependent on recharge within YTC, groundwater is at least partially dependent on the condition of soils and vegetation. Activities that adversely affect infiltration and quantity of groundwater include soil compaction, reduction or loss of vegetation, and channelization of flow (e.g., along improperly designed or constructed roads), all of which have occurred and will continue to occur as a consequence of training (off-road vehicle training, fire, and bivouacking) (ENRD 2002).

3.5 Land Use

The primary mission of YTC is the support of military training. However, much of the 500 square miles that compose the installation are available for contemporary Native American uses, public recreation, and limited livestock trailing. Restricted areas of YTC (e.g., impact and dud areas) are not open to the public.

Currently, YTC provides military training facilities and logistical support for cross-country maneuvers and operational live-fire training opportunities. Major military land uses at YTC include the cantonment area with residential, administrative, commercial, light industrial, and open space uses (1,010 acres); training areas with maneuver, impact, firing ranges, and other special uses, and the Selah Airstrip and Vagabond Army Heliport (326,221 acres).

YTC is located within the area ceded by bands and tribes of the Yakama Nation pursuant to the Treaty of 1855. Yakama tribal members continue to hunt and gather plant resources on YTC. The Wanapum live adjacent to YTC's eastern boundary near Priest Rapids Dam and use the installation for traditional, religious, and ceremonial purposes. Refer to Section 3.11, *Cultural Resources*, of this EA for additional information on contemporary Native American uses.

Public recreational use at YTC includes: hunting, hiking, bird watching, and horseback riding. These activities may take place anywhere throughout non-restricted areas depending on scheduled training exercises.

Limited livestock trailing also occurs at YTC. Trailing consists of biannual movements which take place in winter (e.g., December and January), and spring (e.g., May) months, bringing sheep south to winter feeding grounds, and north to summer pastures. Movements occur within one month, and normally include two to four bands consisting of up to 1,000 sheep each. YTC has established a request, review, and coordination and approval procedure for livestock trailing.

The proposed action alternatives in Training areas 6, 11, and 12, and the MPRC SDZ would not change current land use practices. Consequently, land use will not be discussed further in this document.

3.5.1 Surrounding Lands

Adjacent land use includes private residence, tribal lands, agriculture, rangelands, and a state park. In general, surrounding lands are sparsely populated, however, several rural and urban communities including Yakima, Selah, Moxee City, and Terrace Heights, are adjacent to YTC's

southwest corner. Toward the southern end of YTC's eastern border, the Wanapum lives in a small village near Priest Rapids Dam. Agriculture surrounding YTC includes orchards owned by Auvil Fruit, located adjacent to the eastern boundary just north of the River Crossing Site, and row crops to the north, west and south. Rangelands utilized by local ranchers exist to the north and southwest. Gingko Petrified Forest State Park/Wanapum Recreation Area occupies the area directly northeast of the installation between YTC and the Columbia River.

3.6 Socioeconomics

For this analysis, the region of influence (ROI) for YTC is defined as Yakima and Kittitas Counties. The ROI is the geographical area most affected by the economic activities associated with the installation resulting from the proposed action. Many of the supplies and services needed by the installation are purchased within the ROI. Residential, educational, and recreational facilities for military personnel and their families are also provided within the ROI. The interstate corridors of I-90 and I-82 provide easy access to the cities of Yakima, Selah, and Ellensburg.

The total population for the ROI was an estimated 269,200 in April, 2008 (Washington Office of Financial Management 2008). The largest city in the ROI is the city of Yakima in Yakima County, with a population of 84,300. In Kittitas County, the largest city is Ellensburg, with a population of 17,330. On YTC, barracks may house up to 2,600 people and are utilized on a temporary basis by military personnel participating in training exercises. Approximately 400 personnel (mixed military/civilian/contract) work at the installation of which very few live in barracks. There is no family housing on YTC; consequently, all married military families reside off-post.

3.6.1 Environmental Justice

Pursuant to Executive Order (EO) 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Population*, minority and low-income populations were considered during development of this EA.

Racially and ethnically, Yakima County has a more diverse population than Kittitas County. According to the 2000 Census Bureau information, 65.6% of the population in Yakima County identified themselves as white. Those in Yakima County identifying themselves as having a Hispanic or Latino ethnicity made up 35.9% of the population. In Kittitas County, the percentage of the population identifying themselves as white was 91.8% and those identifying themselves as Hispanic or Latino was 5% (People who identify their origin as Spanish, Hispanic, or Latino may be of any race). The median age of the population in Yakima County is 31.2 years whereas in Kittitas County, it is 31.4 years.

The service industry is the largest employer in the YTC ROI, employing 42,977 individuals. Farming is the second largest employer with 16,163 employees. The unemployment rate in July 2008 for Kittitas County was 6.2% and the unemployment rate in Yakima County was 6.9%. The July 2008 unemployment rate for Washington State was 5.4% (WA. State Employment Security Dept 2008).

Activities associated with construction (e.g., equipment movement) have impacts similar to those encountered during training and with regular road maintenance activities. These types of activities do not disproportionately affect minority or low income populations. Because of the

similarity of the actions of Alternative 1 and Alternatives 2 and 3 to activities currently occurring in the area, environmental justice will not be discussed further in this document.

3.6.2 Protection of Children

Pursuant to Executive Order (EO) 13045, *Protection of Children from Environmental Health Risks and Safety Risks*, the health and safety of children was considered during the development of this EA.

Lands adjacent to the installation are sparsely populated or undeveloped. The project location is in an isolated eastern area of YTC with no residences within a five mile radius. As mentioned above, there is no family housing on-post and no children reside on the installation. However, a small number of school-aged children live in East Selah, located just west of the cantonment area, and in the Badger Pocket area, north of YTC in Kittitas County. The Wanapum Village is to the east of the project area, along the Columbia River.

Current activity at YTC does not affect the health and safety of children. The alternatives being considered would not change activities from those currently performed at YTC. Because of this and the relatively isolated location of the facility, no direct or indirect impacts the health and safety of children would be expected. Protection of children will not be discussed further in this document.

3.7 Human Health

The region of potential human health impact is discussed in Sections 3.4, *Land Use*; 3.5, *Socioeconomics;* 3.8, *Infrastructure*; and 3.11, *Cultural Resources*.

Animal pests occurring on-post include rodents (mice and ground squirrels), mustelids (badgers and skunks), venomous snakes, arthropods (ticks, spiders, and scorpions) and flying insects (mosquitoes, bees, and wasps). These animals do not normally raise issues, but occasionally situations requiring control efforts need to be addressed and are handled on a case by case basis.

Wildland fire burns approximately 9,000 acres annually on YTC (YTC, 2004). The frequency of fire occurrence is typically low in the rural areas adjacent to YTC. However, wildland fires can extend across vast areas due to the availability of fuels and the lack of development that would provide a more fire resistant landscape typically found in residential or transition areas. Typically, there is a longer response time associated with fires in rural areas due to the greater distance required to travel during the response. While military training does contribute to the occurrence of wildland fires at YTC, there are other sources of ignition such as lightning and vehicles (e.g., vehicle exhaust).

3.8 Infrastructure

The cantonment area is the primary developed area within YTC. It contains housing, food service, and exercise facilities as well as administrative, fire department, health services, and other support facilities. Thirty-five barracks are available to trainers as temporary housing during training events. Dining facilities are operated by units as needed, but are closed during non-training periods.

Three discrete Class A potable water systems service YTC personnel: Pomona (serving the cantonment area), Yakima Research Station (YRS), and the MPRC. Non-potable water is provided via Class B wells and several developed springs (Gray & Osborne, Inc. 2003).

Wastewater generated within the cantonment area is handled at the YTC Wastewater Treatment Plant. Following primary and secondary treatment, water is discharged to the Yakima River.

Buildings found in the range areas of YTC include small compounds at the MPRC, the Badger Pocket Assembly Area, and the Doris Site.

There are approximately 1,648 miles of roads on YTC. They consist of five classes of roads (i.e., primary, secondary, and light duty all-weather, unimproved, and trail) with the majority being made up of unimproved roads and trails. The all-weather or maintained road system consists of approximately 516 miles of road.

3.9 Solid Waste

Refuse generated on YTC is disposed through local hauling companies at local landfills. The haulers and contractual arrangements are different in Yakima and Kittitas Counties. Inert demolition waste must be disposed in a commercial permitted landfill. Each contractor is responsible for proper disposal of all waste it generates during operations.

3.10 Hazardous Materials/Waste

Use, storage, and disposal of hazardous materials, related containers, and waste generated are regulated by installation guidelines and policies, as well as Federal and state laws and regulations. These guidelines, policies, laws and regulations apply to all personnel, including military, civilian, and contractor. For hazardous materials, requirements include, but are not limited to, quarterly inventory provided to YTC Environment and Natural Resources Division (ENRD), storage according to best management practices and Fire Code, documented weekly inspection by the "owner," inspection by YTC Fire Department and Environmental Compliance, and mandatory annual training provided by YTC Environmental Compliance.

Storage and disposal of hazardous wastes also are regulated by installation guidelines and policies, and Federal and state laws and regulations. Likewise, all personnel, whether military, civilian, or contractors, must adhere to these guidelines, policies, laws and regulations. YTC Environmental Compliance is the authority at YTC in determining how non-hazardous and hazardous wastes will be managed onsite. Either waste is delivered to the One Stop Yard (Bldg. 450) at the end of each work day or a satellite accumulation site is established at or near the point of generation. Specific requirements apply to satellite accumulation sites, including, but not limited to, secure storage, containers compatible with waste, labeling, secondary containment for liquid wastes, documented weekly inspection by the generator, inspection by the YTC Fire Department and Environmental Compliance, and mandatory annual training provided by YTC Environmental Compliance. All hazardous and non-hazardous wastes are managed through the One Stop Yard (Bldg. 450). It is the only less-than-90-day accumulation site on YTC and accepts waste from throughout the installation for proper handling until the waste is shipped offsite for appropriate management.

YTC adheres to an Installation Spill Contingency Plan which is a component of the YTC Spill Prevention, Control and Countermeasures Plan. Entities responding to a spill may include the YTC Fire Department and/or YTC Police. Depending on the nature and severity of any spill, external participants may be requested for support. Contractors are required to notify the YTC Police immediately upon observance of spill.

Certain materials may be identified by YTC Public Works Operation & Maintenance or Environmental Compliance for diversion from waste and directed to recycle, such as metal siding or electrical cable. Any recyclable materials remain the property of YTC and only the U.S. Army/YTC will profit from recycle.

3.11 Cultural Resources

Cultural resources at YTC include prehistoric and archeological sites and cultural manifestations. The installation also supports contemporary Native American uses. Prehistoric resources are generally found near watercourses, at the base of cliffs, and on uplands. Historically, Euroamericans used sites now occupied by YTC for ranching, mining and quarry operations, and as settlements. Railroad construction and operation also took place across YTC. Remnants of historic uses are found throughout the installation concentrated in small areas of previous development and habitation.

Members of the Yakama Indian Nation and the Wanapum continue to use YTC for traditional cultural purposes consistent with their past practices. Current uses include gathering wild root crops, fruit and berries, and other plant materials for food, medicines, and crafts; hunting of deer and birds; and religious and ceremonial pursuits such as spirit quests. Table 3-1 identifies some common uses and the time of year they typically occur.

The most important root crop is commonly known as biscuit-root, desert parsley, or Indian celery (*Lomatium* spp.). Native American people also harvest the roots, leaves and stalks of balsamroot (*Balsamorhiza* spp.), rhizomes of cattail (*Typha* sp.), roots of bitteroot (*Lewisia redeviva*), and bulbs of wild onion (*Allium* spp.) and yellow bell (*Fritillaria pudica*). Crops are gathered primarily in the spring and mostly from the eastern and southwestern portions of the installation.

Table 3-1 Common Cultural and Religious Uses and Ceremonies Conducted at Yakima Training Center

Use	Typical Time Period
Gathering of plant products and materials (roots, berries, textile materials)	Early March through early June
Hunting	Year round
Religious ceremonies	Year round
Fishing (Columbia River)	Spring and Fall (coordinated with spring and fall salmon runs)

Fruits of common chokecherry (*Prunus virniniana*), western serviceberry (*Amelanchier alnifolia*), blue elderberry (*Sambucus cerulea*), and currants (*Ribes* spp.) are gathered during the summer. Berries are primarily gathered near streams and springs that drain into the Columbia River on the east side of YTC.

3.12 Biological Resources

3.12.1 Upland Vegetation

YTC lies within the shrub-steppe Columbia River Basin province of eastern Washington and Oregon (Franklin and Dyrness 1973). Shrub-steppe vegetation is characterized as the potential big sagebrush/bluebunch wheatgrass zone as described by Daubenmire (1970) and was once widespread throughout the Columbia Plateau. This is the community that is expected to occur without disturbance, alteration of habitat, or invasion by non-native species. Today very little shrub-steppe remains undisturbed or unaltered from its condition prior to Euro-American settlement and it is considered one of North America's most imperiled and neglected ecosystems

(Dobkin and Sauder 2004). Historically, approximately 10.4 million acres of shrub-steppe existed in Washington prior to the arrival of settlers during the 19th century. Today, only about 40% of the original shrub-steppe in Washington remains (Dobler et al. 1996) due to changes in land use over the past century. Yakima County supports the largest amount of shrub-steppe in the state retaining 58% of its original acres. The few remaining large areas of shrub-steppe in Washington are primarily on federal holdings (YTC, Hanford Reach National Monument, and the Yakama Indian Nation) and may represent the only sites suitable for species requiring extensive areas of continuous shrub-steppe (Dobler et al. 1996).

Upland vegetation communities on the installation consist of a mosaic of native and non-native grasslands and a variety of shrubland communities often composed of several species of Sagebrush (*Artemisia*). The intricate mosaic of these plant communities is the result of complex soil patterns, topography, precipitation, and past and current land uses. Historic and present day causes of disturbance to vegetation on YTC include conversion of land to agricultural uses, grazing, fire, construction, road building, the deliberate and inadvertent introduction of non-native species, and maneuver training exercises. Disturbance reduces native plant species cover and diversity, changes species composition and structure, and increases the likelihood of invasion by non-native species (Rickard et al. 1988). Native bunchgrasses and native forbs are particularly vulnerable to disturbances and have decreased dramatically in most portions of the shrub-steppe in Washington.

Within the proposed project area, big sagebrush/bluebunch wheatgrass communities inhabit deeper loessal soils and stiff sagebrush/Sandberg's bluegrass and/or Buckwheat communities are found in shallow, rocky soil areas. The shrub layer is absent from much of the project area that has burned recently and repeatedly, resulting in either stands of native bunchgrass or areas dominated by annual weedy forbs and cheatgrass which colonize and spread after disturbance. Upland vegetation as described in this paragraph is prevalent at each of the proposed project sites as many are essentially uplands, ephemeral channels, and/or drainages.

3.12.2 Riparian Vegetation

Riparian or streamside environments are critical linkages and transition zones between the upland and aquatic environment. Riparian zones provide a variety of ecosystem functions, such as wildlife habitat, contribution to fish habitat, unique plant species habitat, improving flood control, and sediment trapping. Although riparian areas comprise only a fraction of the total land area, they have a much higher plant and animal species diversity and biomass per unit area. Higher species diversity can be attributed to the fact that riparian habitat is found within the narrow zone, or ecotone, between aquatic and terrestrial ecosystems (Youngblood et al. 1985). This interface allows species of both aquatic and terrestrial habitats to occupy and utilize riparian habitat. Riparian habitats are especially important to wildlife when they are adjacent to relatively less productive habitats such as shrub-steppe, steppe, and deserts (Bock et al. 1992).

Riparian habitat is limited geographically and is vulnerable to loss and degradation through human activities and land uses. In the arid and semi-arid regions of the West, riparian habitat is a resource of equal or greater value than the wetlands of the East, Midwest, and South (Kusler 1985). Various causes, such as urbanization, flood control, and grazing have lead to the destruction of riparian habitat in 20 states west of the Mississippi River (Kusler 1985). Since the arrival of settlers in the early 1800s, at least 50% and as much as 90% of riparian habitat in Washington has been lost or extensively modified (Knutson and Naef 1997). On YTC, riparian

areas have sustained repeated damage from livestock grazing prior to 1995 and from impacts associated with military training (e.g., fire, cross-country maneuver, poor road design) since the 1940s. Natural events, such as periodic flooding from high precipitation events, also impact riparian habitat. Riparian habitat is in a constant state of change with newly created habitats shifting over time as point bars are created and are eventually eroded away as the stream continues to change position (Davis et al. 1996). Protecting riparian habitat may yield the greatest gains for fish and wildlife across the landscape while involving the least amount of area (Knutson and Naef 1997).

Riparian vegetation includes riparian and wetland plant communities associated with ponds, springs, and perennial and intermittent streams. YTC contains 17 major streams with intermittent or perennial stream flow and more than 200 springs. Riparian vegetation is primarily dominated by woody shrubs and trees such as black cottonwood (*Populus baslimifera var. trichocarpa*), water birch (*Betula occidentalis*), white alder (*Alnus rhombifolia*), quaking aspen (*Populus tremulolides*), several species of willow (*Salix*), Wood's rose (*Rosa woodsii*), mock orange (*Philadelphus lewisii*), and species of currant (*Ribes*). Riparian communities are also composed of a variety of graminoids including species of rush (*Juncus*), sedge (*Carex*), bulrush (*Schoenoplectus*), bluegrass (*Poa*), and wildrye (*Leymus*). Herbaceous species include species of horsetail (*Equisetum*), cattails (*Typha*), and goldenrod (*Solidago*). Within the proposed project area, riparian habitat as characterized by the description above is limited as most sites occur in ephemeral channels and/or drainages or uplands. Only alternatives proposing water developments at existing springs would impact riparian habitats and associated species. Within the Training Areas/watersheds the projects are proposed in, there are several established riparian areas associated with the major drainages of Alkali, Cow, Sourdough, Selah, and known springs.

3.12.3 Wildlife/Fish

Johnson and O'Neal (2001) identified 651 species of wildlife that reside in Washington State of which some 300 species inhabit the arid and semi arid shrub-steppe region of the Columbia Basin. On YTC there are approximately 246 species of wildlife and 10 to12 species of fish that either occur or are expected to occur based on known ranges and habitat preferences (ENRD 2002). With such an array of fish and wildlife species, a combination of both coarse (wildlife habitat) and fine filter (species specific) approaches are used to manage fish and wildlife species on YTC. Habitat is fundamentally linked to the distribution and abundance of species and underlies explanations of the factors, patterns, and processes that support fitness of wildlife at individual, population, and community levels, as well as their continuing evolution (Johnson and O'Neil 2001). Although it is assumed that with a coarse filter approach that the needs of most species are met through provision of a mosaic of habitats, some species with status concerns require a species specific approach (i.e., fine filter) to management.

Wildlife habitats characteristic of this region and YTC include those vegetation communities described above, their structural components (i.e., shrub height, percent cover, age class), specific habitat elements contained within them (e.g., soil characteristics, cliffs, burrows, large trees), anthropomorphic features (e.g., roads, buildings, towers, lights) and their potential effects. It is assumed that wildlife use habitat arranged or comprised of vital components that result in healthy and viable populations.

Within Training Areas containing proposed projects, wildlife habitat consists of shrub-steppe, dwarf shrub-steppe, grasslands, and riparian vegetation communities displaying varying degrees of structural components and habitat elements within them. These are arranged in a mosaic and influenced by underlying soil characteristics, aspect, and current land uses. In terms of the actual proposed project sites, most occur on or within the zone of influence of existing roads and are characterized by species associated with disturbance and/or upland vegetation communities found throughout the training area or within ephemeral channels. Only the alternatives proposing water development of existing springs would impact riparian habitats and associated species.

3.12.4 Threatened and Endangered Species

There are several species of fish, wildlife, or plants that are of management concern for YTC due to their current or potential federal status under the Endangered Species Act (Table 3-2) and/or the Bald and Golden Eagle Protection Act. This list was developed in consultation with U.S. Fish and Wildlife Service (USFWS) and National Oceanic and Atmospheric Administration (NOAA) Fisheries web-based resources. Review of species and habitat lists contained in recent Biological Assessments that have concluded Section 7 Endangered Species Act (ESA) informal consultation with the regulatory agencies.

Table 3-2 – Threatened and Endangered Species at Yakima Training Center, Yakima, WA

Common Name	Scientific Name	Status	Critical Habitat Present on YTC
Bald Eagle	*Haliaeetus leucocephalus*	Delisted Taxon-Recovered	N/A
Columbia River DPS Bull Trout	*Salvelinus confluentus*	Threatened	No*
Upper Columbia River Spring Run Chinook ESU	*Oncorhynchus tshawytscha*	Endangered	No*
Upper Columbia River Steelhead ESU	*Oncorhynchus mykiss*	Endangered	No*
Middle Columbia River Steelhead ESU	*Oncorhynchus mykiss*	Threatened	No*
Ute ladies'-tresses	*Spiranthes diluvialis*	Threatened	No
Greater Sage-grouse Columbia Basin DPS	*Centrocercus urophasianus*	Candidate**	N/A
Umptanum Wild Buckwheat	*Eriogonum codium*	Candidate**	N/A
Basalt Daisy	*Erigeron basalticus*	Delisted Taxon	N/A
Northern Wormwood	*Artemisia campestris ssp. Borealis var. wormskioldii*	Candidate**	N/A

*Critical habitat is designated for these species but YTC is excluded from designation.
**Only Candidate species that have been analyzed in past Biological Assessments and are known to occur on or adjacent to YTC with potential for impacts from the proposed action are included.

3.12.4.1 Wildlife/Fish

Bald Eagle

On July 28, 2007, the U.S. Fish and Wildlife Service removed bald eagles that inhabit the lower 48 states from the Federal list of Endangered and Threatened Wildlife (i.e., protections under the ESA) due to meeting or exceeding established recovery goals throughout its range. However, the bald eagle is still afforded protection under the Bald and Golden Eagle Protection Act and the Migratory Bird Treaty Act and will therefore be included in this analysis.

Populations of breeding, wintering, and migratory bald eagles occur throughout Washington State. No known nesting occurs on YTC, as suitable habitat does not currently exist but bald eagles have recently attempted to nest adjacent to the installation along the Yakima and Columbia Rivers. Known nesting attempts adjacent to the installation range from 3.5 to 6 km of YTC's boundary. Nearest known nest sites are located greater than 20 km away from any of the proposed project area identified in this EA. Portions of the installation contain suitable habitat for wintering and migrating bald eagles that frequent the installation from October through mid-to-late April. Suitable habitat for migrating and wintering bald eagles consist of diurnal perches adjacent to abundant sources of prey and nocturnal roost areas relatively free of disturbance. Wintering bald eagles found on YTC forage off the installation primarily along the Wanapum and Priest Rapids Reservoirs. Wintering eagles frequenting the Columbia River have been known to roost nocturnally at several sites on the installation to include Hanson Creek, Borden Springs, and historically Alkali Canyon. Known nocturnal roosts located along Hanson Creek are greater than 10 km away of any of the proposed project area and consist of individual and small stands of mature size cottonwood trees. The Borden Springs roost is approximately 3 km north of the northeastern most proposed project area (105mm SDZ Road) and the Alkali Canyon site no longer exists due to recent wildfires. Although wintering/migrating eagles use the areas described above from October through April, the period of consistent daily use is December through March with a peak in number and frequency of observations occurring in February. YTC manages bald eagles under an Endangered Species Management Plan that provides both spatial and temporal protection measures for both populations of wintering bald eagles and existing habitat, as well as restoration efforts for future habitat.

Bull Trout

The USFWS designated the Columbia River Distinct Population Segment (DPS) of bull trout as threatened on June 10, 1998 (63 Fed. Reg. 31647). The Columbia River bull trout DPS consists of all populations in the Columbia Basin which includes four major stocks: the Yakima; Wenatchee; Entiat; and Methow Rivers. These rivers contain 39 subpopulations recognized by the Washington Department of Fish and Wildlife (WDFW 1998) or alternately, 16 subpopulations as recognized by the USFWS. Bull trout are thought to be extirpated from two streams within the Columbia Basin: Satus Creek and Hanford Reach of the mainstem Columbia River. Of the 16 subpopulations recognized by USFWS, 10 are considered to be at risk of extinction (63 Fed. Reg, 31651).

Factors contributing to the decline of bull trout in the Columbia Basin are similar to those affecting salmon, but also include additional elements. Since bull trout are less tolerant of higher water temperatures and sediment loading, they have been affected to a greater degree by logging practices, channelization, water diversions, mining, and grazing practices which have degraded riparian communities. Hydropower and storage dams hindered and precluded migrations normal

for fluvial and adfluvial populations. Bull trout are highly susceptible to capture by anglers, because of their aggressive nature. As road networks have expanded and angler access has increased, bull trout populations have declined. Finally, bull trout will interbreed with brook trout, resulting in sterile hybrids. In the past, brook trout were planted widely in the Columbia Basin and elsewhere throughout the west.

Bull trout in the Columbia Basin DPS spawn in September and sometimes into mid-October, depending on subpopulation. Variations in timing likely follow temperature patterns in the various tributaries. Movement into spawning areas is not well documented but would vary between resident, fluvial, and adfluvial type fish and habitat constraints in the various drainages. In general, movement toward spawning areas occurs in late summer. Spawning areas are characteristically cold, clean reaches within complex habitat, large woody debris, and preferentially with groundwater influence.

Although there has been some mention of potential bull trout spawning and rearing habitat on YTC (Bottorff and Swanson 1993), this is highly unlikely. The streams on YTC are not cold enough for long enough periods of time to provide suitable spawning and rearing habitat. In addition, most streams do not have continuous flow from the installation to either the Yakima or Columbia Rivers during the time in which bull trout would potentially be spawning or migrating to spawn. However, bull trout could forage in streams on YTC for short periods of time when temperatures are tolerable and flows are perhaps more suitable. If there is any use, it is likely to be short-term in nature and located at the mouths of streams during the colder months when streams may provide more tolerable temperatures and dependable flows. Although some suitable foraging habitat may be found on YTC in Johnson, Hanson, and Alkali Creeks, tributaries to the Columbia River, bull trout have never been documented on YTC. There is no suitable habitat for bull trout or any other fish species within the proposed project area as no perennial stream reaches are located within them. The drainage network of Alkali Creek has several proposed projects occurring within ephemeral and intermittent channels located in the headwaters of the stream. The nearest proposed project site is located in a dry ephemeral channel approximately 4 km upstream of the first stream reach of Alkali Creek with any permanent above ground water in the channel. The nearest stream reach with fish (i.e., brook trout) present is approximately 10 km downstream of the proposed project site. There is another approximately 4-5 km of intermittent stream channel downstream of this location where fish are absent. The lower 1-2 km of Alkali Creek above its confluence with the Columbia River has fish present in stretches of above ground flow and in a series of beaver ponds.

Critical Habitat for Columbia River bull trout DPS extends from the Columbia River mouth and estuary throughout the Columbia Basin, including all tributaries historically accessible to the species. On September 22, 2004, the USFWS designated approximately 737 miles of streams in the Columbia River Basin, Washington, as critical habitat for bull trout under the ESA. On Sept 26, 2005, Critical Habitat for Columbia Basin populations of bull trout was excluded from areas covered by the Federal Columbia River Power System (70 FR 56253) which includes those waters on and adjacent to YTC.

Upper Columbia River Spring Chinook Salmon ESU

NOAA Fisheries listed this Evolutionary Significant Units (ESU) as endangered under ESA on March 24, 1999 and endangered status was reaffirmed on June 28, 2005. The decline in abundance of upper Columbia River stocks began in the late 1800s due to over-harvest,

hydropower development, creation of water storage reservoirs, water diversions, logging, mining, and domestic livestock grazing. In particular, Chief Joseph and Grand Coulee Dams on the Columbia River block access to a substantial portion of the historic range of this ESU. The upper Columbia and upper Snake tributary stocks are thought to be among the first to be decimated by the early fishery present on the Columbia River at the turn of the nineteenth century.

Included in this ESU are all naturally spawned populations occurring in all accessible river reaches in the Columbia River tributaries upstream of Rock Island Dam and downstream of Chief Joseph Dam in Washington, excluding the Okanogan River. Nine Upper Columbia spring Chinook stocks occur in this ESU. The Upper Columbia spring Chinook salmon ESU includes all wild stocks upstream of the Wenatchee River confluence, and does not include the Yakima River system. All nine stocks are considered depressed due either to chronically low escapement, a long-term negative trend, or a short-term severe decline in escapement. All stocks are native with wild production, except for the Methow stock, which has composite production because of hatchery stray introgression.

All streams and drainages on YTC are located outside this ESU. The reach of Columbia River adjacent to YTC is a migratory corridor for these fish and individual residence times can be measured in days rather than weeks. Upriver runs start passing YTC in early May and extend through August, based on counts at Priest Rapid Dam. Spawning occurs from late August to mid-September and all documented spawning areas in this ESU are upstream of YTC and the proposed project area.

Upper Columbia Chinook have a stream-type life history pattern, with an 18-month freshwater rearing period prior to migration to the ocean. Spring Chinook in the upper Columbia begin to smolt and initiate migration in April, and may migrate in an early transitional state (not fully smolted). They migrate past YTC from mid-April to early June as indicated from fish trapping records collected at Priest Rapids Dam. Wild spring Chinook in the Columbia River are mixed in with literally millions of hatchery spring Chinook released from facilities upstream.

Habitat requirements for spring Chinook consist of water quality, passage, water velocity and, to a lesser extent, food availability. Chinook salmon have the lowest high-temperature threshold in the genus *Oncorhynchus*. Of the salmonids evaluated in this document, only bull trout require cooler water. Turbidity and sediment transport is an issue as it relates to food production. Gravel, cobble, and boulder substrates produce benthic macroinvertebrates when not embedded with sand or silt particulates. Chronic turbidity can also hinder the photosynthetic basis of the food chain. Passage of downstream migrants as impacted by water velocity and dam design is a limiting factor affecting salmon stocks throughout the Columbia River system.

The YTC is excluded from Critical Habitat designation for Upper Columbia spring-run Chinook salmon (Proposed Rule 2004) pursuant to the National Defense Authorization Act for Fiscal Year 2004 (Public Law No. 108-136). However, the Columbia River immediately adjacent to the installation is designated critical habitat for this ESU.

Upper Columbia River Steelhead Trout ESU

NOAA Fisheries listed this ESU as endangered on August 18, 1997. Status was upgraded to threatened on January 5, 2006 and then was reinstated to endangered status in June 2007 per a U.S. District Court decision. The decline in abundance of Upper Columbia steelhead mirrors

that of Chinook, except for commercial fishery. Commercial harvest of steelhead was never very large, reflecting the fact that steelhead populations have never been as large as Chinook populations.

Three Upper Columbia River ESU steelhead stocks are present in the Columbia River adjacent to the installation and include the Wenatchee, Entiat, and Methow/Okanogan populations. As with Chinook salmon, steelhead from the upper Columbia River are transient residents in the Wanapum and Priest Rapids Reservoirs of the Columbia River migrating past as either adults or juveniles. All three stocks are considered depressed, mixed stock, and maintained with composite production.

Steelhead are the anadromous form of rainbow trout. Steelhead move to the ocean beginning in April and continue through June, with a peak around mid-April. Unlike other salmonids, adult steelhead usually survive spawning and migrate as individuals, rather than in schools (Page and Burr 1991). Spawning typically occurs in March, but may extend into July. The eggs incubate from late March through June, and fry may emerge from gravel from late spring to August. However, steelhead found near YTC in both the Yakima and Columbia Rivers spawn from February to May, and fry emerge in May and June (Cummins 1999). Out-migration of smolts occurs from March to early June, with smolts having spent from one to seven years in freshwater, although the average is two to three years.

Run timing of adult spawners is generally the same for the stocks listed above with small differences due to their position in the system. Steelhead pass by YTC from early June through mid-October as adults, entering natal rivers starting mid-July. Spawning occurs in tributary rivers from March through May. After rearing for two to three years (or more), steelhead smolts migrate downstream past YTC from mid-March through mid-May.

Habitat requirements for steelhead are essentially the same as for Chinook except that they can use smaller tributaries for spawning and prefer higher-gradient stream reaches. Temperature tolerances are also somewhat higher. Steelhead prefer cool water below 21 degrees Celsius, but they can survive in waters from 0 to 26 degrees Celsius. Steelhead require plenty of oxygen and can tolerate a wide range of salinities.

Of the streams on YTC, Johnson Creek contains both resident (rainbow trout) and steelhead (Rogers et al. 1989, Cummins 1999). As such, Johnson Creek is considered part of the Upper Columbia River Steelhead ESU. Several adults have been observed in the lower portion of this creek and are likely hatchery strays that have become naturalized over the years. Despite whether the fish observed in Johnson Creek were naturalized or not, it is certain they are not of Johnson Creek origin prior to 1967. Before the Wanapum Dam was constructed, Johnson Creek was physically separated from the Columbia River. It previously spilled out into a steep, porous alluvial fan of cobble deposited by the Missoula flood. The creek flowed below the ground surface through this formation before eventually connecting with the Columbia River. For the purpose of this analysis, naturalized steelhead that inhabit Johnson Creek, however few, will be considered part of the Upper Columbia River Steelhead ESU. Although located on the installation, Johnson Creek is approximately 17 km north of the proposed project area and is upstream of any drainage flowing out of the proposed project area.

There is no suitable habitat for steelhead or any other fish species within the proposed project area as no perennial stream reaches are located within it. The drainage network of Alkali Creek has several proposed projects occurring within ephemeral and intermittent channels located in

the headwaters of the stream. The nearest proposed project site is located in a dry ephemeral channel approximately 4 km upstream of the first stream reach of Alkali Creek with any permanent above ground water in the channel. The nearest stream reach with fish (i.e., brook trout) present is approximately 10 km downstream of the proposed project site. There is another approximately 4-5 km of intermittent stream channel downstream of this location where fish are absent. The lower 1-2 km of Alkali Creek upstream of the confluence with the Columbia river has fish (i.e., brook trout) present in stretches of above ground flow and in a series of beaver ponds. This lower reach may be considered rearing habitat for smolts and juvenile steelhead.

Habitat on YTC is excluded from Critical Habitat designation for Upper Columbia River steelhead (Proposed Rule 2004) pursuant the National Defense Authorization Act for Fiscal Year 2004 (Public Law No. 108-136). However, the Columbia River immediately adjacent to the installation is designated critical habitat for this ESU.

Middle Columbia River Steelhead Trout ESU

NOAA Fisheries listed this ESU as threatened on March 25, 1999 and reaffirmed threatened status on January 5, 2006. The Mid-Columbia ESU extends from the Klickitat River to the Yakima River, excluding the Snake River and includes reaches of the Klickitat, Deschutes, John Day, Umatilla, Walla Walla, Yakima, and Columbia Rivers. The Yakima River is the only stock near YTC as it is located adjacent to the installation's western boundary. The Yakima River flows into the Columbia River downstream of YTC.

Historically, the Yakima River steelhead run has been estimated to be approximately 10,000 fish (Busby et al. 1996). The current run size averages approximately 1,000 fish, with an escapement of about 800 wild fish. Stock status has been determined to be depressed because of chronically low spawner escapement. Within the Yakima Basin, five distinct populations have been identified. These include runs to Satus Creek, Toppenish Creek, Naches River, the mainstem Yakima River between Rosa Dam and Wapato, and the mainstem Yakima River above Rosa Dam.

The Yakima stock is a native, wild stock sustained by wild and artificial production. Causes for declines (in addition to the usual hydropower, habitat, hatcheries, and harvest problems in the Columbia basin) include passage at irrigation diversions, high temperatures/low dissolved oxygen, and a highly altered hydraulic regime (NWPPC 1990). Storage reservoirs are operated in concert with water needs of an extensive irrigation program in the basin. This leads to an inverted hydraulic regime, with lower than optimal spring flow rates and excessive summer flow rates.

Run timing in the Yakima is bimodal, with an early migration entering the river from September through November. The later migration is from February through June. Spawning occurs from mid-February to Late May. Information on emergence timing for the mainstem river is lacking, but occurs May through June in Satus and Toppenish Creeks and from June to August in the colder Naches system. Smolt out-migration at Prosser occurs from early March through mid-June, mostly as two-year-olds. The median date for passage at Prosser is April 30. Habitat requirements for Mid-Columbia steelhead are similar to Upper Columbia steelhead as described above.

Critical habitat for the Mid-Columbia steelhead ESU has been determined to include all tributaries known to support steelhead within the ESU boundary, the mainstem Columbia River

downstream of the Yakima River, and the Columbia River estuary. Habitat on YTC is excluded from Critical Habitat designation for Mid-Columbia River steelhead (Proposed Rule 2004) pursuant the National Defense Authorization Act for Fiscal Year 2004 (Public Law No. 108-136). However, the Yakima River immediately adjacent to the installation is designated critical habitat for this ESU. There is no suitable habitat for steelhead or any other fish species within the proposed project area as no perennial stream reaches are located within it. The ephemeral drainages within the proposed project area flow east into the Columbia River and do not have potential to impact the Yakima River or this ESU. There are two projects proposed within the Selah Creek drainage, a tributary to the Yakima River. Both are located in dry ephemeral sections of Selah Creek approximately 15 km upstream of its confluence with the Yakima River. That portion of Selah Creek on YTC is considered an intermittent stream containing few perennial flow reaches. From the proposed project site downstream, there is an approximate 2 km stretch with no permanent above ground flow. The remaining 13 km's consist of intermittent reaches interspersed with stretches where above ground water is present. No fish have been observed in Selah Creek during recent surveys.

Greater Sage-grouse

The Columbia Basin DPS of Greater sage-grouse (*Certracercus urophasianus*) is a Washington State threatened species and a federal candidate species under ESA. This species (i.e., Columbia Basin DPS) is a candidate for federal listing due to a reduction in its range as a result of habitat conversion for development and agriculture and from intensive grazing and fire impacts. Suitable sage-grouse habitat consists of medium to dense sagebrush stands exhibiting a range of heights, as well as a variety of forbs and grasses (WDFW 1998). Sagebrush is an essential food for sage-grouse throughout the year and comprises 60 to 80 percent of the species' diet (Remington and Braun 1985). Sage-grouse on YTC tend to use habitat with slopes of less than 15 percent and areas where the dominant species are Wyoming big sagebrush, three-tipped sagebrush, and bluebunch wheatgrass (Livingston 1998). Shrubs provide nests with shelter from avian predators and weather elements while grasses provide shelter from ground predators and create a favorable microclimate (WDFW 1995). Critical periods of sage-grouse life history include lek attendance, nesting, and brood-rearing. Lek attendance is initiated in late winter/early spring and extends through mid-May. Nesting typically occurs March through May and brood-rearing extends through mid-June. Both nesting and brood-rearing occur in relatively close proximity (i.e., within 8 km) to leks when suitable habitat exists.

YTC supports one of two distinct populations still present in Washington and the largest and only population of sage grouse occurring primarily on federally owned land. These remaining populations are isolated from each other and larger contiguous populations located in the Columbia Basin and throughout the range of Greater sage-grouse. Populations of sage-grouse on YTC have been characterized by short-term fluctuations and have exhibited trends similar to those of statewide populations, with male sage-grouse numbers per lek decreasing (Livingston 1998) over time. Annual surveys for leks (communal mating grounds), and lek counts have been conducted on YTC since 1989 to monitor trends and assess population status.

Seventeen known leks were monitored in 2008 and twelve were found to be active. Three of the fourteen active leks were classified as major leks (i.e., ten or more male sage-grouse observed at least once during the season). In 2008 the population estimate for sage-grouse on YTC was 187 and the 20-year population average was 293.

Population declines in greater sage-grouse throughout Washington have resulted from large-scale removal of native vegetation for agriculture purposes, combined with reduced habitat quality caused by intensive grazing by livestock (WDFW 1997). Sagebrush removal using herbicides and fire have contributed to this decline as well (WDFW 1995). From 1960 to 1995, land on YTC was used for livestock grazing which likely resulted in decreased habitat quality for sage-grouse. Indirect threats to Greater sage-grouse are habitat-related and are primarily from fire and military training activities. Fire is a threat because it kills big sagebrush, and repeated fires will make an area vulnerable to invasions by noxious weeds such as cheatgrass and knapweed. Fire regimes in the lower Columbia River Basin were historically characterized by regular, low-intensity burns, which created a mosaic of seral stages. Following fire, natural re-establishment of sagebrush is slow (about 20 to 30 years; Britton and Clark 1985). With the loss and fragmentation of shrub-steppe, fire poses a significant threat to remaining Greater sage-grouse habitat in Washington. Furthermore, damage to soil and vegetation from vehicles and foot traffic associated with military training is a concern for sage-grouse and other wildlife.

Suitable habitat within the proposed project area is very much reduced or non-existent due to previous periodic large landscape level fires. Minimal suitable nesting and/or wintering habitat exists within Training Areas where projects are proposed as there is a lack of a sagebrush shrub component as a result of frequent fires. Despite the lack of sagebrush, grouse utilize the area as brood-rearing and late summer habitat as indicated by recent telemetry studies and several sage-grouse were observed during an August site visit. An active lek is located within the Central Impact Area approximately 1 km west of the upper most northwest proposed project area.

3.12.4.2 Plants

Ute ladies'-tresses

The USFWS listed Ute ladies'-tresses as a federally threatened species on January 17, 1992 due to habitat loss and modification. Ute ladies'-tresses is a perennial, terrestrial orchid known to occur in eight states: Nevada, Utah, Colorado, Idaho, Washington, Nebraska, Wyoming, and Montana. In Washington, this species is known to occur in the north-central portion of the state (Okanogan and Chelan Counties; WDNR 2006). Ute ladies'-tresses grows in lowland areas, at elevations ranging from 1,500 to 7,000 feet (457 to 2,134 m) in the western region of its range usually abutting or near moderate gradient, medium to large streams and rivers. The plant is typically found in open riparian areas in the transition zone between mountains and plains. The species' microhabitat consists of grass-dominated openings in shrubby areas, often associated with beaked spikerush (*Eleocharis rostellata*). One key habitat features necessary for survival of Ute ladies'-tresses is saturated soil throughout the growing season. It is usually located within 12 inches (30 cm) of the water table. While this species will tolerate periodic flooding, it does not occupy areas constantly inundated with water. Ute ladies'-tresses is commonly found in alkaline substrates. This species depends on natural disturbance, growing in areas where early successional conditions are perpetuated or competition from other vegetation is restricted (USFWS 2000). Riparian and wetland habitats that provide suitable habitat for Ute ladies'-tresses throughout its range have experienced impacts from urban development, stream channelization, water diversions and other watershed and stream alterations that degrade natural stream stability and diversity.

Ute ladies'-tresses was listed by USFWS as a species that may occur in Kittitas and Yakima Counties, Washington. Although potential habitat for this species may occur on YTC, Ute

ladies'-tresses has not been documented on the installation during recent (i.e., 2006) rare and sensitive plant surveys and a comprehensive springs assessment effort (2007). Suitable habitat within the proposed project area consists of riparian habitat associated with the four spring sites potentially being developed.

Umptanum Wild Buckwheat

This is a federal Candidate species with a Washington State status of threatened. As little information regarding this species exists, much of the following discussion on population trends, habitat, and threats to this species is provided from Washington Natural Heritage Program's Field Guide to Washington's Rare Plants (WNHP 2000). This endemic species is known from a single population located in Benton County in south-central Washington. It has been impacted in the past from wildland fire and is currently experiencing a declining trend in numbers. It is currently known to occur on Umptanum Ridge, southeast of the installation. As Umptanum Ridge bisects the entire installation, suitable habitat for this species may exist on YTC. However, numerous sensitive plant and vegetation surveys have never recorded its occurrence on the installation.

The known population occurs at elevations ranging between 1100 and 1320 feet on flat to gently sloping microsites near the top of the steep, north-facing basalt cliffs overlooking the Columbia River. It is apparently restricted to the exposed top of one particular basalt flow (the Lolo Flow). Associated species include spiny hopsage (*Grayia spinosa*), grayball sage (*Salvia dorrii*), threadleaf scorpionweed (*Phacelia linearis*), winged cryptantha (*Cryptantha pterocarya*), small evening primrose (*Camissonia minor*), and cheat grass (*Bromus tectorum*). The species' restriction to exposures of one particular basalt flow may suggest a dependent relationship with the chemical composition of that flow. The relatively high water-holding capacity of the substrate also has been suggested as an important factor. The overall vegetation is quite low in comparison of adjacent shrub-steppe vegetation communities characteristic of the Columbia Basin. Suitable habitat for this species as described above does not exist within the proposed project area.

Northern Wormwood

Northern wormwood is a state endangered species and a federal candidate for listing under the Endangered Species Act. It is a small perennial in the composite family (Asteraceae) occurring within the Columbia Basin physiographic province. It is a regional endemic species only known from two widely disjunct locations along the Columbia River; one each in Klickitat and Grant Counties; and historically in adjacent Hood River and Wasco counties, Oregon. The Grant County population occurs near the town of Beverly on the eastern shore of the Columbia River and is the closest population to YTC. At this site, northern wormwood occurs on partially vegetated, stabilized cobble-sand peninsulas and gravel bars. Plant surveys on YTC have never documented this species occurring on the installation and recent surveys associated with the re-licensing of Columbia River dams reported only the known population.

Habitat is characterized by arid climates generally supporting shrub-steppe vegetation. This species grows on basalt, compacted cobble, and sand on relatively flat terrain. Vegetation cover is sparse at both known sites with this species providing less than 1% cover at both sites. One site is partially within areas of shifting sand. The taxon is within the floodplain of the Columbia River and presumably withstands occasional short periods of inundation. As described, habitat for this species is not typically susceptible to fires. This species begins to flower in early April,

with the majority of individuals flowering by mid-April. Individuals with flowers are occasionally seen throughout the season. The length of flowering time for individuals is not known. The fact that the taxon flowers in April may help keep it reproductively isolated from other members of the species complex that flower later. Suitable habitat likely exists on both shores of the Columbia River. Current threats include recreational use (vehicle compaction) of the known sites and weed invasions. Flooding may pose a threat as well due to the limited population size and limited habitat availability. Dam construction along the river is responsible for most of the habitat loss.

Basalt Daisy

This former federal Candidate species was removed from the Federal list as a result of a recent (2007) Candidate Notice of Review finding that listing was not warranted. This species is a perennial forb that displays an affinity for crevices in basalt cliffs and canyon walls with northerly, easterly, and westerly aspects. Elevations range from 1250 to 1500 feet. This species is known within an area 20 square miles in and adjacent to Yakima Canyon in Yakima and Kittitas Counties, Washington. The habitat is exclusively on basalt cliffs along the Yakima and Selah Creek, both of which have cut through basalt from the Yakima Basalt Formation, which occurred during the late Miocene. Six sub-populations are known to occur on YTC, all of which are located within Selah Canyon approximately 18 km southeast of the proposed project area. The population appears to be more or less stable and threats are minimized due to its preference for basalt cliff habitat. There is no suitable habitat for this species in the proposed project area.

Chapter 4 Environmental Consequences

The following examines the anticipated environmental effects associated with the implementation of any of the alternatives described in this document on the Affected Environment described in Chapter 3. For ease of presentation and comparison, impact analysis discussions are grouped by the same technical disciplines as addressed in Chapter 3, *Affected Environment* and summarized in Table 2.3.

Discussions of impacts are framed in context and intensity in order to establish significance. The context of an impact refers to the time and place in which it would occur, spatial scale (i.e., local or regional), and duration (i.e., short- or long-term). Intensity refers to the severity of an impact (i.e., negligible, minor, moderate, or major[1]). A more detailed discussion of significance, context and intensity is provided in Section 8.1, *Glossary*.

4.1 Air Quality

An impact to air quality would be considered significant if it affects the achievement or maintenance of NAAQS.

Proposed Action Alternative 1

An impact to air quality would be considered significant if it affects the achievement or maintenance of NAAQS.

No direct environmental consequences or violations of NAAQS for criteria pollutants would occur from rock crushing or road construction activities. Construction activities would use best management practices (BMPs) to minimize dust. Small amounts of carbon monoxide would be emitted from vehicles during construction. PM_{10} emissions would be produced from rock crushing and vehicles involved in construction activities. The short-term impacts associated with construction and ongoing operation and maintenance would be limited to undeveloped rangeland surrounding the project area. Appropriate air operating permits would be obtained for rock crushing and construction activities, as required. Based on certain assumptions, preliminary calculations for the worst case show no exceedance of the 100 tons/yr. for any one criteria pollutant, other than PM_{10}, could take place for Title V consideration. BMPs would be used to minimize PM_{10} emissions. The expected impact to air quality from this action would be minor to moderate.

Proposed Action Alternative 2 (Spring Water Development Only)

The impacts to air quality from this alternative would be similar to those in Alternative 1. The small contribution of particulates and carbon monoxide from well drilling and vehicles associated with that activity would be absent, but the expected impact would be minor to moderate.

Proposed Action Alternative 3 (Well Water Development Only)

Impacts to air quality from this alternative would be similar to those in Alternatives 1 and 2. The small contribution of particulates and carbon monoxide from vehicles used in developing the springs for use would be absent. The expected impact would be minor to moderate.

[1] For the purposes of this EA the threshold of significance is synonymous with a major impact.

No Action Alternative

Under the No Action Alternative, no rock crushing or road construction would take place. Existing levels of air quality would remain unchanged. The expected impact would be negligible.

4.2 Noise

Impacts would be considered significant if noise from Army actions 1) caused harm or injury to on- or off-site communities; or 2) exceeded applicable environmental noise limit guidelines.

Proposed Action Alternative 1

Noise from this alternative would be from equipment used for the construction of roads, drilling of wells, and development of springs. Noise from these activities would be similar to that of Army vehicles which travel in those areas where construction would be done. The area for this action is relatively remote from both on- and off-site communities. Noise due to training activities would remain consistent with current operational activities. Expected impact from noise would be negligible.

Proposed Action Alternative 2 (Spring Water Development Only

Impacts to the environment from noise for this alternative would be similar to those in Alternative 1. Although equipment for drilling and developing a well would not be used in this alternative, their contribution to overall noise is negligible and would not change the impact.

Proposed Action Alternative 3 (Well Water Development Only)

Impacts due to noise for this alternative would be similar to those in Alternatives 1 and 2. There would be somewhat less noise because equipment used to develop springs would not be used. The expected impact would be negligible.

No Action Alternative

Under the No Action Alternative, there would be no noise from construction and noise generated from training activities would remain consistent with current operational activities. Impact from this alternative would be negligible.

4.3 Geology, Topography, and Soils

Impacts on geology and topography would be considered significant if: 1) they permanently remove resources that are not readily available elsewhere, or 2) the action would affect susceptibility to volcanic or seismic activity.

Proposed Action Alternative 1

Construction impacts on site geology and topography would be negligible. Topography ranges from slightly sloped to steep and would only be slightly modified by proposed construction. Impact to the geologic processes would be negligible as no resources are being permanently removed and does not affect the susceptibility to volcanic or seismic activity.

There would be short term erosional effects to soils because of the proposed construction. Improving or re-routing combat roads or trails, repairing stream channel crossings, closing unnecessary roads, constructing erosion control structures, and removing and recovering cattle guards at various locations within YTC would cause soil displacement and disrupt present

vegetative community resulting in potential establishment of weedy vegetation. The impact to the protective plant cover due to stripping and compounded by loosened soils would cause temporary erosional hot spots. Repair and seeding would mitigate temporary erosional issues. Increased vehicular traffic would cause compaction and crusting of soils. Compacted or crusted soils are more susceptible to wind and water erosional processes. Repair and revegetation would mitigate negligible to minor damages done by vehicular traffic within the construction footprint.

Short term erosional effects due to the proposed construction can be mitigated using BMPs and are considered minor. Long-term impacts to the project area would be negligible due to the similar use patterns, new permanent features being constructed, relatively gentle slope of the terrain, reseeding of areas disturbed as a result of construction, and lack of major drainages in the area.

Proposed Action Alternative 2 (Spring Water Development Only

Construction impacts for geology, topography and soils for this alternative would be similar to those in Alternative 1. However, a well and holding tank would not be constructed in the vicinity of Cross Road Springs. Overall, impacts to geology, topography and soils would be negligible.

Proposed Action Alternative 3 (Well Water Development Only)

Impacts on geology, topography and soils for this alternative would be similar to those in Alternatives 1 and 3. However, springs and associated holding tanks would not be developed. Overall, impacts to geology, topography and soils would be negligible.

No Action Alternative

Under this alternative, degradation to roads, trails and crossing features would continue. Roads and trails would develop rutting, allowing wind and water erosion to the soil. Degraded crossing features would allow erosional cutting into stream banks. Overall, impact from this alternative would be moderate.

4.4 Water

4.4.1 Surface Water

Impacts on surface water would be considered significant if action resulted in applicable Federal and state regulatory limits for surface water quality to be exceeded.

Proposed Action Alternative 1

Impacts to surface water from this action would come from the improvements to degraded crossing features and the development of springs for construction and fire suppression activities. At stream crossings, some construction activities would take place while upgrading crossing features, resulting in short-term degradation of water quality.

Springs would be developed by the installation of collection boxes at the spring and the installation of in ground piping to the holding tank. Excavation would be done by manual shovel work within sensitive riparian areas to minimize disturbance. Outside these areas, mechanical means would be used. There would be a slight decrease in flow between where the water is diverted into the collection box and where the overflow goes back into the source drainage. Impact due to this development would be minor.

Best management practices would be used to minimize the effects to springs and channels. Because the improvements to the crossing features would help minimize sedimentation and erosion, and with affected riparian areas being included in the 2009 Riparian Restoration Plan, the overall impact to surface water from this action would be minor.

Proposed Action Alternative 2 (Spring Water Development Only

Impacts to surface waters for this alternative would be similar to those described in Alternative 1. Crossing features would be upgraded and springs developed for construction and fire suppression activities. Affected riparian areas would be included in the 2009 Riparian Restoration Plan. Overall impacts would be minor and positive.

Proposed Action Alternative 3 (Well Water Development Only)

Surface water impacts for this alternative would be similar to those in Alternative 1. There would be no impact to springs since those would not be developed. Because crossing features at drainages would be upgraded and riparian restoration performed, impacts would be minor and positive.

No Action Alternative

Under the No Action Alternative, the impact to surface water would be moderate as no upgrade to crossing features would occur. This would allow increased erosion caused by vehicles crossing at the degraded crossing features. Water quality would be degraded through sedimentation, disturbance to riparian vegetation, and additional erosion to the banks.

4.4.2 Groundwater

Impacts to groundwater would be considered significant if action resulted in applicable Federal and state regulatory limits for groundwater quality to be exceeded.

Proposed Action Alternative 1

Construction activities may have a short-term minor effect on groundwater as a result of increased water use during construction. A new well would be drilled to supply water for construction. The well would be drilled in accordance with Washington Department of Ecology regulations. The well would have a 6-inch casing and would be drilled to a depth sufficient to supply a minimum 20 gallons per minute flow. Daily use is estimated at up to 25,000 gallons per day for 30 days over the length of the project. Subsequently, the well would remain available for fire suppression and possibly to supply a dip point for aerial firefighting resources. BMPs would be used during construction to minimize opportunities for groundwater contamination and to address any instances of hazardous material, petroleum, or antifreeze spills during construction.

Because this action disturbs more than one acre, a Notice of Intent for construction, related to the National Pollutant Discharge Elimination System (NPDES) construction permit, would be filed and approval obtained before the start of construction. Risks to groundwater resources as a result of ongoing operation and maintenance activities would remain unchanged from current conditions. Overall, effects to groundwater would be negligible due to lack of potential sources or modes of contamination.

Proposed Action Alternative 2 (Spring Water Development Only

Effects to the groundwater for this alternative would be negligible. Effects would be similar to those noted in Alternative 1 except that no well would be drilled.

Proposed Action Alternative 3 (Well Water Development Only)

Effects to groundwater for this alternative would be similar to those noted for Alternatives 1 and 2. A well would be drilled as specified in Alternative 1, but no development of springs would be done. Overall effects from this alternative would be negligible.

No Action Alternative

Under the No Action Alternative, the impact to groundwater would be negligible as no new roads or crossing features would be constructed and there would be no increase in impervious surface area.

4.5 Land Use

Land use impacts would be considered significant if they caused substantial loss of military training capability.

Proposed Action Alternative 1

Improved access and fire suppression resources would improve military training capabilities as a result of this alternative. Access roads and associated stream crossing feature improvements would support all weather access by military trainers. Current erosion problems associated with roadways and crossing sites would be stabilized resulting in improved resource conditions and improved safety at these sites. Safety hazards (e.g., cattle guards) would be removed, and fire suppression resources such as water developments and roads that provide compartmentalization (e.g., firebreak effect) for fire containment and improved fire suppression access would also occur as a result of this alternative. The overall long term impact to military training capability would therefore be minor and positive since training opportunities and safety would increase.

Proposed Action Alternative 2 (Spring Water Development Only

Minor and positive impacts for this alternative would be similar to those of Alternative 1 because military training capabilities and safety would also be improved for the affected area. The difference between the effects of this alternative and Alternative 1 (with respect to Land Use) is that only spring water sources would be used to support construction and fire suppression activities. This alternative would provide opportunity for up to four springs to be developed to support construction and fire suppression water needs. Therefore, the overall effects of this alternative on infrastructure would be minor and positive.

Proposed Action Alternative 3 (Well Water Development Only)

The minor and positive impacts for this alternative would be similar to those of Alternative 1 because military training capabilities and safety would also be improved for the affected area. The difference between the effects of this alternative and Alternative 1 (with respect to Land Use) is that only water from well sources would be used to support construction and fire suppression activities. Therefore, the overall effects of this alternative on infrastructure would be minor and positive.

No Action Alternative

There would be no immediate changes to Land Use as a result of this alternative. However, over time there would be a decline in the capability of the affected area to support military training due to ongoing erosion and resource deterioration issues (e.g., erosion). Effects of this continued deterioration would likely expand beyond the immediate project area to other training areas that

are already used extensively. Therefore, the overall effect of this alternative would be moderate because training would be limited to less training areas than would otherwise be available as a result of the action alternatives.

4.6 Socioeconomics

Socioeconomic impacts would be considered significant if they caused substantial change to the sales volume, income, employment or population of the surrounding ROI.

Proposed Action Alternative 1

Contractors for the construction of Alternative 1 may be selected from the area within YTC's ROI. Construction time is projected to be spread over eighteen months and the amount of labor required for the work would not be larger than many other projects within the ROI. It is not expected that local contractors would experience any manpower difficulties. No large influx of workers would be expected, thus no additional stress would be placed upon the housing, schools, or services in the ROI. The socioeconomic impact from this project would be minor and short-term but positive due to increased business to the local contractors. No long-term or cumulative impacts are expected as there would be no anticipated increase in the labor as when completed, work would be limited to normal maintenance activities similar to those already done. Overall impact from this alternative would be negligible.

Proposed Action Alternative 2 (Spring Water Development Only

Socioeconomic impacts for this alternative would be similar to those in Alternative 1. There would not be a need for a contractor to drill a well, but the number of workers and the time required for that action is minimal. Overall impact from this alternative would be negligible.

Proposed Action Alternative 3 (Well Water Development Only)

Socioeconomic impact for this alternative would be similar to those in Alternative 1 and Alternative 2. There would be a small beneficial impact due to a contractor being required to drill a well. There would be negligible impact from not developing springs as a water source because it is expected that the equipment and workers would be from the contractor selected to perform other parts of the project. Overall impact from this alternative would be negligible.

No Action Alternative

There would be no new socioeconomic impact associated with this alternative as there would be no increase in the current labor force. Overall impact from this alternative would be negligible.

4.7 Human Health

Impacts to human health would be considered significant if the action increased above historical levels any of the following: the risk of damage from natural disasters; risk of exposure to hazardous materials, waste, and activities; or risk of contracting diseases.

Proposed Action Alternative 1

The greatest potential impact to human health from Alternative 1 comes from wildland fire. As stated in Section 3.7, approximately 9,000 acres burn each year on YTC. The majority of these fires have been contained on the installation. The Wildland Fire Management Plan (YTC 2004) describes methods, such as prescribed burns and firebreaks, used to minimize the potential for a fire escaping from YTC. The plan also describes the Live Fire Risk Assessment used to evaluate

risk of starting uncontrolled fires associated with various training activities during the fire danger season. Improvements to roads in the project area would improve access to a fire. Development of springs and a well in this area would improve fire suppression by reducing turnaround times for filling water trucks and helicopter firebuckets. Overall, there would be a moderate positive impact to human health from this action.

Proposed Action Alternative 2 (Spring Water Development Only

The impacts to human health for this alternative would be similar to Alternative 1. Because no well would be developed, there would be one less water resource available in the event of wildland fire. However, up to four springs and the MPRC would be developed, each with a holding tank and a possible dip point for aerial firefighting use. Because development of these resources would improve fire suppression activities by reducing turnaround times for filling water trucks and helicopter firebuckets, there would be a moderate positive impact to human health from this action.

Proposed Action Alternative 3 (Well Water Development Only)

Development of a well would have a minor positive impact on human health. Depending on the location of the well, this resource plus the possible development of a water resource at the MPRC would help to reduce turnaround times for filling water trucks and helicopter firebuckets. Because of the reduced number of water resources available in this alternative, the positive impact to human health is less than that of Alternative 1 or Alternative 2.

No Action Alternative

Under this alternative, no development of water resources would take place. With increased training taking place in the area, risk of fire increases. Without the developed water resource, ground and aerial firefighting vehicles will need to make longer trips to refill with water. Since roads will not be upgraded, access to areas for fighting fires would be limited. Overall, impact to human health from this alternative would be moderate.

4.8 Infrastructure

Impact to infrastructure would be significant if the action affected the ability to meet the overall training mission.

Proposed Action Alternative 1

Infrastructure would be improved within the affected training areas resulting in minor positive impacts within these areas. Training capability would be improved because erosion hazards, resource conditions, and fire suppression capabilities would be improved. In addition, safety hazards would be removed (cattle guards). Overall, the results of this alternative would be a positive impact to the installations ability to support military training not just within the project area, but across the entire installation. Therefore, effects of the alternative are moderate and positive.

Proposed Action Alternative 2 (Spring Water Development Only

The effects of this alternative would be similar to those of Alternative 1 because infrastructure improvements would enhance the ability to support military training within the affected area. The difference between effects of this alternative and Alternative 1 (with respect to infrastructure) is that only water from spring sources would be used to support construction and

fire suppression activities. Therefore, overall effects of this alternative on infrastructure would be moderate and positive.

Proposed Action Alternative 3 (Well Water Development Only)

Effects of this alternative would be similar to those of Alternative 1 because infrastructure improvements would enhance the ability to support military training within the affected area. The difference between the effects of this alternative and Alternative 1 (with respect to infrastructure) is that only water from well sources would be used to support construction and fire suppression activities. Therefore, overall effects of this alternative on infrastructure would be moderate and positive.

No Action Alternative

There would be no direct changes to infrastructure as a result of this alternative. However, without action to correct unimproved roads, crossing sites, erosion, closure of unnecessary roads, and safety hazards from cattle guard deficiencies there would be a slow degradation of the current infrastructure over time. Effects of the degradation would likely expand beyond the immediate project area as training would be shifted to other areas, and as resource conditions continue to decline, there would be impacts to other resources outside the project area. Therefore, the effect of this alternative would be minor with a shift to moderate as training area access conditions worsen.

4.9 Solid Waste

Proposed Action Alternative 1

Direct and indirect environmental impacts due to solid waste would be negligible. Contractors involved in rock crushing and road construction would be required by contract to properly recycle or dispose of all wastes generated during the project. During use of the improved roads, waste generation and collection would be expected to remain consistent with current operation activities.

Proposed Action Alternative 2 (Spring Water Development Only

Environmental impacts from this alternative would be similar to those in Alternative 1. Generation of solid waste would generally be the same as in the first alternative other than there would be no generation of solid waste from drilling and developing a well. Direct and indirect impacts would be negligible.

Proposed Action Alternative 3 (Well Water Development Only)

Direct and indirect impacts from this alternative would be negligible. Effects for this alternative would be similar to those in Alternative 1. Because there is no development of springs, solid waste generation would be limited to the construction of roads and drilling of the well.

No Action Alternative

Generation and collection of solid waste would remain consistent with current levels under the No Action Alternative. Impact to the environment would remain negligible.

4.10 Hazardous Materials/Waste

Proposed Action Alternative 1

Direct and indirect impacts from hazardous materials and hazardous, toxic, and other regulated waste during rock crushing and road construction would be negligible. All wastes would be evaluated and recycled or disposed according to regulatory requirements. All recycling would be performed by legal and permitted companies; disposal would occur at permitted landfills. Hazardous, toxic, and other regulated wastes must be managed through the YTC One Stop Yard and are subject to established controls.

During training, there would be no appreciable change in generation from current levels; therefore, direct and indirect impacts to the YTC environment would be negligible.

Proposed Action Alternative 2 (Spring Water Development Only

Impacts from this alternative would be similar to those described in Alternative 1.

Proposed Action Alternative 3 (Well Water Development Only)

Impacts from this alternative would be similar to those described in Alternative 1.

No Action Alternative

Under the No Action Alternative, the hazardous materials used and the amount of hazardous waste generated would remain consistent with present volume. Management would continue according to installation guidelines and policy, as well as Federal and state laws and regulations. Impact to the YTC environment would remain negligible.

4.11 Cultural Resources

Impacts to cultural resources would be considered significant if Army actions: 1) permanently restricted access of tribal members to traditional cultural properties; 2) appreciably increased safety risks to tribal members using traditional cultural properties; 3) resulted in a long-term loss or degradation of plant or animal populations of traditional cultural importance to Native Americans; or 4) diminished the integrity of a historic property or archaeological site such that it was no longer eligible for listing in the National Register of Historic Places.

Proposed Action Alternative 1

Direct impacts of this alternative to cultural resources would be attributed to any new construction and any access restrictions to areas that contain or have potential to contain traditional foodstuffs, sacred places, and traditional cultural properties. All proposed new construction is located in areas that have been surveyed for cultural manifestations. No known archaeological sites would be impacted by construction within the proposed footprint of the erosion control project. It is possible that subsurface archaeological deposits may be present. Procedures are in place for mitigation of impacts to inadvertent archaeological discoveries found during construction.

The 161 archaeological sites located within the MPRC SDZ would not be directly impacted but are being evaluated for determination of eligibility to the National Register of Historic Places (NRHP). The Yakama Nation and the Wanapum People, under the Treaty of 1855, applicable agreements and permission granted by the Commander YTC, will continue to have the ability to hunt, fish, gather food stuffs and visit sites for other cultural and religious purposes..

The Tributary Headwaters Archaeological District (THAD) may be impacted as a result of construction activities occurring within the District boundaries. However, there are no known archaeological sites within the District that would be impacted by construction activities. THAD was formed as part of Section 106 compliance for the construction of the MPRC. A Memorandum of Agreement (MOA) was signed in September, 1996 between the Army and the State Historic Preservation Office (SHPO) designating the boundaries of the THAD and stipulations for protection of ten archaeological sites located in the THAD. The ten stipulated sites are not directly impacted by new construction. Overall, because there are no known sites within the construction footprint, and Native American access will continue, direct and indirect impacts from this alternative would be negligible.

Proposed Action Alternative 2 (Spring Water Development Only

The effect to cultural resources in the project area from this alternative would be the same as those discussed for Action Alternative 1.

Proposed Action Alternative 3 (Well Water Development Only)

The effect to cultural resources in the project area from this alternative would be the same as those discussed for the Action Alternative 1.

No Action Alternative

Under the No Action Alternative, there would be no new construction and roads and trails would not be improved. With continued degradation to roads and trails, access to areas by Native Americans could be reduced. Cultural resource impacts from this alternative would be moderate.

4.12 Biological Resources

4.12.1 Upland Vegetation

Impacts to upland vegetation resources are dependent on the type and location of activity proposed and the existing condition of those resources within the proposed sites. Ground disturbing activities have potential to change upland vegetation through direct (i.e., destruction) and indirect (i.e., introduction of noxious weeds, manipulation of site conditions) impacts. The composition, structure, and function (i.e. stand integrity) of native stands of vegetation have a greater potential for impact than that of previously disturbed sites displaying modified stand characteristics. To a great extent, upland vegetation resources of the proposed project exist as either ephemeral drainages, unimproved roads, or previously disturbed areas associated with unimproved roads.

Proposed Action Alternative 1

Ground disturbing activities with potential to impact upland vegetation resources are common between all action alternatives and include those actions described in Chapter 2. Combat road and trail improvements would have little to no impact to upland vegetation resources as essentially all of them are proposed on existing unimproved roads. There are two small sections of re-routes that better align roads to reduce grade and/or provide access to an existing unimproved road proposed to be upgraded which have potential to directly impact upland vegetation resources. The construction of these two sections would eliminate approximately 0.73 acres of existing upland vegetation. The two sections differ in vegetation composition as the 1000 foot re-route proposed on the south end of Holmes Ranch road would remove a native

bluebunch wheatgrass community currently devoid of native shrubs while a 600 foot re-route proposed on the south side of the 105mm SDZ road impacts a previously disturbed upland site dominated by cheat grass and tumble mustard. In total, there is approximately nine miles of combat road and trail improvement proposed of which 0.31 miles of new construction associated with re-routes would permanently remove existing upland vegetation. When the amount of roads proposed to be closed and rehabilitated back to upland vegetation communities is considered (6.88 acres) there would be a net total amount of 6.16 acres of upland vegetation gained. Given the small scale and localized nature of the impacts of upgrading and rehabilitating of roads impacts to the upland vegetation resource is considered minor. There is a total of 34 channel crossing features (Table 2-2) proposed to address degraded crossing conditions or areas where hardened crossing features do not exist currently but would be needed to compliment proposed combat road and trail improvements. These features are designed to provide improvements at each site to correct deficiencies and to provide a maintainable crossing feature that supports long-term (sustained) use of the area for military training. The 34 proposed crossing features consist of corrugated metal pipe culverts, cable concrete mattresses, geo-cell fabric and rock spall fords and are included in all action alternatives. These features would occur on or associated with the proposed combat road and trail improvements and therefore would have little to no impact to upland vegetation resources as essentially all of these currently exist as unimproved roads. As some features would extend beyond the footprint of proposed roads (14 ft.), there would be a small amount (< 1 acre) of disturbance to upland vegetation resources associated with armoring and construction of them. This expected disturbance would occur primarily in ephemeral channels, within the zone of influence of current unimproved roads, or previously disturbed areas with minimal intact native upland vegetation resources of concern. As any construction disturbance will have rehabilitation efforts employed to re-establish upland vegetation, overall impacts would be short-term in nature. Given impacts of proposed crossing features are localized on previously disturbed areas, small scale (< 1 acre) in size, and short-term in nature, impacts to upland vegetation resources are considered negligible.

There is 15 erosion control structures consisting of loose rock features and rock bank barbs proposed in association with the Holmes Ranch Road improvement portion of all action alternatives. These features would protect the improved road in a section where both road and an ephemeral headwater channel of Alkali Creek run parallel for approximately 250 meters. These features would protect the proposed improved road, re-establish the ephemeral channel along its natural course, and stabilize several channels upstream and downstream of three crossing features. The footprint and construction of the proposed erosion control features would have very localized small scale impacts to the upland vegetation resources previously mentioned and are considered negligible.

As previously mentioned, portions of seven unimproved roads in the MRPC SDZ and TA6 will be closed, ripped and reseeded as part of any of the action alternatives selected. Approximately 2.8 miles will be closed and rehabilitated to establish native upland vegetation. Although a beneficial effect, this effort is also localized, small-scale in nature, and would result in a net total increase of approximately 6.16 acres of native upland vegetation. As such, beneficial effects would be considered negligible.

In addition to the previously mentioned ground disturbing activities there are 14 cattle guards proposed to be removed and 5 gates to be installed as part of any of the action alternatives. Both of these actions would have minimal impacts to upland vegetation resources as they are either

currently located or proposed to be located on existing roads. Due to the location of both actions occurring on areas devoid of upland vegetation resources, impacts are considered negligible.

Specific to Alternative 1, water for construction purposes would be provided by development of any/or all of four springs using storage tanks with overflow returns to the source drainage and/or through the drilling and development of a well. Impacts to upland vegetation associated with either option for water development would be localized to where the footprint of the water tank(s) and/or the well being drilled overlap upland vegetation present on site. Impacts would be small-scale in nature and would be considered minor due to permanent loss of developing the water sources and access to fast-fill sites.

Given that most ground disturbing actions in Alternative 1 result in either short-term, localized, and/or minimal impacts to upland vegetation resources with the exception of several small-scale (< 1 acre) permanent losses, impacts to this resource is considered negligible.

Proposed Action Alternative 2 (Spring Water Development Only)

Impacts to upland vegetation resources in Alternative 2 would be similar to those associated with Alternative 1 with the exception of those attributed to the proposed well development would not occur. Although a decrease in impacts to upland vegetation resources would result, the magnitude of the decrease is minimal and would not significantly change the level impact which is considered negligible.

Proposed Action Alternative 3 (Well Water Development Only)

Impacts to upland vegetation resources in Alternative 3 would be similar to those associated with Alternative 1 with the exception of those attributed to proposed spring development would not occur. Although a decrease in impacts to upland vegetation resources would result, the magnitude of decrease is minimal and would not significantly change the level impact which is considered negligible.

No Action Alternative

Under the No Action Alternative, there would be no new construction, roads and trails would not be improved, unnecessary roads would not be closed and rehabilitated, and riparian areas would not be developed. With continued degradation to the roads and trails, access for management actions such as fire suppression and noxious weed control could be reduced increasing the risk of negative long-term impacts to upland vegetation resources. Without closure and rehabilitation of roads/trails not needed for access, further long-term degradation of upland vegetation resources at these sites would continue. Although potential for further long-term impacts to upland vegetation resources would increase under this alternative they would be limited to localized areas and would be considered minor.

4.12.2 Riparian Vegetation

Impacts to riparian vegetation resources are dependent on the type and location of activity proposed, and the existing condition of those resources within the proposed sites. Ground disturbing activities have potential to change riparian vegetation through direct (i.e., destruction) and indirect (i.e., introduction of noxious weeds, manipulation of site conditions) impacts. The composition, structure, and function (i.e. stand integrity) of native stands of riparian vegetation have a greater potential for impact than that of previously disturbed sites displaying modified stand characteristics. To a great extent, riparian vegetation resources with the greatest potential

for impact by the proposed project consist of the four springs being proposed for water development. All other existing riparian vegetation communities within the Training Areas are outside of the proposed actions that consist primarily of ephemeral channels, unimproved roads, or previously disturbed areas associated with unimproved roads.

Proposed Action Alternative 1

In this alternative, water for construction purposes would be provided by development of any/or all of four springs using storage tanks with overflow returns to the source drainage and/or through the drilling and development of a well adjacent to one of the identified springs. Impacts to riparian vegetation associated with either option for water development would be localized to the area needed for the installation of a catchment system, piping, and footprint of the water tank(s) and/or the well being drilled and their overlap with riparian vegetation present on site. Impacts would be small-scale in nature but permanent and would be considered minor due to lack of such habitat on the installation and its disproportionate use by wildlife species.

Proposed Action Alternative 2 (Spring Water Development Only)

Impacts to riparian vegetation resources in Alternative 2 would be similar to those associated with Alternative 1 with the exception of those attributed to the proposed well development that would not occur. Although a decrease in impacts to riparian vegetation resources would result, the magnitude of decrease is minimal and would not significantly change the level impact which is considered minor.

Proposed Action Alternative 3 (Well Water Development Only)

Impacts to riparian vegetation resources in Alternative 3 would be similar to those associated with Alternative 1 with the exception of those attributed to the proposed spring development(s) that would not occur. Although a decrease in impacts to riparian vegetation resources would result, the magnitude is minimal and would not significantly change the level impact which is considered minor.

No Action Alternative

Under the No Action Alternative, there would be no new construction, roads and trails would not be improved, unnecessary roads would not be closed and rehabilitated, and riparian areas would not be developed. With continued degradation to roads and trails, access for management actions such as fire suppression and noxious weed control could be reduced increasing the risk of negative long-term impacts to riparian vegetation resources. Although potential for further long-term impacts from wildfire and noxious weeds on riparian vegetation resources would likely increase, there would not be any development of spring sites under this alternative thus decreasing the overall impact. Given that direct impacts on riparian areas would not occur under a no action alternative, impact would be considered negligible.

4.12.3 Wildlife/Fish

Impacts on fish and wildlife species can be either direct or indirect. Direct impacts include changes in a species presence, survival, or productivity as a result of some action. Temporary displacement and/or abandonment from an area due to disturbance; or injury/death associated with encounters with construction equipment are examples of direct impacts to species. Indirect impacts include changes in habitat characteristics or quantities/quality of habitat resulting in a response in species presence, survival, or productivity. Direct and indirect impacts can exhibit

either positive or negative effects. The degree to which a species is impacted varies with each individual animal, species-specific habitat requirements, and their sensitivity to disturbance and habitat change. The conservation status of the species also aids in determining the level of impact as rare species that are habitat specialists are assumed to be more sensitive to impacts than relatively common species that are habitat generalists. Additional management emphasis, such as for those species of birds that are protected under the Migratory Bird Treaty Act, may also influence the level of impact that is determined to occur. None of the proposed action alternatives are considered "military readiness activities" (MRA) as defined by Migratory Bird Permits; Take of Migratory Birds by the Armed Forces Rule, Final Rule, 28 February 2007 (70 Federal Register § 8931-8950) and none are considered critical in providing direct and/or essential support of a MRA as all actions are general improvements rather than elements required of any specific MRA being conducted.

Proposed Action Alternative 1

Direct impacts would include the potential for temporary displacement and/or abandonment of the area during the construction phase of the project for species that may be sensitive to noise and increased presence of humans. There will likely be an increase in injury/mortality resulting from vehicle accidents due to the increased traffic during the construction phase of the project. These impacts are expected to be relatively short-term in nature (i.e., duration of the project/18 months) and localized to the proposed project area, immediate adjacent areas, and species and populations that frequent habitat characterized by the proposed project area. Although direct effects will likely occur, the actions being proposed result in impacts similar to those of current land uses (road travel, military training, road maintenance) which already occur in the area. It is likely that some species have become accustomed to current land uses and associated impacts thus reducing the extent of any new direct impacts to that of the increased frequency of noise, traffic/road use, and construction activities proposed. The majority of the proposed action alternatives occurs on or in the immediate vicinity of existing unimproved roads which exhibit reduced habitat effectiveness for species associated with upland vegetation communities. As such, any new direct or indirect impacts would be minimized from the existing reduced habitat effectiveness of the area. Those areas consisting of intact native upland vegetation (road re-routes) and riparian areas (i.e., springs) represent areas more susceptible to potential impacts due to increased habitat effectiveness. Given the permanent habitat loss associated with re-routes through intact native upland vegetation communities and water developments in riparian areas, indirect impacts resulting from reduced quantity and quality are likely. Although both direct and indirect impacts to fish and wildlife species are anticipated, they would only result in minor effects due to the localized and short-term nature of the project and small-scale level of habitat permanently affected. Given that the determination of minor effects as discussed above applies to all avian species, it is anticipated that there will be no population level impacts to migratory bird species as a result of the non-military readiness actions proposed within this project.

Proposed Action Alternative 2 (Spring Water Development Only)

Impacts to fish and wildlife species in Alternative 2 would be similar to those associated with Alternative 1 with the exception of those attributed to the proposed well development would not occur. Although a decrease in impacts to riparian habitat and associated species would result, the magnitude of decrease is minimal and would not significantly change the level impact which is considered minor.

Proposed Action Alternative 3 (Well Water Development Only)

Impacts to fish and wildlife species in Alternative 3 would be similar to those associated with Alternative 1 with the exception of those attributed to the proposed spring developments would not occur. Although a decrease in impacts to riparian habitat and associated species would result, the magnitude of decrease is minimal and would not significantly change the level impact which is considered minor.

No Action Alternative

Under the No Action Alternative, there would be no new construction, roads and trails would not be improved, unnecessary roads would not be closed and rehabilitated, and riparian areas would not be developed. With continued degradation to roads and trails, access for management actions such as fire suppression and noxious weed control could be reduced increasing the risk of negative long-term impacts to wildlife habitat. Although potential for further long-term impacts from wildfire and noxious weeds on wildlife habitat would likely increase, there would not be any development of spring sites under this alternative thus decreasing the overall impact. Given that direct impacts on riparian habitat would not occur under a no action alternative, impacts to wildlife habitat and associated species would be considered negligible.

4.12.4 Threatened and Endangered Species

Given the analysis below, determinations of "no effects" have been made for all Federal listed species due primarily to the absence of both species and suitable habitat within the proposed project area. As such, analyses and determinations made within this environmental assessment will suffice for the biological assessment requirement of Section 7 of the Endangered Species Act.

Proposed Action Alternative 1

Bald Eagle

No direct or indirect impacts to bald eagles or bald eagle habitat are anticipated from the proposed action alternatives as there is no suitable habitat for nesting, wintering, and/or migrating bald eagles present in the project area. Although bald eagles are present on the installation from October – April, they do not frequent the proposed project area given a lack of suitable habitat. As such, a determination of "no effect" is made for bald eagles.

Listed Salmonid Species (Bull Trout, Chinook Salmon, Steelhead)

No direct or indirect impacts to listed salmonid species are anticipated from the proposed action alternatives as there is no fish or suitable habitat present for any of the listed fish species in the project area. Although the project is upstream of portions of Alkali Creek that may provide suitable habitat for certain life-stages of Chinook salmon and steelhead as indicated by the presence of other salmonid species (i.e., brook trout), all construction will take place in dry head-water ephemeral channels, uplands, or isolated springs more than 10 km away from any above ground fish bearing reach. All proposed construction is isolated by at least a 4 km reach of dry ephemeral and/or intermittent channel before any above ground water is encountered. In addition, no listed species were found in areas inhabited by other salmonid species (i.e., brook trout) in recent fish survey efforts of Alkali Creek. As YTC is excluded from designated Critical Habitat for the four listed species no impacts to Critical Habitat will occur. Given the lack of

direct and indirect impacts to listed salmonids and their habitat, a determination of "no effect" is made.

Sage-grouse

There is potential for direct and indirect impacts to sage-grouse and sage-grouse habitat to occur with this action alternative due to the presence of the species and elements of seasonal habitat being present within the proposed project area. Although present, it is anticipated that direct impacts (i.e., displacement and mortality) would likely be seasonal in nature and of short duration (through construction phase) as grouse utilize the proposed project area during the lekking, brood-rearing, and late summer seasons. Indirect impacts of permanent habitat loss would be associated with the two road re-routes through existing upland vegetation communities previously discussed. Although existing as upland vegetation, the entire project area is devoid of a shrub component due to frequent fires and as such, only provides marginal sage grouse habitat. The two re-routes are small-scale in nature and are not likely to adversely affect either sage-grouse populations and/or its habitat. Given the seasonal nature of sage-grouse use, short duration of the project, and the small-scale impacts to marginal suitable habitat, no adverse impacts on sage-grouse are anticipated.

Listed Plant Species (Ute Ladies'-tresses, Umptanum Wild Buckwheat, Northern Wormwood, Basalt Daisy)

No direct or indirect impacts to listed plant species is expected to occur from this action alternative as none are known to be present on YTC or expected to occur in the project area. The only exception is the Basalt Daisy which has recently (2007) been de-listed. Suitable habitat for the four species above does not occur within the proposed project area with the possible exception of Ute Ladies'-tresses association with riparian habitat. The four spring sites proposed for possible development may provide suitable habitat for this species however it was not found to be present during a recent (2003-2007) spring assessment and plant survey effort. Given that none of the species above have been known to occur on YTC, no direct or indirect impacts are anticipated.

Given the discussion regarding direct and indirect impacts on Federal listed plant species above, impacts to species and/or habitat associated with them are considered negligible. A determination of "no effect" is made for listed plant species given the analysis above.

Proposed Action Alternative 2 (Spring Water Development Only)

Impacts to Federal listed species in Alternative 2 would be similar to those associated with Alternative 1 with the exception of those attributed to the proposed well development that would not occur. Although a decrease in impacts to riparian habitat would result, the magnitude of decrease is minimal and would not significantly change the level impact which is considered negligible.

Proposed Action Alternative 3 (Well Water Development Only)

Impacts to Federal listed species in Alternative 3 would be similar to those associated with Alternative 1 with the exception of those attributed to the proposed spring developments that would not occur. Although a decrease in impacts to riparian habitat would result, the magnitude of the decrease is minimal and would not significantly change the level impact which is considered negligible.

No Action Alternative

Under the No Action Alternative, there would be no new construction, roads and trails would not be improved, unnecessary roads would not be closed and rehabilitated, and riparian areas would not be developed. With continued degradation to roads and trails, access for management actions such as fire suppression and noxious weed control could be reduced increasing the risk of negative long-term impacts to potential suitable habitat for greater sage-grouse. There would also be no spring development, thus reducing impacts on potential suitable habitat for Ute ladies' tresses. As most other Federal listed species and associated suitable habitats are not present in the proposed project area, current impacts are considered localized, small scale, and thus minor.

Chapter 5 Cumulative Effects and Conclusions

Cumulative effects are the incremental environmental impacts of the proposed action when added to other past, present, and reasonably foreseeable future actions regardless of what agency or person undertakes such action. They may result from individually minor but collectively significant actions taking place locally or regionally over a period of time.

In January 2007, President Bush asked Congress for authority to increase the overall strength of the Army by 74,200 Soldiers over the next five years. In September 2007, the Secretary of Defense approved the Army's proposal to accelerate growth for the Active component and the Army National Guard. A Programmatic Environmental Impact Statement for Army Growth and Force Structure Realignment was prepared and the Record of Decision (ROD) was signed by the Army Deputy Chief of Staff in December 2007. As a result of this decision, Fort Lewis will experience an increase of approximately 1800 Soldiers. This increase will result in increased training at YTC. The cumulative effects of this action along with Army Growth and other actions in the past, present, and foreseeable future are analyzed in the following sections.

5.1 Cumulative Effects to Identified Resources

5.1.1 Air Quality

Proposed Action Alternative 1

Immediate cumulative effects from this Alternative may come from the operation of two rock crushers in the area. Scheduled construction for upgrading the MPRC overlaps the schedule for the proposed action. Preliminary calculations for the use of two rock crushers and rock hauling activities, based on worst case assumptions, show no exceedance of the 100 tons per year threshold for any one criteria pollutant other than PM_{10}. Emissions of PM_{10} from rock crushing and hauling of rock to the construction site would be minimized by the use of BMPs. The impacts from this would be of a relatively short duration as the erosion control project would likely be completed before construction at the MPRC was completed.

Training in the area would increase due to the upgrade to the MPRC and the Army Growth initiative. The upgrades to roads from this project will benefit the area by minimizing erosion to the roads, resulting in less dust in the air. The cumulative effects for the ROI are negligible because of overall good local and regional quality of the air and the quick dispersion of particulate matter pollutants.

Proposed Action Alternative 2 (Spring Water Development Only)

Cumulative effects for air quality would be the same for this alternative would be the same as those described in Alternative 1.

Proposed Action Alternative 3 (Well Water Development Only)

Cumulative effects for air quality would be the same for this alternative would be the same as those described in Alternative 1.

No Action Alternative

With the increased training in the area, roads would continue to degrade, contributing to increased dust caused by wind or vehicular travel. Overall, the cumulative effect would be minor.

5.1.2 Noise

Proposed Action Alternative 1

The primary noise in the area other than construction would be from military training. As detailed in the Environmental Assessment for the Modernization and Upgrade of the Multi-Purpose Range Complex (Army 2007), there have been no complaints received that are related to noise from either the MPRC or the Multi-Purpose Training Range (MPTR). Noise from construction at the MPRC and from the proposed action would be of limited duration. Weapons used during military training activities would remain consistent with those used previously. Although the frequency of loud noises associated with military training may increase, there would not be an increase in the maximum noise levels. Because of its remote location and distance from receptors, cumulative effect from noise would be negligible.

Proposed Action Alternative 2 (Spring Water Development Only)

Cumulative effects for noise would be the same for this alternative would be the same as those described in Alternative 1.

Proposed Action Alternative 3 (Well Water Development Only)

Cumulative effects for noise would be the same for this alternative would be the same as those described in Alternative 1.

No Action Alternative

Under the No Action Alternative, noise would be limited to that of military training and construction at the MPRC as detailed in Alternative 1. Because of the remote location and distance from receptors, the overall cumulative effect in the ROI would be negligible.

5.1.3 Geology, Topography, and Soils

Proposed Action Alternative 1

Overall cumulative effects to the geology, topography, and soils in the ROI would be considered negligible. Construction activities associated with this project, the MPRC and other ranges would be short term in nature, and mitigated by BMPs, reseeding and rehabilitation. Long term impacts related to operation and maintenance activities would be mitigated by predominant use of range facilities on hardened surfaces, continued maintenance of the roads and trails, and by continued BMPs to maintain desirable vegetative cover. The type of use at ranges in the ROI would remain consistent with that done currently.

Proposed Action Alternative 2 (Spring Water Development Only)

Cumulative effects for geology, topography, and soils would be the same for this alternative would be the same as those described in Alternative 1.

Proposed Action Alternative 3 (Well Water Development Only 3)

Cumulative effects for geology, topography, and soils would be the same for this alternative would be the same as those described in Alternative 1.

No Action Alternative

Cumulative effects to geology, topography, and soils would come from the increased erosion to roads and trails by vehicles traveling on them. As roads and trails become more degraded,

vehicles would be forced to go around them, resulting in a widening of sections of road which in turn would expose more soil to erosion. Because of increased traffic from increased training, roads and trails would degrade faster. Overall, the cumulative effect would be moderate.

5.1.4 Water

5.1.4.1 Surface Water

Proposed Action Alternative 1

This action alternative would have minor, positive effects due to improvements made to crossing features and rehabilitation of riparian areas. These upgrades to crossing features would mitigate effects on surface water quality from vehicles crossing drainages. Erosion control structures along Holmes Ranch Road would protect the road during high flow, re-establish the stream channel along its natural course, and stabilize the main-stem of Alkali Creek upstream and downstream of the crossing.

Developed springs would have sporadic, short-term use for construction and fire suppression activities. Because water from the holding tank would return to the source drainage, there would be no loss of flow in the source drainage. There would be small loss of flow within the section between the diversion point and return point. Overall, cumulative effects on surface waters would be minor.

Proposed Action Alternative 2 (Spring Water Development Only)

Cumulative effects from this alternative would be similar to those described in Alternative 1.

Proposed Action Alternative 3 (Well Water Development Only 3)

Cumulative effects from this would be similar to those described in Alternative 1 other than there would be no effects to springs from development.

No Action Alternative

Cumulative effects from this alternative would be moderate. Surface water quality would degrade from siltation caused by vehicles using degraded crossings and runoff from degraded roads, and erosion of the channel would continue. The rate of degradation of the crossings, roads, and channels would increase due to increased military training.

5.1.4.2 Groundwater

Proposed Action Alternative 1

Cumulative effects for groundwater with this alternative would be negligible. The amount of water pulled from the proposed well is comparable to the average daily consumption of 5,000 gallons. Only two other wells are present in the area, nearest being approximately 6.5 miles north at the MPRC. Although roads are being repaired, there would be no increase in impervious surfaces, allowing recharge rates to stay consistent with past rates. The low amount of water pumped along with the relative isolation of the well means there would be negligible effects on the water table.

Proposed Action Alternative 2 (Spring Water Development Only)

Because there would be no well drilled, cumulative effects from this Alternative would be negligible.

Proposed Action Alternative 3 (Well Water Development Only)

Cumulative effects for this alternative would be similar to those discussed for Alternative 1. Overall, the impact from cumulative effects would be negligible.

No Action Alternative

Under the No Action Alternative, the impact to groundwater would be negligible as no new roads or crossing features would be constructed and there would be no increase in impervious surface area.

5.1.5 Land Use

Proposed Action Alternative 1

Construction activities will cause a short term decrease of use of the area. Once construction is complete the area will be capable of supporting higher levels of military training due to availability of all weather road conditions. Fire suppression capabilities would be improved and erosion and safety hazard conditions would also be improved. Cumulative effects (measured temporally and spatially against current conditions) within the affected area would therefore be minor positive with respect to Land Use.

Proposed Action Alternative 2 (Spring Water Development Only)

Cumulative effects on land use from this alternative are similar to the effects described for Alternative 1. Land use in the area will be temporarily impaired during construction, but will be of increased availability once construction is complete. Cumulative effects of the action on land use following construction would also be minor positive due to increased capability of the area to be used for military training.

Proposed Action Alternative 3 (Well Water Development Only 3)

Cumulative effects on land use from this alternative are similar to effects described for Alternative 1. Land use in the area will be temporarily impaired during construction, but will be of increased availability once construction is complete. Cumulative effects of the action on land use following construction would be minor positive due to increased capability of the area to be used for military training.

No Action Alternative

There would be no short term decrease in availability of the affected area to support military training. However, over time the area is expected to experience decrease capability as resource and access conditions worsen. Since deteriorated access, resource and safety conditions would not be addressed, and conditions are expected to worsen over time, long term cumulative effects of this alternative would progress from minor to moderate over time.

5.1.6 Socioeconomic

Proposed Action Alternative 1

Construction activities for the modernization and upgrade of the MPRC to a digital MPRC will be happening concurrently with activities described in the proposed action. It is expected that these two projects will be done by different contractors. Having at least two different contractors performing construction activities at YTC would result in a short-term positive effect in the ROI by bringing additional money and employment into the local economy. Additional construction

projects, such as the Multipurpose Machine Gun Range, Sniper Field Fire Range, and Armed Forces Reserves Center, are relatively small and temporally spread out over several years and would not affect the construction resources in the ROI. After construction, use and maintenance of the roads and facilities would return to levels seen in previous years. Overall, these projects are a negligible effect on the ROI.

Spring Water Development Only (Alternative 2)

Cumulative effects from this alternative would be similar to those in Alternative 1. There would be no contractor used for the drilling of one well, but the impact of that would be negligible to the ROI. Road usage and maintenance activities would be at levels seen in previous years. The cumulative effect from this alternative would be negligible.

Proposed Action Alternative 3 (Well Water Development Only)

Cumulative effects from this alternative would be similar to those in the other two alternatives. At the end of the project, road usage and maintenance activities would return to levels similar to prior years. The cumulative effect from this alternative would be negligible.

No Action Alternative

Because of the relatively small size of this project and because of other projects scheduled for YTC and within the ROI, the cumulative socioeconomic impact of this alternative is negligible.

5.1.7 Human Health

Proposed Action Alternative 1

This action alternative will enhance the turnaround time for ground and aerial firefighting assets and will improve access to areas in the event of wildland fire. In this same area, the project to upgrade the MPRC will place a firebreak in an area that has been subject to fire in previous years. Also, the improvement to roads, removal of cattleguards and installation of gates at the MPRC SDZ will improve the safety to Soldiers, trainers and civilians on the installation. These actions will result in a moderate, positive cumulative effect to human health.

Proposed Action Alternative 2 (Spring Water Development Only

The cumulative effects on human health for this alternative would be similar to those described for Alternative 1.

Proposed Action Alternative 3 (Well Water Development Only)

The cumulative effects on human health for this alternative would be similar to those described for Alternative 1.

No Action Alternative

For this alternative, no action would result in further degradation to roads and trails in the area, making them unsafe for the Soldiers, trainers, and civilians to travel on them. Degraded roads and trails would hinder access into the area, making wildland firefighting more difficult. In addition, by not developing water resources in the area, aerial firefighting activities would be slowed by requiring aerial assets to travel further to refill firebuckets. The overall cumulative effect would be a moderate, negative effect to human health.

5.1.8 Infrastructure

Proposed Action Alternative 1

Infrastructure on YTC will expand with the increased training. Current range projects include the digital upgrade to the MPRC, the Improvised Explosive Device Defeat (IED-D) lanes, the Sniper Field Fire Range (SFFR) and the Multi-Purpose Machine Gun Range (MPMG). For the MRPC project, this action will help to improve access to the area and improve fire suppression in the event of wildland fire. Overall, this project will have a moderate and positive impact to military training throughout the installation.

No Action Alternative

With this alternative, degradation to existing roads would continue. As roads degraded, military training would shift to other areas of the installation, increasing wear on those roads and trails. Increased training in the other areas would begin to cause degradation of roads, trails and crossings in those areas. The long-term impact from the No Action Alternative would be moderate.

5.1.9 Solid Waste

Proposed Action Alternative 1

Negligible direct and indirect impacts related to solid waste generation and disposal have occurred in past and present operation. Rock crushing and road construction would not increase impacts to the surrounding environment. Wastes from this action and military training would be recycled or disposed of according to requirements through established contracts, resulting in negligible environmental impacts for all alternatives.

5.1.10 Hazardous Materials/Waste

Proposed Action Alternative 1

Hazardous, toxic, and other regulated waste generated would continue to be managed according to installation requirements, as well as Federal and state laws and regulations. No appreciable change in waste generated from current levels would be expected in the foreseeable future from either this action or increased military training. Because of this, direct and indirect impacts to the YTC environment would be negligible for all alternatives.

5.1.11 Cultural Resources

Proposed Action Alternative 1

Cumulative effects on cultural resources from past, present, and foreseeable future actions related to military training on the installation are expected to be moderate for the local area over the long term. Prior to construction of training ranges, land was held and used privately for agricultural grazing, as well as hunting, gathering, and traditional uses by Native Americans. With the establishment of YTC, these uses were greatly reduced With construction of the MPRC and its' associated SDZ, large areas of TA 5 and TA 6 were affected for all land uses except military live fire training. Multiple new and upgraded training facilities are planned in the near to mid-term for construction at YTC. Each facility will incrementally reduce the opportunities for land use other than military training.

The Native American practices of hunting, gathering, and traditional uses have also been negatively affected with systemic increases in military range and training uses. The availability and accessibility for areas to practice cultural uses will continue to decrease as the Army continues to upgrade and build training facilities to support military training to doctrinal standards. In part, this trend has and will be the result of military technologies increasing the range and lethality of weapon systems. Another factor in this trend has been the increase in operation training tempo as more units require training as the Army training doctrine changes to increase the training requirements for a given unit.

Proposed Action Alternative 2 (Spring Water Development Only

The cumulative effect to cultural resources in the project area from this alternative would be the same as those discussed for Alternative 1.

Proposed Action Alternative 3 (Well Water Development Only)

The cumulative effect to cultural resources in the project area from this alternative would be the same as those discussed for Alternative 1.

No Action Alternative

The cumulative effect to cultural resources in the project area would be moderate with the No Action alternative. New and upgraded training facilities are planned within the project area, long term degradation to the road and trails would hamper access and require more extensive upgrading or construction of new roads and trails in the area. Native American access into the area would be hampered by degraded roads. More areas would be inaccessible without upgrade to roads and trails and fires would likely spread further and possibly affect cultural resources in the area by exposing them.

5.1.12 Biological Resources

Proposed Action Alternative 1

Direct and indirect impacts on biological resources from this action alternative range from negligible to minor (Table 2-4) as upgrading existing combat trails/roads, establishing crossing features, erosion-control devices, installing gates, and developing water sources does not significantly change the current condition for biological resources. These impacts when consider in the context of other past, present, and foreseeable future actions are not anticipated to have a significant cumulative impact on biological resources and are considered negligible.

Proposed Action Alternative 2 (Spring Water Development Only

Cumulative impacts associated with Alternative 2 would be similar to Alternative 1.

Proposed Action Alternative 3 (Well Water Development Only)

Cumulative impacts associated with Alternative 3 would be similar to Alternative 1.

No Action Alternative

Cumulative impacts under the No Action Alternative would occur regardless of what is proposed and would include past, present, and future actions. Past land-use practices on the installation that have impacted biological resources include domestic livestock grazing, military training, and

subsequent wildfires. There is continued use of the installation for military training and as a result it is reasonable to assume that additional wildfires would occur also having effects on biological resources. It is anticipated that the primary land-use for the installation (i.e., military training) would not change and that future range developments would likely occur to meet new training requirements. Cumulatively, impacts to biological resources would continue to occur and likely result in an increase in fire frequency, a change to more fire tolerant/dependent vegetation communities, and a decreased habitat effectiveness for species less tolerant of human disturbance.

5.2 Cumulative Effects Conclusions

The cumulative environmental impacts associated with the proposed action and alternatives range from negligible to moderate. Projects in this area of YTC in the foreseeable future are consistent with present uses of the surrounding ROI Positive effects from this project, such as erosion control and development of water resources for fire fighting, will minimize impacts to the environment from increased military training in the area, while enhancing the training experience for Soldiers.

Chapter 6 Conclusions Regarding the Impacts of the Proposed Action

Overall environmental impacts for the three action alternatives range from negligible to moderate positive. Because the project is being done on existing road, trails, and crossings, no new impacts would be anticipated. Development of water resources in the area for construction and fire suppression would have a positive effect by contributing to mitigation of wildland fire damage.

Effects to air quality during project construction and would range from minor to moderate for all three alternatives due to the use of BMPs to minimize dust during rock crushing and construction activities. No violation of NAAQS would be expected to occur even if rock crushing for the upgrade to the MPRC is occurring during the proposed action because of the overall good quality of the air and the tendency for local wind flow to disperse pollutants.

Noise effects would be expected to be negligible for all alternatives. All construction activities would be within noise levels experienced previously.

Effects to geology, topography, and soils at the site of the proposed action would be minor for the three action alternatives and moderate for the No Action Alternative. Erosional effects would be short term from the proposed construction. Repair and revegetation to the roads, trails and crossings would mitigate the negligible to minor damage done by vehicular traffic. For the No Action Alternative, vehicular traffic would continue to degrade the roads, trails, and crossing features, resulting in moderate impact.

Surface water effects would be minor for all three action alternatives. Impacts from construction would be short-term, while the upgrade to crossing features and erosion controls would mitigate siltation in surface water. In the No Action Alternative, sedimentation, disturbance to riparian vegetation, and continued erosion would occur, resulting in moderate impact.

Groundwater effects for all alternatives would be negligible due to lack of potential modes of contamination.

Effects to land use for all three action alternatives would be minor and positive. All three action alternatives would improve access and fire suppression resources. For the No Action Alternative, erosion and degradation of resources would occur, resulting in moderate impact to land use.

Because of the relatively small size of the project, the socioeconomic impact of all alternatives would be negligible.

The impact to human health for all three action alternatives would be moderate and positive. Development of water resources in the project area would improve the firefighting capability in the area. Ground and aerial firefighting equipment would have quicker turnaround times while fighting fires in the area. The impact from the No Action Alternative would be moderate as there would be no water resources in the immediate area, necessitating longer turnaround times.

Infrastructure effects would be moderate and positive for the three action alternatives. Erosion hazards would be repaired and resource conditions and fire suppression capabilities would be improved. This plus the removal of safety hazards would improve the installation's ability to support military training. The No Action Alternative would have an impact of minor trending

over time to moderate. Without being upgraded, roads and trails would become unusable for military training, causing training to shift. This shift would then begin a degradation of resources in other areas.

The effects of solid waste produced during the proposed action would be negligible for all alternatives. The contractor doing rock crushing and construction would be contractually responsible for proper management of solid waste generated. For the No Action Alternative, there would be no change in the generation of solid waste.

The amount of hazardous waste generated would be comparable to current levels. Hazardous, toxic, and other regulated wastes would be managed through the YTC One Stop and would be subject to established controls. Because of this, the overall effect of hazardous waste would be negligible for all alternatives.

There are no known cultural sites within the project footprint and the proposed action will improve Native American access. Because of this, the impact to Cultural Resources for the three action alternatives would be minor. For the No Action Alternative, degraded roads and trails would limit access into traditional areas and result in a moderate impact.

Negligible effects on upland vegetation would occur under the action alternatives. Combat road and trail improvements would have little to no impact on upland vegetation as most are proposed on existing unimproved roads. The proposed erosion control features, removal of cattle guards and development of water resources result in small scale, localized impacts. Because of this, impacts to upland vegetation for all three action alternatives would be considered negligible. For the No Action Alternative, degraded roads would result in less access for fire suppression and noxious weed control activities. This would result in minor impacts to upland vegetation.

The installation of catchment systems, piping, and the footprint of tanks and/or well drilling would have small scale impact on riparian vegetation. Due to small amount of such habitat on YTC and the disproportionate use by wildlife species, the level of impact for all three action alternative would be minor. Impact for the No Action Alternative would be negligible, as there would be no development in riparian areas.

Impact to fish and wildlife from the three action alternatives would be minor. Although some habitat loss in upland vegetation communities and development of riparian areas would occur and temporary displacement and/or abandonment of areas during construction are expected, these would be short-term and localized. Impact for the No Action Alternative would be negligible as there would be no construction or development of springs.

No direct or indirect impacts are anticipated from all three action alternatives for threatened or endangered species. Bald eagles do not frequent the project area as there is no suitable habitat for nesting or wintering. No suitable habitat for listed salmonid species exists in the project area. No adverse impacts are anticipated for sage-grouse due to the short duration of the project, the seasonal nature of sage-grouse use, and the marginal habitat in the project area. For the No Action Alternative, continued degradation of roads and trails would reduce access for fire suppression and noxious weed control activities. Overall, impacts from the No Action Alternative would be minor.

Based on the analyses contained in this EA, it has been determined that the known and potential impacts of the Proposed Actions on the physical, natural, and cultural environment would have negligible to moderate, positive effects. The No Action Alternative would have negligible to

moderate impacts to the surrounding environment. Preparation of an Environmental Impact Statement (EIS) is not required, and a Finding of No Significant Impact (FNSI) will be published in accordance with Army Regulation 200-2, *Environmental Analysis of Army Actions.*

Chapter 7 References

32 Code of Federal Regulations § 651. Environmental Analysis of Army Actions. 2002.

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Chapter 10 Glossary and Acronyms

10.1 Glossary

10.1.1 Context

Duration

Short-term - would not persist beyond 5 years.

Long-term - would persist beyond 5 years or be permanent.

Spatial Scale

Local - would occur in the area immediately surrounding a project or activity and within the boundaries of YTC.

Regional - has the potential to migrate off-post.

10.1.2 Intensity (thresholds)

Negligible – may locally alter the resource, but would not measurably change its function or character.

Minor – any change to the resource would either be isolated and localized or not measurable on a wider scale.

Moderate – changes to the resource would be measurable on a wide scale (e.g., across the entire installation or region). If impacts are adverse, they would not exceed limits of applicable local, state, or federal regulations.

Major – may exceed limits of applicable local, state, or federal regulations or would untenably alter the function or character of the resource.

10.1.3 Significance

For the purposes of this EA the threshold of significance is synonymous with a "major" impact. For example, an action that would violate existing pollution standards; cause water, air, noise, soil, or underground pollution; impair visibility for substantial periods; or cause irreparable harm to animal or plant life [would] be determined significant (32 CFR § 651.39).

10.2 Acronyms

BMP	Best Management Practices
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
dBA DNL	decibels adjusted day-night level
DPS	Distinct Population Segment
EA	Environmental Assessment

EIS	Environmental Impact Statement
ENRD	Environmental and Natural Resources Division
EO	Executive Order
ESU	Evolutionarily Significant Units
FNSI	Finding of No Significant Impact
ITAM	Integrated Training Area Management
km	Kilometer
LRAM	Land Rehabilitation and Maintenance
M-DMPRC	Modified Digital Multipurpose Range Complex
MOA	Memorandum of Agreement
MPRC	Multi-Purpose Range Complex
MPTR	Multi-Purpose Training Range
NEPA	National Environmental Policy Act of 1970
NAAQS	National Ambient Air Quality Standards
NOAA	National Oceanic and Atmospheric Administration
NPDES	National Pollutant Discharge Elimination System
NRHP	National Register of Historic Places
PM_{10}	Particulate matter less than 10 micrometers in size
ROCA	Range Operations Control Area
SDZ	Surface Danger Zone
SHPO	State Historic Preservation Officer
THAD	Tributary Headwaters Archaeological District
USFWS	United States Fish and Wildlife Service
WDFW	Washington Department of Fish and Wildlife
WDOE	Washington State Department Of Ecology
YRCAA	Yakima Regional Clean Air Agency
YRS	Yakima Research Station
YTC	Yakima Training Center