

# **ENVIRONMENTAL ASSESSMENT**

## **TREE CLEARING IN MCCHORD FIELD'S PRIMARY SURFACE ZONE**

*Joint Base Lewis-McChord, Washington*



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## Acronyms

AIRFA	American Indians Religious Freedom Act
BMP	Best Management Practice
BRAC	Base Realignment and Closure
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CFS	Cubic Feet Per Second
CWA	Clean Water Act
DoD	Department of Defense
DOL	Directorate of Logistics
DPW	Directorate of Public Works
EA	Environmental Assessment
EIS	Environmental Impact Statement
EISA	Energy Independence and Security Act
EPA	Environmental Protection Agency
ESA	Endangered Species Act
FAA	Federal Aviation Administration
FNSI	Finding of No Significant Impact
INRMP	Integrated Natural Resources Management Plan
I-5	Interstate 5
JBLM	Joint Base Lewis-McChord
LF	Linear feet
MILCON	Military Construction
NAGPRA	Native American Graves Protection and Repatriation Act
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NPDES	National Pollutant Discharge Elimination System
NPL	National Priorities List
NRHP	National Register of Historic Places
SF	Square feet
SR	State Route
SWPPP	Stormwater Pollution Prevention Plan
USAF	United States Air Force
UFC	Unified Facilities Criteria
WDOE	Washington Department of Ecology

# 1. PURPOSE AND NEED FOR ACTION

## 1.1 Introduction

The Department of Army (Army), in coordination with the U.S. Air Force (USAF), is addressing issues surrounding vegetation management and airfield obstructions at McChord Field Airfield, located at Joint Base Lewis-McChord (JBLM). Vegetation management is a critical component to safe navigation and safe flight operations at McChord Field because of their impact to airfield clearance and instrument procedure.

McChord Field is home to the USAF 62d Airlift Wing of the Air Mobility Command (AMC), which operates C-17 aircraft. Transient and/or tenant aircraft that operate on McChord Field Airfield are primarily AMC mission aircraft, including C-5, C-130, KC-135, KC-10 aircrafts, and their variants. All of these aircraft utilize a CAT II Instrument Landing System (ILS) for safe operation. The CAT II ILS is a complex navigation system that utilizes lateral guidance (localizer) and vertical guidance (glide slope or glide path) to guide aircraft approaching McChord Field runway. The ILS system aids pilot’s ability to make safe landings and ensure proper touchdowns.

Due to the complexity of the ILS localizer and glideslope systems, there are some limitations. Localizer systems are sensitive to obstructions in the signal broadcast area like large buildings, hangars, or trees. Glideslope systems are limited by the terrain in front of the glideslope antennas. If terrain is sloping or uneven, reflections can create an uneven glidepath causing unwanted needle deflections. To avoid hazardous reflections that could affect the ILS signal, regulations have been established for ILS sensitive and ILS critical areas. These regulations are outlined in Unified Facilities Criteria (UFC) UFC 3-535-01, Visual Air Navigation Facilities, and UFC 3-260-1, Airfield and Heliport Planning and Design.

## 1.2 Need for Proposed Action

Flight operations at McChord Field need to comply with Air Force and UFC regulations including UFC 3-260-01, Airfield and Heliport Planning and Design, and AFI 32-1076, Visual Air Navigation Facilities, which require airspace imaginary surfaces be maintained free of obstructions for the safe operation of aircraft. UFC 3-260-01 outlines the slope requirements for airspace imaginary surface (Table 1).

<b>IMAGINARY SURFACES</b>	<b>COLOR</b> (as indicated on Figure 2).	<b>LENGTH AND WIDTH FROM RUNWAY</b>	<b>SLOPE</b> <b>Horizontal to Vertical</b>
<b>Primary Surface</b> (Proposed Action)	<b>Blue</b>	<b>Runway Length + 200 ft long</b> <b>1,000 ft wide</b>	<b>0% slope.</b> <b>Elevation is the same elevation as the runway centerline.</b>
Approach/ Departure Surface	Orange	25,000 ft long 2,000 ft wide	50:1 (i.e. 50 ft horizontal to 1 ft vertical)
Transitional Surface	Green		7:1
Inner Horizontal	Pink		

Surface			
Conical Surface	Yellow		20:1

Air Force Handbook 32-7084 (1 Mar 1999)

In 2010, a Light Detecting and Ranging (LiDAR) analysis was conducted of vegetation around McChord Field, to identify existing and potential tree obstacles around the airfield that are in violation of UFC regulations (Figure 2: Current/Projected Tree Obstacles in the Imaginary Surfaces at McChord Field).

### 1.3 Purpose of Proposed Action

The purpose of the proposed action is to ensure pilot safety by addressing obstructions within McChord Field’s Primary Imaginary Surface, while balancing the needs of sensitive environmental resources and the surrounding human environment.

### 1.4 Laws, Regulations, Permits, and/or Other Consultation Requirements that Influence the Proposed Action

General repair and maintenance of the McChord Field airfield is Categorically Excluded (CATEX) from the need to prepare National Environmental Policy Act (NEPA) documentation, in accordance with 32 CFR 651, Appendix B (g)(1). Routine maintenance of the airfield includes all mowing, the removal of small shrubbery, and the removal of dead, diseased, or damaged trees. Most airfield maintenance activities fall under this CATEX. Nevertheless, concerns with proposed and/or listed Endangered Species Act (ESA) species and potential impacts to Clover Creek triggered concerns, and prompted the Army and Air Force to examine the potential impacts of the proposed project in more detail.

Airfield tree and vegetation management in the Runway 16/34 South Approach/Departure Imaginary Surface (50:1) at McChord Field was analyzed in an Environmental Assessment and a Finding of No Significant Impact (FNSI) was signed in 2007. This document addresses all tree and vegetation within the South Approach/Departure zone within JBLM property (north of Perimeter Road). Continued maintenance within this area, per the conditions outlined in the FNSI, will continue to occur and is not addressed further within this document.

### 1.5 Project Scoping and Public Involvement

The Department of Army published a draft Environmental Assessment and Finding of No Significant Impact, September 04, 2013. Notification was published in the Tacoma News Tribune and postcards were sent to the EA’s distribution list at this time. The Army met with the Chambers-Clover Creek Watershed Council late September to discuss potential mitigation that could be implemented for the proposed action. The Army also conducted site visits with the USFWS, and with the EPA on two separate occasions. All comments that were received by letter, or through in-person discussions have been incorporated into this draft.

## 2. DESCRIPTION OF THE ALTERNATIVES INCLUDING THE PROPOSED ACTION

During initial project scoping, several design alternatives were identified for the McChord Field Airfield Tree Obstacles project. Development of the designs took into consideration obvious environmental constraints, including Clover Creek and Morey Pond wetlands, private property and

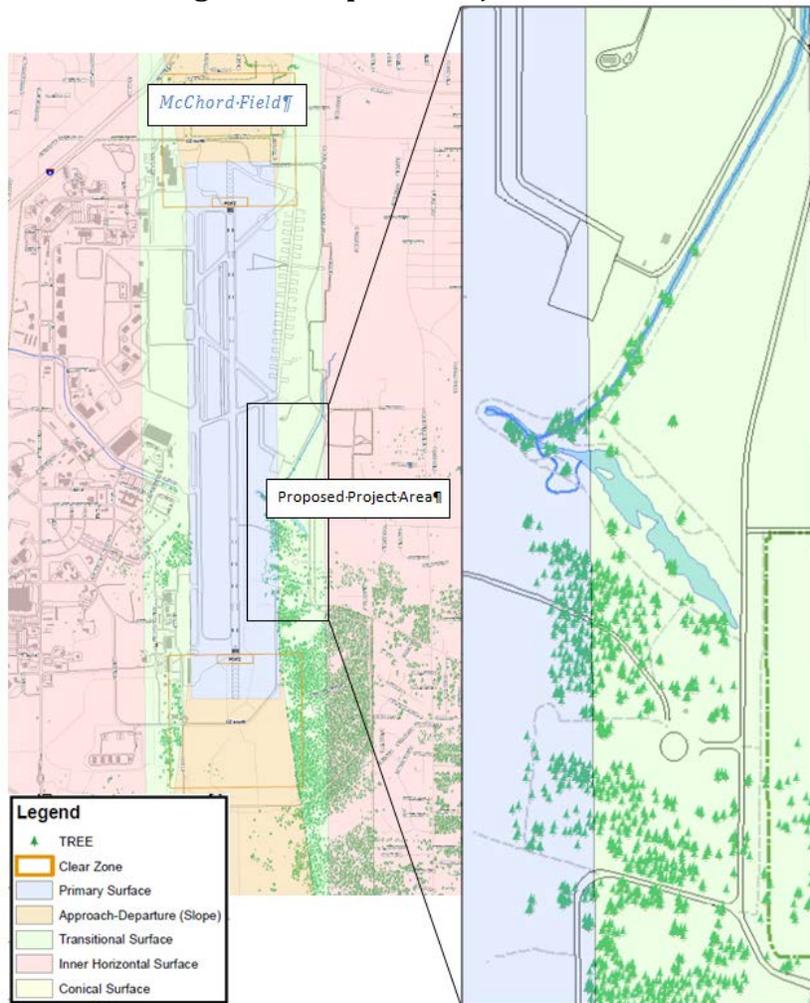
proposed critical habitat for listed species. To be considered a reasonable alternative for this project, the proposal must:

- Meet the proposed project’s purpose and need;
- Avoid all non-mitigable adverse effects; including those to the environment, cultural resources, or the JBLM mission.

## 2.1 Proposed Action - Clearing of the Primary Surface Area

The DoD’s Proposed Action (Preferred Alternative) involves clear cutting all trees within the boundaries of the runways 1,000 foot Primary Surface area (see the blue shaded area in Figure 1). The Primary Surface area is required to be level with the runway and have a 0% slope. Under the Preferred Alternative, the DoD would remove all trees and vegetation in non-environmentally sensitive areas, currently penetrating, or having the potential to penetrate, the approach/departure airspace imaginary surface, including those trees within the Clover Creek and Morey wetlands. The proposed action would also implement a mitigation project along Clover Creek to increase the riparian area buffer.

**Figure 1. Proposed Project Location**



The clearing of the Primary Surface Zone would remove approximately 100 trees east of the runway (APPENDIX E). The trees range in size from three (3) to thirty six (36) inches diameter

breast height, and will be removed in a way to minimize the environmental impact. In all areas outside of the Morey Pond and Clover Creek riparian areas, the project will include cutting and grinding stumps flush with existing grade. Trees will be felled and skid in a manner that preserves and prevents damage to surrounding vegetation, soil and infrastructure.

Many trees within the Clover Creek riparian area will not be able to be cut at grade. In cases where the tree roots have established themselves within the creek bed, or otherwise have established themselves and/or provide stability to the Creek's slope, will be cut in a manner that maintains the integrity of the creek (this is a top priority for the Air Force and Army).

Merchantable timber will be cut, and any excess (branches, large twigs, and stumps) will be cut for firewood or chipped and moved off-site for composting.

The proposed clearing of the Primary Surface Zone has also implemented the following restrictions/requirements that will be included within the project proposal. The restrictions include:

- Removal of all bluebird boxes that are within the Primary Surface Area. Bluebird boxes will be relocated to the east, just outside of the 1,000 foot clearance area; or a six (6) to seven (7) foot stump will be retained for those trees with bird boxes.
- All tree cutting outside of the riparian area would be required to be completed between September 1 and March 31 to avoid disturbance to nesting streaked horned lark.
- All removal of Oregon white oaks with a DBH equal to or greater than four (4) inches will be mitigated at a 6:1 ratio. Plantings of the trees will be included within the projects costs and will be at least two (2) inch caliper. Mitigated trees will be planted at the direction of the installation's Fish and Wildlife Program Manager.
- All trees outside of the Primary Surface, that have not been previously cut (i.e. are not already part of the Air Field Maintenance Contract), will be preserved through a Waiver obtained by the Air Field.
- Any landscape features scarred or damaged by the Contractor's equipment or operations shall be restored to the projects natural condition/grade. All skidding damage or ruts and tracks from any source shall be restored to their original condition (topography) and planted with Roemer's fescue (*Festuca roemerii*) at the proper planting period during the year.
- Roemer's fescue will be planted in the two areas (4.05 and 2.93 acres) where all vegetation will be removed. This will be done during the proper planting period during the year.
- The proposed tree cutting around the riparian area will remove trees between July 16<sup>th</sup> and October 30<sup>th</sup>, which is the dry, low flow season. However, work would be discontinued should any coho salmon be observed in Clover Creek or Morey Creek in the project area. Trees will be cut at their base and root systems will not be disturbed, to ensure minimal erosion impacts.
- No in-water work or walking, etc. in the creek will occur.
- All trees will be felled up the streambanks (upslope). No part of trees to be cut, including limbs, to the extent practicable, will be permitted in the creek or allowed to slide down the streambank into the creek.
- No trees will be felled into or across the creek.
- If trees are cut into 16.5-foot logs, these logs must be deposited on the adjacent upland area and not permitted to fall onto the creek's streambank/wetland.

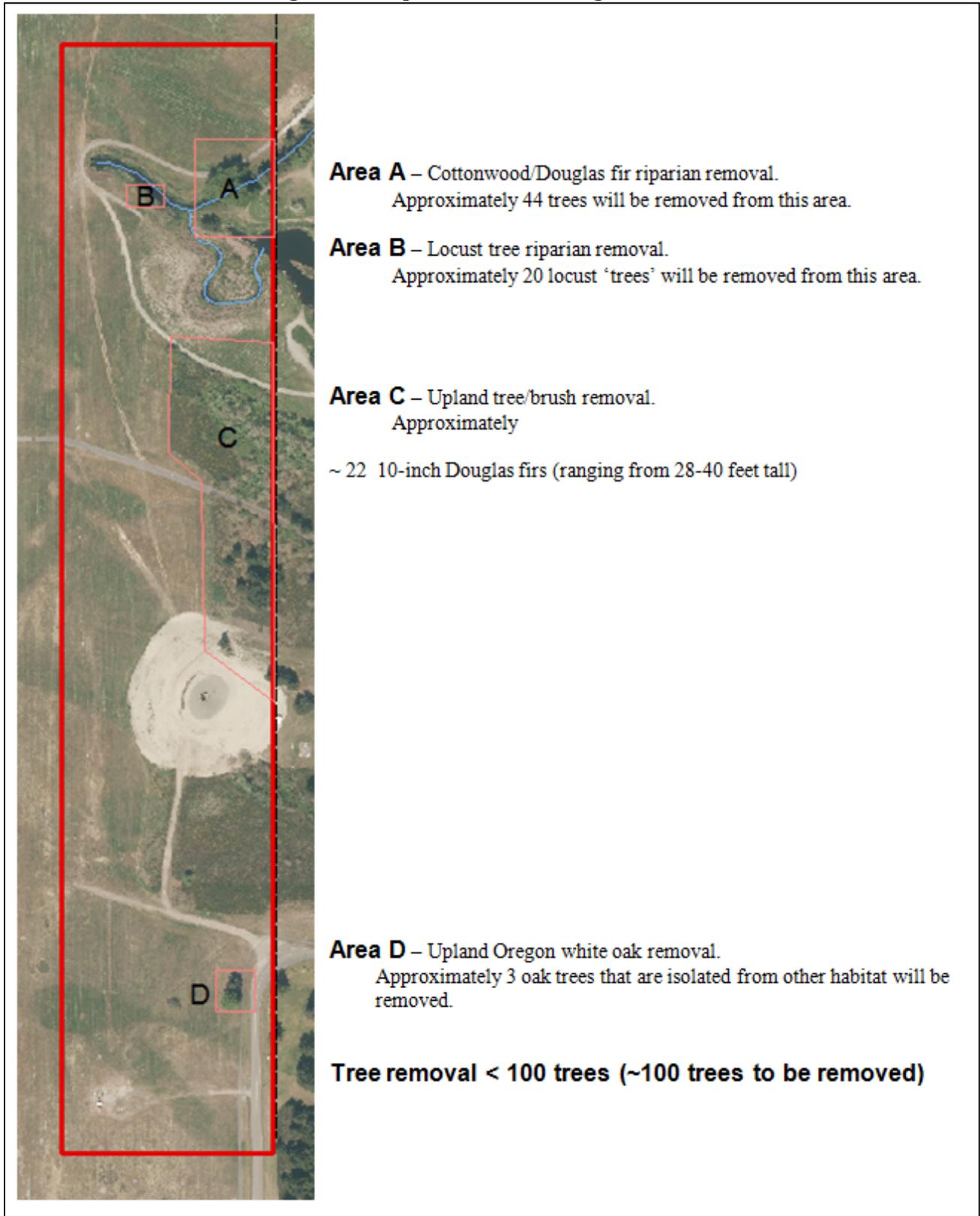
- Regardless of how the trees are cut, in 16.5 foot logs or a total tree cut, logs or trees will not be skidded up the streambanks, but must be lifted off the streambank to the adjacent upland area to avoid vegetation damage and erosion impacts.
- No willows (shrubs), native shrubs or shrubs planted as part of the Morey Pond Dam bypass project along the streambanks of the Morey Pond Dam Bypass will be cut or removed as part of the project.
- The locust tree within the Morey Dam Bypass peninsula area will be felled in place in a southerly direction and left where it falls. This tree will not be cut into logs. The limbs on the top side of the felled tree will be removed so that no limbs are higher than the trunk of the felled tree. Removing this tree without causing damage to the bypass vegetation and the bypass itself, along with the associated and adjacent naturally seeded upland area would be very difficult and could cause significant impacts. Access to this area is extremely limited and removing the tree would also be a safety issue.
- No pesticide, herbicide, etc. spraying will be part of this action.

JBLM will also implement two mitigation projects as a part of this proposed action. Within the 1,000 foot buffer area (from the runway culvert to the 1,000 ft boundary), the streambank will be re-planted with native species that grow no higher than streambank height (to maintain 0% slope). The slope of the streambank will likely only allow for native species that grow no more than 2 meters tall to maintain the 0% slope. Existing plants and/or vegetation that establish itself in the future will likely exceed the 0% slope and will require them to be topped or otherwise managed through the Airfield's vegetation management contract. Appropriate species will be planted (OBL to FAC+ based on soil composition and saturation) in such a way as to ensure they will not be choked out by reed canary grass (ie. with plastic tubing). Annual reed canary grass control will be implemented to manage invasive species, as outlined in JBLM's INRMP.

The second mitigation area would occur outside of the 1,000 ft clear zone (from 1,000 ft to the JBLM property boundary). Within this section shade producing plants will be planted along creek bank to mitigate impacts to shade). Species within this area would have to comply with the 7:1 Transitional Surface requirements which state for every seven feet away from the Primary Surface; you can go up one foot in height. Based on the location of mitigation area, the Transitional Surface allows trees and shrubs up to 60-120' (20-40 m) to be planted in this area. Species such as Pacific willow, dogwood, big leaf maple, etc will be planted. Reed canary grass removal would be conducted prior to planting, if necessary. Otherwise, long-term management of invasive species, including reed canary grass, will occur as consistent with the JBLM INRMP.

All staging areas for this project will be located outside of the boundaries of environmentally sensitive areas, including the Clover Creek buffer and proposed Critical Habitat areas. All contractor furnished equipment must be thoroughly washed off-base and inspected prior to being brought on the base to ensure that no foreign material, including undesirable plant matter, seeds, etc., are introduced to the Air Field. No pesticide, herbicide, etc. spraying will be part of this action.

**Figure 2. Proposed Tree Clearing Areas**



**Figure 3. Proposed Project Mitigation Areas**



## 2.2 No Action Alternative

The No Action Alternative serves as the baseline from which to compare all other reasonable alternatives. Under the No Action Alternative, existing vegetation management activities, which are authorized within the McChord Field Grounds Maintenance contract, would be allowed to continue. The McChord Field Grounds Maintenance contract includes vegetation management within the Primary Surface (blue shaded) and the Transitional Surface (green shaded), with the exception of the trees and vegetation within the vicinity of Murray Creek and Holiday Park.

All mowing and vegetation/tree removal would continue to be managed by the DPW's Service Contract, subject to the McChord Field mowing schedule which has been established to protect streaked horned lark, which breed at the air field.

Under the No Action Alternative, McChord Field would remain out of compliance of UFC 3-260-01 criteria and would be required to obtain a temporary waiver to address violations associated with tree obstructions.

**Figure 4: Waiver Area for the No Action Alternative**



## 2.3 Alternatives Ruled Out From Detailed Analysis

Several alternative project locations and/or project options were developed and reviewed in development of this project. The following alternatives did not sufficiently meet the initial screening criteria for this action and have therefore been ruled out for further detailed analysis.

***Removal of All Imaginary Obstacles, Including Holiday Park Transitional Surface and Parkland Inner Horizontal Surface:*** Although full compliance with surface imagery would be possible within the JBLM boundary, alternatives that included tree cutting within Holiday Park and/or the

Inner Horizontal Surface area that buffers McChord Field from the Parkland community were ruled out from further analysis. Holiday Park and the Parkland Inner Horizontal Surface provide both habitat to species and also a noise-buffer to the communities outside of JBLM, McChord Field. Because of these reasons, the Air Force and the Army would prefer to maintain the vegetation in these areas.

### 3. AFFECTED ENVIRONMENT

The affected environment reviews the environmental setting or general environmental conditions of the proposed project area. It describes the environmental baseline against which the environmental effects can be evaluated. Throughout scoping of this project, specific resource areas were identified that may be affected by the proposed action. These included: air quality, water quality and quantity, cultural resources, and biological resources.

Impacts associated with land use, topography and soils, traffic and transportation, socioeconomics and Environmental Justice, and hazardous materials and waste management were considered, but not examined in-depth in this analysis because they are not expected to be impacted by the proposed action. A rationale for their exclusion is outlined below:

Land Use	No changes to land use will occur as a result of the proposed action. The proposed action will focus on maintaining an existing airfield.
Topography and Soils	No long-term impacts to topography and soils are expected to occur as a result of the proposed action. The proposed action will cut trees at the base for removal. The landscape is relatively flat and minimal to no erosion would occur as a result of this activity.
Noise	The proposed project location is within the 75-80 decibel level for aircraft noise (McChord AFB Air Installation Compatible Use Zone (AICUZ) report). Tree cutting would generate noise, but beyond the existing noise contours for the Air Field airfield.
Traffic and Transportation	The proposed project will have no impacts to traffic and transportation. Logging activities will occur entirely within the JBLM boundaries. Any logs traveling to mills or other processing areas will have no impact on traffic or transportation.
Socioeconomics and Environmental Justice	The proposed project will have no impacts to socioeconomics or environmental justice. The proposed project will occur entirely within the JBLM boundaries. No direct or indirect impacts associated with the proposed tree cutting will impact either of these areas of concern.
Hazardous Material and Waste Management	The proposed action would not require the use of hazardous materials other than common materials used by logging/construction equipment (motor oil, lubricant, coolant, fuel).

Environmental consequences are those impacts that directly or indirectly affect the environment as a result of the proposed action. The degree to which environmental resources are affected is based on significance criteria specific to each resource, as well as the time (long-term or short-term) and place (local or regional) that the proposed action would occur. The spatial parameters defined for individual activities are known as the region of influence.

### **3.1 Air Quality**

Air Quality at JBLM McChord Field is regulated by the Puget Sound Clean Air Agency (PSCAA). JBLM's air quality is classified as good and is in attainment with the National Ambient Air Quality Standards for all criteria pollutants (U.S. Army, 2010). McChord Field operates under synthetic minor emission limits under the Clean Air Act (CAA) Title V Air Operating Program. The PSCAA is responsible for issuing and enforcing the CAA Title V Synthetic Minor Limits in the Regulatory Order for NC No. 9364 (issued 7/27/2006) to the Air Force.

### **3.2 Water Quantity and Quality**

Clover Creek, Morey Creek, Morey Pond and associated wetlands are part of the Chambers-Clover Creek Watershed (Water Resource Inventory Area (WRIA) 12) (HUC 17110019). JBLM occupies at least 25 percent of the land within the watershed. Morey Creek enters McChord Field on the eastern boundary of the installation and flows westward through a 5-foot culvert under Perimeter Drive, to Morey Pond. The discharge from Morey pond flows to a fish bypass to Clover Creek and flows 0.6 miles through two 12-foot diameter steel culverts that cross beneath the McChord Field airfield. Clover Creek emerges on the west side of the runway and flows an additional 2.6 miles to Lake Steilacoom. Lake Steilacoom connects to Chambers Creek, which discharges to Chambers Bay within Puget Sound. Annual precipitation in the Chambers-Clover watershed ranges from 40-60 inches per year. Most of this precipitation arrives during the winter months. During the summer, there is little rain and naturally low stream flows, which are dependent upon groundwater inflow. Since the 1980s the Chambers-Clover Creek watershed has been closed to further surface water appropriations due to its low flow. Surface water from Clover Creek water is not diverted for any use on McChord Field.

#### ***Water Quantity and Flow Issues***

Loss of stream flow has been an ongoing issue within the Chambers-Clover Creek Watershed. Since 1940, a midsection of Clover Creek has been subject to intermittent drying periods during the summer months, even when there were considerable volumes of water in the upper reaches (e.g. at Watter Road and at the end of Golden Given Road) (Tobiason, 2003). Chambers-Clover Creek flows measured at the most downstream flow gauge (Chambers Creek below Leach Creek) have declined over the past 50-years, even with similar precipitation over the same time-frame. Flows at low flow periods are on the order of 10 cfs lower; they have declined from typical flows in the 50 cfs range to typical flows in the 40 cfs range (Technical Memorandum found in Appendix J of CCWMP, 2004). Historic records of water flow data from the U.S. Geological Survey and Pierce County have been inconclusive in determining a model of intermittent or ephemeral flow for Clover Creek, but early maps, historical accounts, and historic flow records have indicated that flows to the creek have been degraded and have not always had issues with intermittent flows (Tobiason, 2003).

In general, issues with water quantity and stream flow are highly complex, but one of the primary focuses on water quantity within Clover Creek has been on groundwater. Clover Creek originates from springs and ground water discharge, and throughout the watershed there is a strong linkage between surface waters and groundwater which affects stream flow and hydraulic continuity (Chambers-Clover Watershed Management Plan, 2004). Population growth within the watershed is steadily increasing the demand for water. Rapid urbanization and suburbanization since the 1950s has resulted in a population of more than 270,000 in the Chambers-Clover Creek Watershed. The

amount of water already allocated in the entire watershed has increased approximately fivefold since 1947—from 91 cfs (cubic feet per second) to 585 cfs (Chambers-Clover Creek Watershed Characterization (CCCWC), 1997).

Chambers creek has a long history of alterations to its flow patterns and several past projects have contributed to the water quantity and the stream flow issues that are occurring within the Chambers-Clover Creek watershed. Beginning sometime after 1880, Clover Creek was altered multiple times by dredging, channelization, and human activities. Interviews and historic accounts of water flow of Clover Creek have indicated that up until 1940, Clover Creek from Canyon Road through what is now JBLM McChord Field, flowed with large quantities of water (Tobiason, 2003).

In the early 1900s, a canal was built adjacent to the Creek to supply the City of Tacoma with drinking water. The canal was never used for its intended purpose but it now carries half of the present creek's flow (CCCWC, 1997). Historic interviews have indicated that the major issues with intermittent drying periods began around 1940 when dredging or bulldozing action took place east of Pacific Avenue (Tobiason, 2003). Personal interviews conducted by Tobiason (2003), indicate that the dredging that occurred east of Pacific Avenue just prior to the 1940s seems to have been the change that most significantly impacted low flow conditions, and contributed to lowered American Lake levels as well as lowered groundwater levels. Other historical impacts include the regional sewer system of 1986 that diverted water to Puget Sound thereby reduction groundwater recharge and increased water usage in the basin (CCWMP, 2004). Development of the south Puget Sound has also likely contributed to loss of stream flow as the amount of impervious surface has diverted stormwater away from recharging groundwater.

Major past actions that have impacted water flow at Clover Creek include:

- Works Progress Administration (WPA) projects (1938-1940) which were the formation of draining districts to prevent flooding (early 1940s). These were carried out through drainage districts without legal easements (Tobiason, 2003).
- Dredging activities for farming activities and construction from individual landowners which altered the stream and streambed (e.g. Smith Ditch (1863)) (Tobiason, 2003)
- McChord Army Airfield dredging (1938-1939) which ditched 1,400 feet of the creek for the construction of a new runway.
- Diversion of the stream for the construction of PLU and the replacement of road bridges for further channeling (1933-1967) (Tobiason, 2003).
- Dredging for construction of Interstate-5.
- General urbanization and development along the creek (Lakewood, Spanaway, Fredrickson, JBLM, etc).

## ***Water Quality***

Water quality includes temperature, dissolved oxygen, and other dissolved and suspended substances. Clover Creek and its tributaries are listed on Washington State's 303(d) list of impaired water bodies because they do not meet water quality criteria for temperature, dissolved oxygen, and fecal coliform bacteria.

Water temperature is a prime regulator of natural processes within the aquatic environment. Temperature determines those aquatic species that may be present in a water system and also affects the level of dissolved oxygen within the waterbody. Temperature levels fluctuate over the day and night in response to climatic conditions and river flows, but tend to be greatly influenced

by human activities. Washington Department of Ecology has found in general, during non-spawning and non-incubating times, the temperature should not rise above 18.3° C (WAC 173-201a, Class A waters).

Water temperature is a complex issue and is affected by headwaters, air temperature, flow regime, substrate composition, riparian vegetation, turbidity, groundwater-surface water interactions, channel complexity, water diversion, the presence of headwater wetlands and lakes, and reservoir releases. Within the Clover Creek, issues with water temperature have been primarily associated with the loss of stream flow within the watershed, but can also be contributed to the loss of riparian habitat that provides shade to the creek. Riparian habitat characteristics (width, cover and shading) have been cited as adequate in the head waters of Clover Creek and 25-50% throughout the rest of the creek (Appendix J – CCWMP, 2004).

The Chambers-Clover Watershed has also had issues with dissolved oxygen within the Morey Creek/Morey Pond segment of the watershed (see Figure 5). Dissolved oxygen in appropriate concentrations is essential to keep organisms alive, and to support the bacteria needed for decomposition of organic matter in water. Oxygen enters the water by absorption directly from the atmosphere or by plant photosynthesis, and is removed by respiration of organisms and the decomposition of organic matter. High levels of organic matter mean high levels of bacteria and a greater demand for oxygen. In addition, warmer temperatures increase the metabolic demand for oxygen while the capacity of freshwater to hold oxygen decreases (Quinn 2005). Creeks that are heavily associated with marsh and wetland areas are often found to have low dissolved oxygen levels. Issues with dissolved oxygen occur only along the Morey Creek/Morey Pond segment of the Chambers-Clover watershed and have been linked to muck soils (decomposition of organic matter) within this stretch of the watershed (CCWMP, 2004). The plant decomposition that typically occurs in wetlands consumes oxygen at a higher rate than usually occurs in creeks.

Fecal coliform bacteria are found in the intestines of warm blooded animals and serve as indicators of unsanitary conditions. Sources of fecal coliform bacteria include: manure from farm animals, failed on-site septic tanks, and waste from domestic pets and wildlife. Fecal coliform has been identified starting at the upper reaches of Clover Creek and have continued down through the watershed to Steilacoom Lake (see Figure 3). Issues with fecal coliform have been linked to stormwater runoff within the watershed (CCWMP, 2004).

Pierce County has identified sites on Clover Creek as part of the Raise the grade Program. The Clover Creek site is reported as C+ for 2012 (Pierce County Report Card- Surface Water). Much of the creek's low score is attributed to water quality in Spanaway Lake, the headwaters for the creek. This site is upstream of McChord Field. The proposed project and actions on JBLM do not impact any upstream sites on Clover Creek.

**Figure 5. Clover Creek Water Quality Impairments and Land Use**

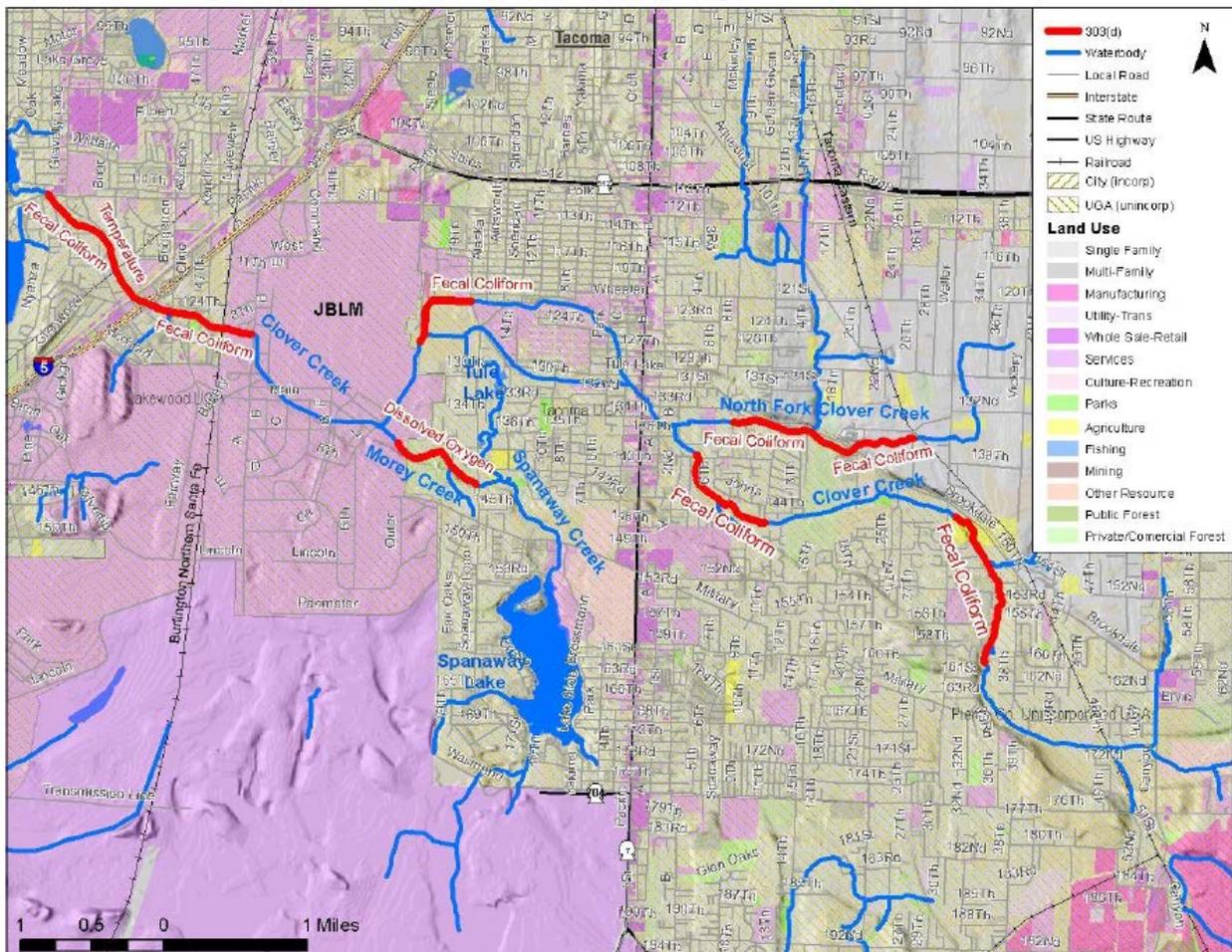


Image from WA Dept. Ecology Publication 13-03-109, April 2013,

### 3.3 Wetlands

Wetlands have been delineated for wetlands along Clover Creek and Morey Creek. These wetlands act as groundwater discharge or recharge areas, depending on seasonal changes in the water table and the direction of groundwater flow. While federal law does not protect wetland buffers, wetland buffers reduce the adverse impacts of adjacent land uses to wetlands. JBLM has implemented a 50-meter wetland buffer surrounding wetlands and other water bodies located at the installation.

Section 401 of the Clean Water Act (CWA) prohibits “the discharge of any pollutant” into “waters of the United States” without a permit (33 U.S.C. 1311(a)). Section 404 of the CWA, administered primarily by the Corps, is the permitting authority for the “discharge of dredged or fill material”-- both pollutants under the CWA --into the waters of the United States. As the statutory text indicates, § 404 jurisdiction depends on the presence of a *discharge*, which, under the relevant statutory and regulatory definitions, equates to an *addition* of a pollutant or material. No Section 404 permit is required for this project because above-ground tree and vegetation removal does not meet the regulatory definition of “dredge or fill material” (40 CFR 232.2 (ii)).

### 3.4 Cultural Resources

A cultural resource is any definite location or object or past human activity, occupation, or use, identifiable through inventory, historical documentation, or oral evidence. Cultural resources may include archaeological sites; historical buildings, structures and/or districts; or traditional tribal resource sites. If eligible, cultural resources can be listed under the National Register of Historic Places (NRHP). In addition, some cultural and traditional tribal resources that may not be eligible under NRHP are protected under the National Historic Preservation Act (NHPA), the Native American Graves Protection and Repatriation Act (NAGPRA), the American Indian Religious Freedom Act (AIRFA), or other federal or state laws.

Historic resources and archaeological resources have been inventoried within the proposed project's area, in association with the DPW Cultural Resources Program management activities, and military construction activities. No historic buildings, structures or districts exist in or adjacent to the project site.

McChord Field property possesses a history of Euro-American settlement dating back years before statehood. Two archaeological sites are located at and/or near the project site on the south side of Morey Pond. These sites, a farmstead (Rigney) and the Sastuc Outstation (Sheep Station), were located in the area on the south side of Morey Pond.

The first documented use of the property was as a sheep station and farm named "Sastuk," operated by the Puget's Sound Agricultural Company (PSAC). The PSAC was an outgrowth of Hudson's Bay Company agricultural interests. This is the earliest group of historic sites related to the PSAC. Sites of this category are rare, and represent the initial development of agriculture in the region.

The Morey Pond area is the historic location of the Sastuk Sheep Station, according to the 1847 PSAC map. The site consisted of a shepherd's hut, three gardens, a bridge, and a barn. If this was the location of Sastuk and the barn at the Rigney farmstead (see discussion below) was a PSAC structure associated with the Sastuk, it is likely that the site was heavily disturbed during the initial development of McChord Field and construction of the airfield. If Sastuk was located further east and at least one building from this station was incorporated into the Rigney farmstead, some potential for subsurface remains exists. Shovel testing revealed the area to be generally disturbed.

The historic farmstead location formerly contained at least nine structures. The land historically is associated with the Rigney family. A Puget Sound Agricultural Company (PSAC) shepherd's hut, or perhaps a house and barn built in 1858 or 1859 for farm manager Thomas Cooper, could have been incorporated into the Rigney farmstead. The site was likely affected and/or destroyed by construction of the airfield or covered with fill dredged from the creation of Morey Pond in the 1970s. Testing revealed a shallow, though not uniform, A horizon and evidence of debris throughout the area (asphalt, cement and electrical cable casing fragments). Testing indicated that the area had been heavily disturbed.

### 3.5 Biological Resources

The proposed project is located at McChord Field, which is dominated by developed concrete runways and mowed grass areas. A few stands/individual trees of Oregon white oak (*Quercus garryana*) are within the mowed grass area. Oregon white oaks have been identified for protection within JBLM because of the habitat that it provides to State-listed wildlife species, including the

western gray squirrel and several migratory bird species. All of the proposed alternatives would be required to mitigate impacts to Oregon white oak. Six (6) 2-inch caliper balled Oregon white oak trees will be planted on JBLM for every one (1) tree over 4 inches in DBH removed within the construction footprint, as required mitigation.

The McChord Field airfield is proposed critical habitat for streaked horned lark (SHL) (*Eremophila alpestris strigata*), which are proposed for listing under the Endangered Species Act. SHL prefer open, flat, treeless landscapes of 300 acres or more, with sparse, grassy spots with patches of bare ground. Nesting in the south Puget Sound region begins in late April to mid-May. Second clutch initiation generally begins in mid-June to late July. Larks may initiate a third clutch in response to failure of the second clutch. In south Puget Sound, all nesting activity is over by the end of August.

Clover Creek and Morey Pond are within the project area, and will be impacted by the proposed tree cutting. These areas have had special attention recently because of joint restoration projects that opened up habitat for anadromous salmon species. In 2009, the Morey Creek Dam Bypass was constructed as a partnership between Pierce County, the Salmon Recovery Funding Board, and the Department of the Air Force. The bypass project opened up six miles of Morey Creek for anadromous fish spawning access, specifically coho salmon and sea-run cutthroat trout. This project was targeted and funded largely because the habitat protected by JBLM appeared to have the most potential for productive coho spawning, once barriers are removed. Vegetation planted as part of the bypass project was required to be native species with the requirement that no trees be planted because of the close proximity to the airfield.

Clover and Morey Creek are inhabited by nine observed fish species (Entrix, 2006). Reticulate sculpins (*Cottus perplexus*) and threespine sticklebacks (*Gasterosteus aculeatus*) were the two most commonly observed species during field surveys in March and June 2005. Other observed species were: coho salmon (*Oncorhynchus kisutch*), cutthroat trout (*Oncorhynchus clarki clarki*), pumpkinseed (*Lepomis gibbosus*), rainbow trout (*Oncorhynchus mykiss*), redbelt shiner (*Richardsonius balteatus*), rock bass (*Ambloplites rupestris*) and yellow perch (*Perca flavescens*). Of the anadromous species present in Clover Creek and Morey Creek, only coho salmon are managed under the Magnuson-Stevens Fishery Conservation and Management Act. Observations show that coho salmon utilize habitat upstream and downstream of the proposed project area. The work window for Freshwater in-water work for Chambers Creek is July – September 30<sup>th</sup>.

The majority of anadromous fish use Chambers Creek, which is downstream of Steilacoom Lake (not in the study area of this project). The mouth of the lake has a concrete fish ladder which is only functional when sufficient discharge is available from the lake. Discharge is controlled by the outlet weir operated by the Steilacoom Lake Homeowners Association which does not provide minimum flows for fish in the ladder. This limits fish access to the lake and upstream into the Clover Creek watershed (Runge et al., 2003).

No ESA listed salmon are known to exist in the proposed project area. The Chambers Creek basin historically supported winter steelhead, although presently steelhead are no longer thought to be present in the basin” (PSSTRT, 2013). In recent years anadromous fish have been unable to access their historic spawning or rearing areas due to barriers such as low and intermittent streamflow or alterations to the creek such as culverts and impoundments. Similarly, many resident species such as cutthroat trout also experience difficulties accessing their habitats (Runge et al., 2003).

Clover Creek and its associated wetland/riparian areas provide important habitat to a wide range of species. Tree species within the Creek's streambank/wetland are dominated by black cottonwood (*Populus trichocarpa*), Douglas fir (*Pseudotsuga menziesii*), and non-native black locust (*Robinia pseudoacacia*), which would all be removed as part of the proposed action. Other riparian vegetation including snowberry (*Symphoricarpos albus*), Pacific willow (*Salix lasiandra*), salmonberry (*Rubus spectabilis*), Douglas spirea (*Spirea douglasii*), invasive reed canarygrass (*Phalaris arundinacea*) and Scot's broom (*Cytisus scoparius*) would not be disturbed. The proposed project would remove approximately 100 trees from the proposed project area. The proposed clearing would remove ~ 40 cottonwood trees with an average DBH of 12 inches and approximately 80 feet tall. There are four Douglas fir within the Creek streambank/wetland area. Average height of the fir is 75 feet with a DBH of 20 inches. The non-native locust trees are also located within the Creek's wetland/riparian area. The locust are approximately 50 feet tall, with a DBH of 10 inches. All other tree cutting would occur outside of the Clover Creek wetland/riparian area. Approximately 22 Douglas fir trees (10-inch DBH ) would also be removed outside of the Clover Creek wetland/riparian area (see Figure 2).

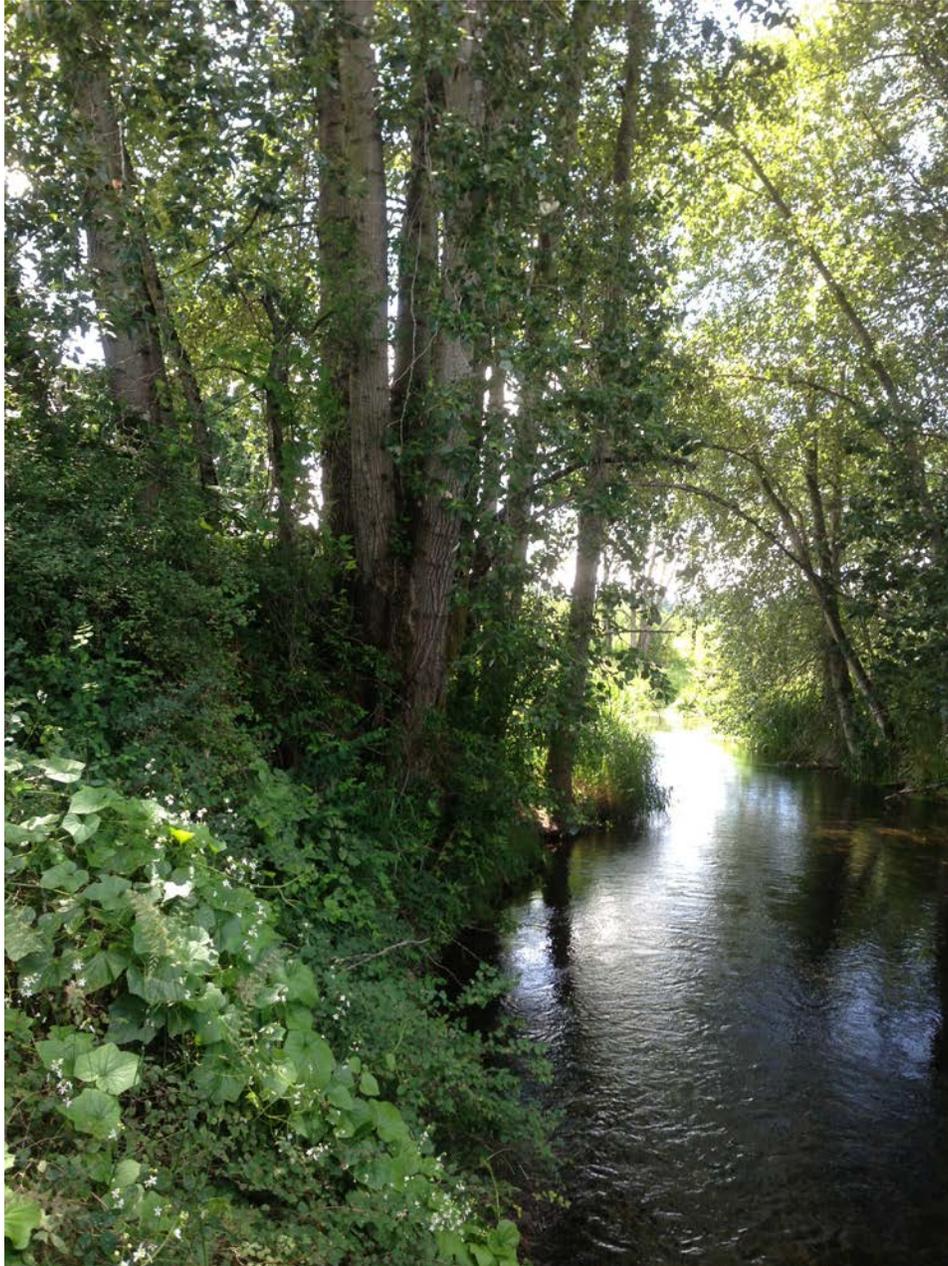
The habitats found in and around wetland systems, oak woodlands, coniferous forests attract a variety of wildlife during some portions of their life cycles. The proposed project area supports several common species, including rodents, squirrels, raccoons, Columbian black tailed deer, and black bear. Bald and golden eagles, and many species of migratory birds have also been identified within the proposed project site. Although rare, a female ring-neck pheasant was also identified during a site visit to the proposed project area.

**Figure 6. Proposed Tree Removal from Creek**



### Figure 7. Proposed Tree Removal

Trees within Clover Creek will be cut at base to minimize impacts to the Creek



**Figure 8. Locust Trees that will be removed as part of the Proposed Action**



## **4. ENVIRONMENTAL CONSEQUENCES**

### **4.1 Air Quality**

#### *IMPACTS ASSOCIATED WITH THE PROPOSED ACTION- CLEARING OF THE PRIMARY SURFACE AREA*

Minimal direct impacts are expected to air quality with the implementation the proposed tree clearing within the primary surface area of McChord Field (Alternative 1). Short-term, minor air quality impacts from motorized logging equipment (i.e. trucks, saws, chipper, etc) may result in temporary increases of emissions at the air field. The impacts of this are considered to be negligible because of the temporary nature and the minimal amount of equipment that will be required. Based on current baseline conditions at JBLM, it is expected that the total direct and indirect emissions from the proposed projects will be below the thresholds established in 40 CFR 51.853(b) and therefore considered regionally insignificant under 40 CFR 93.153(i).

Minimal indirect impacts are expected to air quality with the implementation of the preferred action. Long-term indirect impacts to air quality were also considered due to the potential loss of carbon sequestration that is associated with the loss of trees. While calculations for individual trees were not completed in this assessment, the potential long-term impacts to air quality was considered to be de minimis, because of the overall minimal number of trees that would be cut.

The cumulative impacts to air quality resulting from the direct emissions from the proposed logging actions, as well as the indirect impacts associated with the reduction of trees was not considered for potential cumulative impacts. Impacts to air quality are considered de minimis for the proposed tree clearing within McChord Field's primary surface area.

#### *IMPACTS ASSOCIATED WITH THE NO ACTION ALTERNATIVE*

The No Action Alternative serves as the baseline for the proposed project. No direct impacts to air quality would be expected with the implementation of the No Action Alternative. The trees within McChord Field's primary surface would remain and would continue to provide the indirect benefit of carbon sequestration.

### **4.2 Water Quantity and Quality**

#### *IMPACTS ASSOCIATED WITH THE PROPOSED ACTION- CLEARING OF THE PRIMARY SURFACE AREA*

##### ***Water Quantity and Stream Flow Issues***

No impacts to water quantity and stream flow are expected to occur with the implementation of the proposed action. Information on water quantity and stream flow were included in the EA because they are relevant to discussions regarding water quality and cumulative impacts, but the implementation of the proposed clearing of the Primary Surface Area will have no direct or indirect impact to water quantity within the Clover-Chambers Creek watershed.

## ***Water Quality***

Water quality issues with Clover Creek include potential issues with turbidity, temperature, dissolved oxygen, and fecal coliform. The loss of stream flow (biologically significant flow changes) has been cited as the primary driver of water quality issues within Clover Creek (CCCWC, 1997).

Minor, short-term impacts to water quality are expected for the proposed primary surface zone clearing. Concerns with erosion and water quality were addressed during project scoping, and it was determined that all trees would be cut at the base and felled away from the creek in order to minimize disruptions to the soil. No other ground disturbing activities would occur. Existing grasses, shrubs, and other native, non-woody plants within the creek's wetlands/streambanks would remain. Minimal erosion is expected to occur from hillside disturbance occurring from the loggers as they make their cuts and secure the tree to ensure it falls away from the creek. Impacts from human activity are expected to be minimal, and result in less than significant impacts to water quality.

Minor, less than significant short-term and long-term impacts to temperature are expected as a result of the proposed action. The proposed action will remove the trees within the Primary Surface Area which result in the direct and indirect impacts to loss of stream shade and potential increases to the stream temperature. In review of the proposed project these potential impacts were expected to result in minor, less than significant impacts to temperature because of the minimal tree cutting that would occur and the mitigation that was proposed to be implemented with the proposed action.

Riparian vegetation characteristics (stand density, height, species composition, proximity to stream) and channel characteristics (width and constraint) affect canopy cover and shade over the stream (OWEB, 1999). Shade is often expressed through percent canopy cover (percent of the sky covered by vegetation or topography), but in this instance, the Army also recognized that shade can come from 'shade producing features' such as tree trunks and understory vegetation which may have a greater impact on stream shade than canopy cover. Currently, the proposed project area only provides approximately 10-20% riparian cover to the existing stream. Outside the Primary Surface Zone, Clover Creek maintains approximately 50-80% riparian cover through the installation. Outside of the installation, cover and shading of Clover Creek has been cited as adequate in the head waters of Clover Creek and at 25-50% throughout the rest of the creek (Appendix J - CCWMP, 2004). Outside of the Airfield, stream cover vegetation is greater than 50% (CCCWMC, 1997). Due to the minor reduction of trees, and the minimal contribution that the proposed area currently contributes to shading of the creek, and the proposed mitigation plan which will re-plant riparian areas upstream, the impacts to temperature were considered less than significant.

The proposed action, the clearing of the primary surface area at McChord Field, will have no direct, indirect, or cumulative impact on dissolved oxygen or fecal coliform within the proposed project area. Impacts to dissolved oxygen were assessed because loss of stream shade could potentially lead to increased loss of dissolved oxygen in the watershed. Although the Army reviewed the projects potential impact to dissolved oxygen, it was discounted as a factor for this proposed project. The project will have no impact on flow levels or flow conditions in Clover Creek. Dissolved oxygen issues are isolated to the Morey Pond/Morey Creek overflow which is adjacent to the proposed site. Although temperature plays a role, dissolved oxygen concerns are driven primarily from the lack of stream flow and muck soils that are characteristics of this pond/wetland habitat. Outside of Morey Pond, dissolved oxygen has not been an issue within Clover Creek. The

proposed tree clearing will not increase any issues with dissolved oxygen within the Chambers-Clover Creek watershed. In addition, fecal coliform within the Chambers-Clover Creek Watershed has been contributed to inputs of stormwater into the watershed. The removal of trees will not increase the amount of stormwater that will enter Clover Creek and will result in no impacts to fecal coliform.

The proposed action, the clearing of McChord's Primary Surface Area assessed the potential cumulative impact of the project on water temperature within Clover Creek. When addressing cumulative impacts, the Army set their temporal boundaries for the temperature analysis to include the entire Clover Creek drainage system, from the headwaters in Spanaway/Fredrickson to its end point in Steilacoom Lake. Although the Army's proposed project would result in individually minor (de minimis) impacts to water quality due to the reduction of stream shade, the Chambers-Clover Creek watershed is listed on the 303(d) list for temperature which indicates that *any* stream shade removal would have the potential to intensify this already significant impact.

Although stream shade and canopy cover is an important factor in stream temperature, temperature issues specific to Clover Creek must also include discussions regarding the loss of stream flow which exacerbates any issues with water quality. Within Clover Creek issues with temperature have been primarily associated with the loss of stream flow within the watershed (CCWMP, 2004). Riparian habitat characteristics (width, cover and shading) has been cited as adequate in the head waters of Clover Creek and 25-50% throughout the rest of the creek (CCWMP, 2004). Riparian vegetation cover through McChord Field is greater than 50% (CCCWMC, 1997).

Cumulative impacts to water quality are expected to be less than significant because of the minimal trees that will be removed with the proposed action and the mitigation that has been incorporated into the proposed action. Stream canopy cover will be mitigated at a 2:1 ratio. The proposed project includes approximately 1,000 feet of tree and shrub planting (vegetation no higher than 60 meters) mitigation along Clover Creek outside of the Primary Surface Area. This mitigation is in addition to the 500 feet of mitigation that will be re-planted with native shrubs after the existing tree obstacles are removed. Due to the de minimis impacts of the proposed tree cutting and the proposed mitigation, no cumulative impact to water quality is expected to result with the proposed action.

#### *IMPACTS ASSOCIATED WITH THE NO ACTION ALTERNATIVE*

The No Action Alternative serves as the baseline for the proposed project. No direct or indirect impacts would be expected to water quantity and/or quality with implementation of the no action alternative. Under this alternative there would be no tree removal within the riparian area, nor would any mitigation be conducted for the project. Issues with low flow, temperature, dissolved oxygen, and fecal coliform would continue to occur.

### **4.3 Cultural Resources**

#### *IMPACTS ASSOCIATED WITH THE PROPOSED ACTION- CLEARING OF THE PRIMARY SURFACE AREA*

No known cultural resources would be impacted with this alternative. The proposed tree cutting includes a stand of locust trees which were considered potentially culturally significant. Locust trees are native to the southeastern United States, which indicates that the trees were intentionally planted on the site. After investigation, it has been determined that there are No Historic

Properties on the site, because the surrounding site has been so disturbed that there is no cultural context in which to associate the trees. No other cultural resources were identified on the site.

Although unlikely, the Army implements a policy protecting inadvertent discoveries for any project that disturbs the soil. As with all projects, in the event that human remains, artifacts, or features of archaeological interest are inadvertently discovered, the contractor shall immediately cease activity in the vicinity of the discovery, stabilize and protect such discoveries from further disturbance or public disclosure. Work may not proceed in the vicinity of the discovery until authorized to proceed by the Installation Cultural Resource Manager and the Contracting Officer's Representative.

#### *IMPACTS ASSOCIATED WITH THE NO ACTION ALTERNATIVE*

The No Action Alternative serves as the baseline for the proposed project. There would be no impacts to cultural resources with the implementation of the No Action Alternative.

## **4.4 Biological Resources**

#### *IMPACTS ASSOCIATED WITH THE PROPOSED ACTION- CLEARING OF THE PRIMARY SURFACE AREA*

The proposed clearing of the McChord Field Airfield's Primary Surface is considered to have short-term and long-term adverse effects to biological resources, but impacts are not expected to be significant.

The cutting of the Oregon white oaks is not expected to result in significant adverse impacts, because they are located within the airfield and do not provide high quality habitat for species of concern. Oak trees will be mitigated at a 6:1 ratio, outside of the Primary Surface Zone of the air field.

Tree removal is not expected to result in adverse impacts to SHL or proposed critical habitat. The proposed tree removal would occur outside of the SHL nesting time, from April 15<sup>th</sup>-August 31<sup>st</sup>. Removal of trees would have minor impacts to proposed critical habitat, with trees being cut at base, which would maintain the open characteristics of the air field. The minor impacts would result from vehicles, hauling routes, skidding, etc. resulting in ruts, vegetation damage, etc. These impacts would be repaired (filled in) and planted/hydroseeded with Roemer's fescue (*Festuca roemerii*) and the proper time of the year for planting.

The proposed project area supports a depressed population of coho salmon. The proposed project will try to avoid tree cutting when the species is present in the stream, and will attempt to remove trees during the Creek's in-water work window, July 16<sup>th</sup> – September 30<sup>th</sup>. Any streambank/riparian vegetation damage will require the planting of replacement, non-invasive shrubs as determined by the JBLM, DPW, ED Fish and Wildlife staff.

Riparian habitat function was assessed utilizing the Lewis River Riparian Function Model (2008) which evaluates watershed-scale habitat for salmon management. See ([www.nwfsc.noaa.gov/research/divisions/fed/wpg/documents/lrcs/appendixhriparianfunction.pdf](http://www.nwfsc.noaa.gov/research/divisions/fed/wpg/documents/lrcs/appendixhriparianfunction.pdf)). The assessment looks at three aspects of riparian function: shade, recruitment of pool-forming conifers, and wood recruitment. Utilizing the model, the proposed project area was rated 'Fair' on the 3-step scale (i.e. Poor, Fair, and Good), due to 10-20% forest cover that is provided at the site.

Pool formation was not applicable because less than 30% of our project area was coniferous trees. Large woody debris recruitment was also listed as Fair, due to conifer DBH ranging from  $\geq 10$  and  $< 20$  inches. Removal of trees within this habitat area was not considered to be a significant impact because of the minimal area of disturbance (approximately  $\frac{1}{4}$  acres) and the 'fair' habitat that is provided anadromous species.

#### *IMPACTS ASSOCIATED WITH THE NO ACTION ALTERNATIVE*

The No Action Alternative serves as the baseline for the proposed project. No biological resources would be impacted with the implementation of the No Action Alternative.

## **5. CUMULATIVE EFFECTS DISCUSSION**

Evidence is increasing that the most devastating environmental effects may result not from the direct effects of a particular action, but from the combination of individually minor effects of multiple actions over time (CEQ, 1997). Cumulative effects address the incremental environment impacts of the proposed action, together with impacts of past, present, and reasonably foreseeable future actions. The cumulative effects address the impacts from projects that may be individually minor, but result in collectively significant impacts when taking into account actions occurring over a period of time (40 CFR §1508.7).

Cumulative impacts assessed overall impacts from previous airfield tree removal. Previous airfield activities removed all on-base trees within the approach/departure clearance and primary surface (with the exclusion of those within sensitive environmental habitats). In addition, those trees within the east and west transitional surface, with the exception of those around environmentally sensitive areas, Holiday Park or outside of the installation boundary, have also been removed. Although only 35% of the subwatershed is built up, the Clover Creek subwatershed has also been impacted by past projects outside of JBLM. The Clover Creek subwatershed is home to significant development including: Lakewood Mall, Lakewood Industrial Park, Clover Park Vocational College, Pacific Lutheran University, among other commercial and private development within the area.

Current projects at McChord Field are that are currently ongoing and/or will occur in the near future are primarily maintenance driven. JBLM Environmental Project Reviews have indicated that current projects at McChord Field are limited to grounds maintenance, the relocation of antennas within the South Approach Zone, and a proposed project for taxiway ramp striping. JBLM is also starting project scoping on a proposal to replace two culverts along Clover Creek with a new bridge construction. The proposed project would address concerns associated with a FEMA flooding report and open the streambed for salmonids passage. The project will also repair the abutments on a third bridge that is currently slipping. Details for these project are not available at this time because the Army is still within the preliminary stages of project conception, but short-term impacts associated with the construction of the bridges is expected to result in long-term beneficial impacts to salmon passage.

Future projects (funding requested, but not funded) include a proposal to relocate freight terminals from the Primary Surface Zone. This project has not been programmed or planned, so it has not been included as a potential cumulative impact. Nevertheless, the probable impacts from this project are likely to have negligible impact on the Chambers-Clover Creek watershed. The objective of the project would be to relocate the building outside of the Primary Surface area (i.e. away from Clover Creek), so impacts to the creek would not be anticipated. In addition, there are

no known current or future projects outside of JBLM that have the potential to impact Clover Creek. The Army reached out to Pierce County Planning Department to confirm this information. Pierce County also has no knowledge of any current or future projects that could result in potential impacts to Clover Creek.

Based on the information above, the Army determined that their potential for cumulative impacts to the creek would be less than significant. The Army's proposed project would result in individually minor (*de minimis*) impacts to water quality due to the reduction of stream shade. The proposed tree clearing affects less than 500 feet of the creek. In addition, the existing canopy cover that will be affected by the tree cutting provides limited value for thermal regulation. Current canopy cover is rated as 'fair' due to its 10-20% forest cover that is provided at the site (Lewis River Riparian Function Model). In addition to the minor impacts, the proposed project also includes planting of native vegetation and shrubs ( $\leq 2$  meters) within the Primary Surface to replace felled trees. Riparian vegetation planting will also occur along 1,000 feet of Clover Creek outside of the Primary Surface area. This will result in a net gain (2:1) of riparian shade to Clover Creek. Due to the *de minimis* impacts of the proposed tree cutting and the proposed mitigation, no cumulative impact to water quality is expected to result with the proposed action.

## **Mitigation Measures**

The proposed action includes native tree and shrub planting within the project's tree clearing area and within the 500 foot (tree clearing area) and a 1,000 foot section of the creek outside of the runway's Primary Surface area.

The following measures will also be implemented to minimize the potential adverse effects to designated EFH and steelhead (ESA):

- The proposed tree cutting will remove trees between July 16<sup>th</sup> and October 30<sup>th</sup>, which is the dry, low flow season. However, work would be discontinued should any coho salmon be observed in the Clover Creek project area. Trees will be cut at their base and root systems will not be disturbed, to ensure minimal erosion impacts.
- No in-water work or walking, etc. in the creek will occur.
- All trees will be felled up the streambanks (upslope). No part of trees to be cut, including limbs, to the extent practicable, will be permitted in the creek or allowed to slide down the streambank into the creek.
- No trees will be felled into or across the creek.
- If trees are cut into 16.5-foot logs, these logs must be deposited on the adjacent upland area and not permitted to fall onto the creek's streambank/wetland.
- Regardless of how the trees are cut, in 16.5 foot logs or a total tree cut, logs or trees will not be skidded up the streambanks, but must be lifted off the streambank to the adjacent upland area to avoid vegetation damage and erosion impacts.
- No willows (shrubs), native shrubs or shrubs planted as part of the Morey Pond Dam bypass project along the streambanks of the Morey Pond Dam Bypass will be cut or removed as part of the project.
- The locust tree within the Morey Dam Bypass peninsula area will be felled in place in a southerly direction and left where it falls. This tree will not be cut into logs. The limbs on the top side of the felled tree will be removed so that no limbs are higher than the trunk of the felled tree. Removing this tree without causing damage to the bypass vegetation and the

bypass itself, along with the associated and adjacent naturally seeded upland area would be very difficult and could cause significant impacts. Access to this area is extremely limited and removing the tree would also be a safety issue.

- No pesticide, herbicide, etc. spraying will be part of this action.
- DPW/ED/Fish and Wildlife staff must be notified immediately if any trees and/or logs go into the waters of Clover Creek or the Morey Pond Dam bypass.
- For restoration and rehabilitation for this project, Roemer's fescue will be planted on upland areas and preferably Pacific willow will be planted on the streambanks. Other native vegetation may be planted with the approval of DPW/ED/Fish and Wildlife staff.
- Canary grass will be monitored and will be removed in accordance with the JBLM INRMP, if required.
- The Army will also consider a proposal to add large woody debris into Clover Creek as a separate mitigation project, in accordance with their INRMP. Additional NEPA documentation will need to be completed for this proposed mitigation. The Army will look at the projects potential beneficial impacts to fish, and see if a mitigation can be designed that does not cause flooding issues at the Airfield culverts and/or results in inadvertent impacts to the Bird Airstrike Hazard Plan.

The following measures will be implemented to minimize the potential adverse impacts to proposed Streaked Horned Lark and proposed Critical Habitat:

Clearing of the Primary Surface Area will also include:

- All tree cutting would be required to be completed between September 1 and March 31 to avoid disturbance to nesting streaked horned lark.
- Haul routes and cutting prescriptions must be adhered to avoid any stoppages and/or delays with this project, which could include obtaining additional permits for the project to proceed.
- Any landscape features scarred or damaged by the Contractor's equipment or operations shall be restored to the projects original condition/grade. All skidding damage or ruts and tracks from any source shall be restored to their original condition (topography) and planted with Roemer's fescue (*Festuca roemerii*).
- Any landscape features scarred or damaged by the Contractor's equipment or operations outside proposed streaked horned lark critical habitat shall be restored to the project's original condition/grade if ruts exceed 2 inches or the surface area, excluding the 4.05 acre and 2.93 acre sites, is scraped or otherwise cleared of vegetation.

In addition to those BMPs that were described as part of the proposed action, mitigation will be required to offset the projects potential impacts to Oregon white oak. Oaks impacted by the proposed action will be replaced at a ratio of 6:1, where six (6) Oregon white oak trees will be replanted for every white oak removed by the implementation of the project. Trees will be replanted with directions from and at sites designated by JBLM, DPW, ED, Fish and Wildlife Biologists.

## 6. OTHER CONSIDERATION REQUIRED BY NEPA

### Endangered Species Act

The Endangered Species Act (ESA) of 1973 provides broad protection for species of fish, wildlife and plants that are listed as threatened or endangered, and their critical habitats. The proposed project is located within proposed Critical Habitat for streaked horned lark (SHL) and potential steelhead habitat. A Not Likely to Adversely Affect determination has been completed for the proposed tree cutting, which is located within the Appendix A and Appendix B of this document.

### Clean Water Act (Section 404/401)

In response to litigation (i.e. the “Tulloch II” rule), the U.S. Army Corps of Engineers (USACE) and the Environmental Protection Agency (EPA) released 40 CFR Part 232, Revisions to the Clean Water Act Regulatory Definition of “Discharge of Dredged Material”; Final Rule (December 2008). In this ruling, the Agencies reaffirmed their 1999 definition of “discharge of dredge material.” Section 404 permits are not required for this action because all trees and vegetation within the riparian area will be cut at the base of the tree and no ground disturbing activities will occur. Discharge of dredge material does not include activities that involve only the cutting or removing of vegetation above the ground (e.g., mowing, rotary cutting, and chain sawing) where the activity neither substantially disturbs the root system nor involves mechanized pushing, dragging, or other similar activities that redeposit excavated soil material (40 CFR 232.2 (ii)).

### Magnusson Stevens Fisheries Act and Essential Fish Habitat

The Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act), as amended by the Sustainable Fisheries Act of 1996 (Public Law 104-267), established procedures designed to identify, conserve, and enhance Essential Fish Habitat (EFH) for those species regulated under a Federal fisheries management plan (FMP). Section 305(b)(2) of the Magnuson-Stevens Act requires Federal agencies to consult with the National Marine Fisheries Service (NMFS) on all actions, or proposed actions, authorized, funded, or undertaken by the agency, that may adversely affect EFH.

Essential Fish Habitat is defined as those waters and substrate necessary to fish for spawning, breeding, feeding or growth to maturity (16 USC 1802(10)). The Act further defines:

**Waters** include aquatic areas and their associated physical, chemical, and biological properties that are used by fish and may include aquatic areas historically used by fish where appropriate (50 CFR 600.10).

**Substrate** includes sediment, hard bottom, structures underlying the waters, and associated biological communities (50 CFR 600.10).

**Necessary** means the habitat required to support a sustainable fishery and the managed species’ contribution to a healthy ecosystem (50 CFR 600.10).

The EFH consultation for this project can be found in Appendix A of this document.

## Coastal Zone Management Act

Washington State manages its coastal zone through a partnership with the federal government as expressed in the federal Coastal Zone Management Act. Passed in 1972, the act calls for the “effective management, beneficial use, protection, and development” of the nation’s coastal zone and promotes active state involvement in achieving those goals. The coastal zone includes all of Pierce County. Under the Washington State CZMP, activities undertaken, must comply with the six laws listed below:

- Shoreline Management Act
- State Environmental Policy Act
- Clean Water Act
- Clean Air Act
- Energy Facility Site Evaluation Council
- Ocean Resource Management Act

Although the Coastal Zone Management Act specifically excludes from the coastal zone lands that are held by the federal government, actions taken by the federal government are evaluated through a process called “federal consistency.” In these cases, the federal agency reviews the activity for consistency with six federal laws affecting coastal resources and prepares a “federal consistency determination.” The determination describes the activity and determines whether the activity affects coastal resources. If the activity affects coastal resources, a statement must be provided that the activity is consistent to the maximum extent practicable with the enforceable policies in the six laws. The Washington State Department of Ecology has up to 60 days to concur with or object to the determination, in writing. The Consistency Determination for the proposed action is provided in Appendix C.

## 7. CONCLUSIONS

The proposed action, under either action alternative, would result in no significant impacts. Based on the data and analysis presented within this EA, the proposed action would produce no significant adverse impacts to land use, topography and soils, air quality, water quality and quantity, cultural resources, biological resources, traffic and transportation, and hazardous materials and waste management.

RESOURCE AREA	Proposed Clear Cutting of McChord Field Primary Surface	No Action Alternative
Air Quality	<p>Short-term, minor air quality impacts from motorized logging equipment (i.e. trucks, saws, chipper, etc) may result in temporary increases of emissions at the air field. These impacts are considered to be negligible, because they are temporary in nature and will be below the thresholds established in 40 CFR 51.853(b), and considered regionally insignificant under 40 CFR 93.153(i).</p> <p>Long-term impacts to air quality due to the loss of trees was considered to be de minimis, because of the overall minimal number of trees that would be cut, in addition to the 6:1 mitigation that would be implemented for the</p>	No impacts to air quality are expected with this alternative.

	removal of oaks.	
Water Quality & Quantity	<p>Minor, short-term impacts to water quality are expected. All trees would be cut at the base, in order to minimize disruptions to the soil, to minimize soil disturbance (erosion). Impacts from human activity are expected to be minimal, and result in less than significant impacts to water quality.</p> <p>Potential long-term cumulative impacts to water temperature will be mitigated with the proposed 2:1 tree and shrub planting mitigation. The mitigation will plant shrubs for shading that will comply with the Primary Surface Area (~2 meters tall) and will also restore the canopy cover to a segment of creek outside of the primary surface area to mitigate for shade. Trees and shrubs along this 1,000 foot stretch can be no taller than 60 meters tall to comply with the Airfield's Transitional Surface zone. Due to the negligible effects of the project and the proposed mitigation that has been put in place, potential cumulative impacts to water quality have been determined to be less than significant.</p>	No impacts to water quality and quantity are expected with this alternative.
Cultural Resources	No known cultural resources would be impacted with this alternative. The proposed tree cutting includes a stand of locust trees which were considered potentially culturally significant. After investigation, it has been determined that there are No Historic Properties on the site, because the surrounding site has been so disturbed that there is no cultural context in which to associate the trees. No other cultural resources were identified on the site.	No impacts to cultural resources are expected with this alternative.
Biological Resources	<p>Minor short-term and long-term adverse effects to biological resources are expected, but impacts are not expected to be significant.</p> <p>Consultation/conferencing has been completed for ESA and EFH species. Conservation recommendations have been incorporated into the project.</p> <p>Tree removal is not expected to result in adverse impacts to SHL or proposed critical habitat. Project timing will avoid nesting times.</p> <p>Project will avoid tree cutting when the salmonids (coho) are present in the stream. No in-water work will be completed as part of this project. Any streambank/riparian vegetation damage will require the planting of replacement, non-invasive shrubs as determined by the JBLM, DPW, ED Fish and Wildlife staff.</p> <p>All Oregon white oaks will be mitigated 6:1.</p>	No impacts to biological resources are expected with this alternative.

## 8. REFERENCES

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## 9. DISTRIBUTION LIST

### Federal Agencies

Environmental Protection Agency  
Office of Enforcement & Compliance Assurance  
1200 Sixth Avenue, Suite 900  
Seattle, Washington 98101-3140

National Marine Fisheries Service  
Northwest Regional Office  
510 Desmond Drive S.E., Suite 103  
Lacey, Washington 98503

U.S. Fish and Wildlife Service  
Western Washington Office  
510 Desmond Drive S.E., Suite 102  
Lacey, Washington 98503

### State Agencies

Washington Salmon Recovery Board  
P.O. Box 40917  
Olympia, Washington 98504

Washington Department of Ecology  
Environmental Review  
P.O. Box 47703  
Olympia, Washington 98504

Washington Department of Fish and Wildlife  
Recreational Salmon Fishery Manager  
ATTN: Tara Livingood  
600 Capitol Way N.  
Olympia, Washington 98501-1091

Washington Department of Fish and Wildlife  
District 11 Program Fisheries Biologist  
ATTN: Larry Phillips  
600 Capitol Way N.  
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Washington Department of Fish and Wildlife  
Habitat Program  
ATTN: Katie Knight  
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Washington Department of Fish and Wildlife  
SEPA Coordinator  
ATTN: Bob Zeigler  
600 Capitol Way N.  
Olympia, Washington 98501-1091

Washington Department of Fish and Wildlife  
Wildlife Program, District Biologist  
Michelle Tirhi  
600 Capitol Way N.  
Olympia, Washington 98501-1091

Washington State Recreation and  
Conservation Office  
Salmon Recovery Funding Board  
P.O. Box 40917  
Olympia, Washington 98504-0917

### Counties and Regional Agencies

Chambers-Clover Creek Watershed Council  
ATTN: Chris Schutz, Watershed Coordinator  
2702 South 42<sup>nd</sup> Street, Suite 201  
Tacoma, Washington 98409

Pierce County  
Planning and Land Services  
2401 S. 35<sup>th</sup> Street  
Tacoma, WA 98504

Pierce County Public Works and Utilities  
Capital Improvement Program  
ATTN: Helmut Schmidt  
2702 South 42<sup>nd</sup> Street, Suite 201  
Tacoma, Washington 98409

Pierce County Public Works and Utilities  
Surface Water Management Division  
ATTN: Harold Smelt, PE  
2702 South 42<sup>nd</sup> Street, Suite 201  
Tacoma, Washington 98409-7322

Pierce County  
Public Works,  
2401 S. 35<sup>th</sup> Street  
Tacoma, WA 98504

Puget Sound Clean Air Agency  
Compliance Services  
1904 Third Avenue, Suite 105  
Seattle, Washington 98101

Tacoma-Pierce Health Department  
ATTN: Ray Hanowell  
3629 South D Street  
Tacoma, Washington 98418

### **Tribal Governments**

The Honorable Joan K. Ortez  
Chair, Steilacoom Indian Tribe  
PO Box 88419  
Steilacoom, Washington 98388

The Honorable Cynthia Iyall  
Chair, Nisqually Indian Tribe  
4820 She-Nah-Num Drive SE  
Olympia, Washington 98513

The Honorable Herman Dillon, Sr.  
Chair, Puyallup Tribal Council  
3009 East Portland Avenue  
Tacoma, Washington 98404

The Honorable James Peters  
Chair, Squaxin Island Tribe  
SE 10 Squaxin Lane  
Shelton, Washington 98584

### **City Governments**

City of DuPont  
1700 Civic Drive  
DuPont, Washington 98327

City of Lakewood  
10510 Gravelly Lake Dr. SW  
Lakewood, Washington 98499

City of Roy  
P.O. Box 700  
Roy, Washington, 98580

City of Yelm  
P.O. Box 479  
Yelm, Washington 98597

Steilacoom Planning Department  
1030 Roe Street  
Steilacoom, Washington 98388

### **Libraries**

Pierce County Library, DuPont  
1540 Wilmington Dr.  
DuPont, Washington 98327

Pierce County Library, Lakewood  
6300 Wildaire Road SW  
Lakewood, Washington 98499

Pierce County Library, Parkland/Spanaway  
13718 Pacific Ave S.  
Tacoma, WA 98444

Pierce County Library, Tillicum Library  
14916 Washington Ave SW  
Lakewood, Washington 98498

### **Other**

The Nature Conservancy  
217 Pine Street, Suite 1100  
Seattle, Washington 98101

**APPENDIX A: ESSENTIAL FISH HABITAT ASSESSMENT FOR CLOVER CREEK TREE CUTTING**

August 13, 2013

Public Works

David Molenaar, Fisheries Biologist  
National Marine Fisheries Service  
510 Desmond Drive S.E., Suite 103  
Lacey, Washington 98503

Dear Mr. Molenaar,

The Magnuson-Stevens Fishery Conservation and Management Act (MSA) requires Federal agencies to consult with the Secretary of Commerce regarding any action or proposed action authorized, funded, or undertaken by the agency that may adversely affect Essential Fish Habitat (EFH) identified under the Act. The Endangered Species Act (ESA) requires Federal agencies to consult with the Secretary of Commerce for similar projects. The Department of Army, is initiating EFH/ESA consultations for a proposed tree clearing project within Clover Creek and its associated wetlands/riparian corridor, located at McChord Field, Joint Base Lewis-McChord, through the National Environmental Policy Act (NEPA) process.

The Army has prepared a combined ESA/EFH biological assessment for informal consultation. We have also enclosed a copy of the Draft Environmental Assessment (EA) and Draft Finding of No Significant Impact (FONSI) for this project. Please provide your concurrence or non-concurrence on our ESA/EFH determinations and any comments that you may have on the NEPA documentation. The Army will respond to comments, as appropriate. We request that you provide EA comments before the end of the 30-day public review period, which **closes on September 30, 2013**.

This is a time-sensitive FY 13 funding project. As such, anything you can do to expedite the processing of ESA/EFH assessment, would be greatly appreciated. If you have any questions, please contact Valerie Elliott, JBLM Natural Resource Planner, at 253-966-6450.

Sincerely,

Paul T. Steucke Jr.  
Chief, Environmental Division

Enclosures (2):

Essential Fish Habitat, EFH (Coho) and ESA (Steelhead) Assessment for Tree Clearing in McChord Field's Primary Surface Zone  
Environmental Assessment for the Tree Clearing in McChord Field's Primary Surface Zone

**Essential Fish Habitat Assessment (for Coho Salmon) and Endangered Species Act, Section 7  
(for Steelhead) for Tree Clearing in McChord Field Airfield's Primary Surface Zone**

**Agency Name:** Department of Army

**Project Name:** Tree Clearing in McChord Field Airfield's Primary Surface Zone

**Description of the Proposed Action**

The proposed tree clearing of the Clover Creek and associated wetland area involves clearcutting all trees within the boundaries of the runway's 1,000 foot Primary Surface Zone (Figure 1). The Primary Surface Zone is required to be level with the runway and have a 0% slope. To accomplish this all trees and vegetation currently penetrating, or having the potential to penetrate, the approach/departure airspace imaginary surface, including those trees within the Clover Creek and associated wetland/riparian area would be removed.

Trees species to be cut in the Clover Creek wetland and riparian area are primarily black cottonwood, Douglas-fir and locust. Approximately 585 linear feet of streambank/wetland (three different areas) along Clover Creek will have trees removed (Figure 2). Locusts will be removed from 125 feet along the south side of Clover Creek just west of the convergence with the Morey Pond Dam bypass. Black cottonwoods and Douglas-firs will be cut on opposite banks upstream from the bypass convergence, 268 feet on the north side and 192 feet on the south side (Figures 2 and 3). Trees range in size from three (3) to thirty six (36) inches diameter breast height (dbh). Trees will be felled upslope on the streambank where they are located and removed in a manner that preserves and prevents damage to surrounding vegetation, soil and infrastructure.

Many of the trees within the Clover Creek wetland will not be able to be cut to the existing grade. Tree roots that have established themselves within the creek bed, or otherwise have established themselves and/or provide stability to the creek's streambanks will be cut in a manner that maintains the integrity of Clover Creek. Trees will be cut as low to the ground as possible (to meet the objective of the project). However, without eliminating the stumps and root systems of the cottonwoods, these trees will re-spout and continue to grow.

Trees will be cut and removed to avoid any work in the creek and preferably no damage or minimal damage to the streambank/wetland, which will be rehabilitated, preferably with Pacific willow stake plantings. Any landscape features scarred or damaged by the Contractor's equipment or operations shall be restored to the project's original condition/grade. All skidding damage or ruts and tracks from any source shall be restored to their original condition (topography) and planted, at the proper time of the year, with appropriate non-tree vegetation (preferably Pacific willow or other approved native vegetation on the streambanks).

Merchantable timber will be cut, and any excess (branches, large twigs, and stumps) will be cut for firewood or chipped and moved off-site for composting.

All staging areas for this project will be located outside the boundaries of environmentally sensitive areas, including the Clover Creek and the associated wetlands and their buffer areas (50-meter radius). All Contractor furnished equipment must be thoroughly washed off-base and inspected prior to being brought on the base to ensure that no foreign material, including undesirable plant

matter, seeds, etc., are introduced to the airfield. No pesticide, herbicide, etc. spraying will be part of this action.

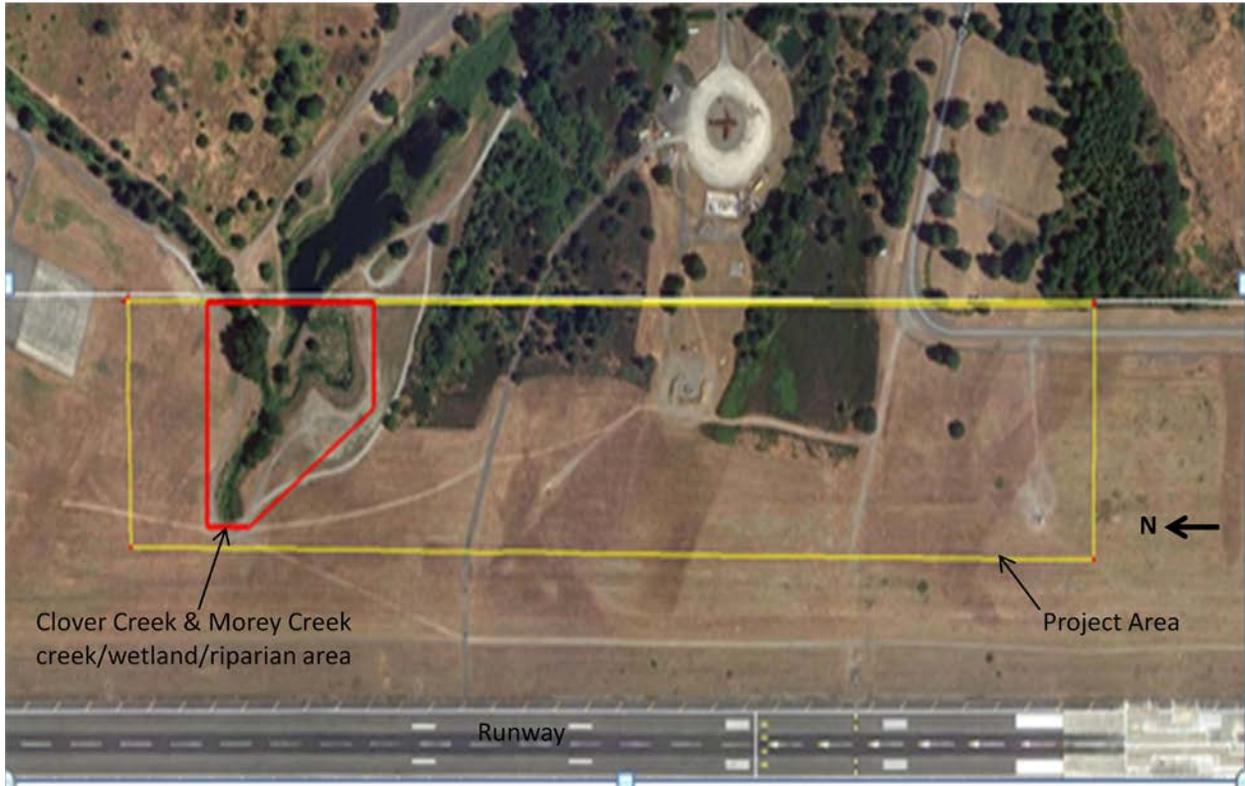


Figure 1: Proposed Project Area

### Habitat

Clover Creek flows in a defined altered (excavated in the 1930s) channel through the project area. Its lower banks are classified/delineated as jurisdictional emergent wetlands. It is a low gradient, slow-moving creek. The creek substrates are predominantly comprised of fines-sands, gravels and cobbles. The creek also has an area within the project area where concrete chunks have been dumped into the creek and the chunks extend partly up both streambanks. These chunks were probably a dam of some sort.

Clover Creek is completely shaded by black cottonwoods and Douglas-firs in the project area upstream from the old Morey Creek/Clover Creek confluence. Vegetation on the streambanks in this cutting area has limited undergrowth and only minimal growth of non-native, invasive reed canarygrass (Figure 4).

A June 2009, stream survey described the general habitat conditions for Clover Creek upstream of the Morey Creek confluence as lotic, pool-riffle, hardwood riparian. The channel width was measured at 7.6 meters and average depth was 0.33 meters.

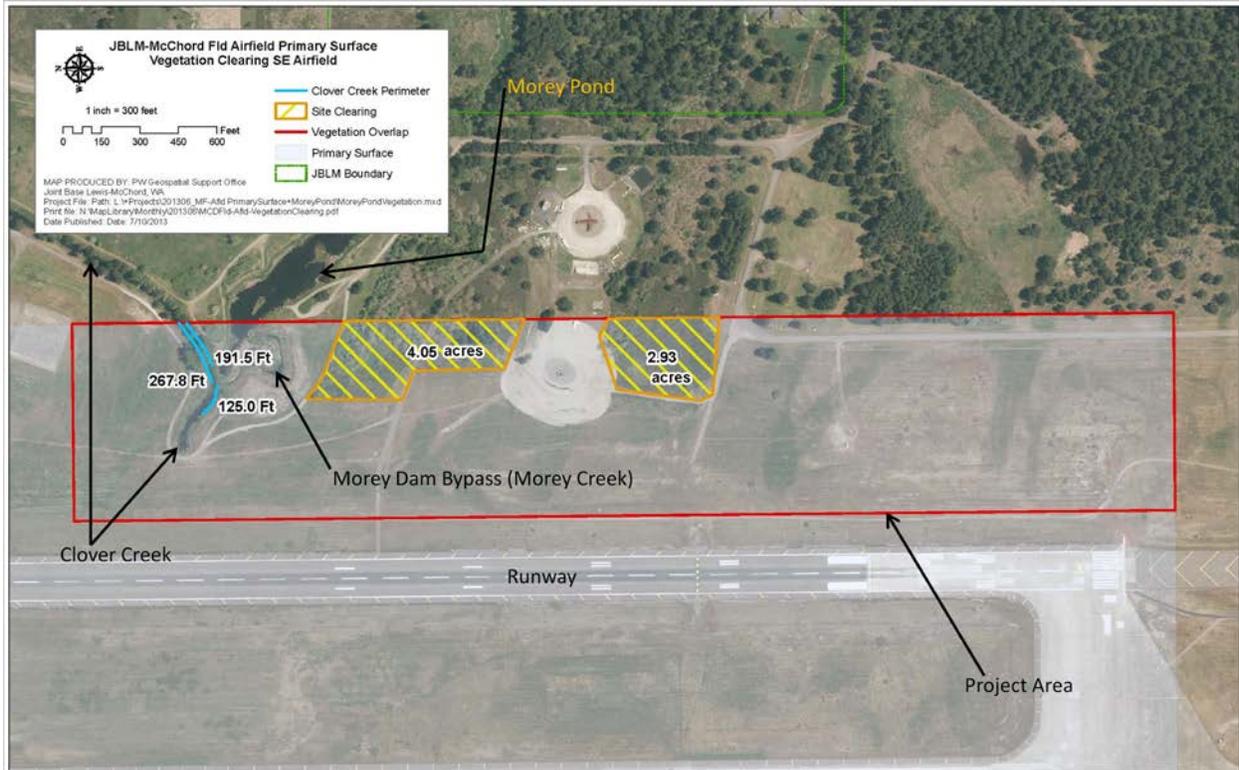


Figure 2: Location of Clover Creek and Morey Creek Tree Removals (denoted with measured blue lines)

The part of Morey Creek within the project area encompasses the Morey Pond Dam bypass, a sinuous pool/riffle creek channel constructed in late 2009, with the original outflow channel of Morey Pond over the dam, now a 100-year flood overflow channel with no flow. Presently, all the outflow from Morey Pond flows through the bypass and joins Clover Creek just downstream from where the original dam outflow entered Clover Creek.

Temperatures during the summer months (pre-bypass) have shown that temperatures are warmer near the Morey Pond Dam than upstream of Morey Pond, differing by as much as 2°C. At the same time of year, Clover Creek, upstream of the Morey Creek confluence (pre-bypass) were 8.5°C lower than at the base of the Morey Pond Dam. Temperature data has not been collected at these sites since the construction of the bypass and the additional plant shading of the Morey Creek within the bypass. Little temperature variation occurred in the cooler months of the year.

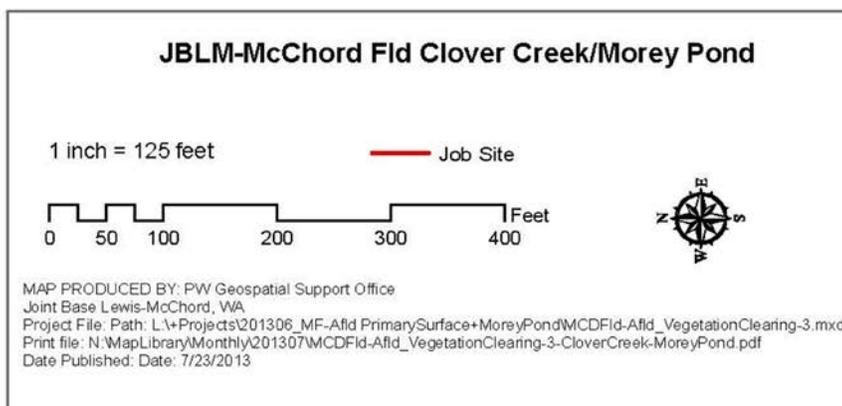
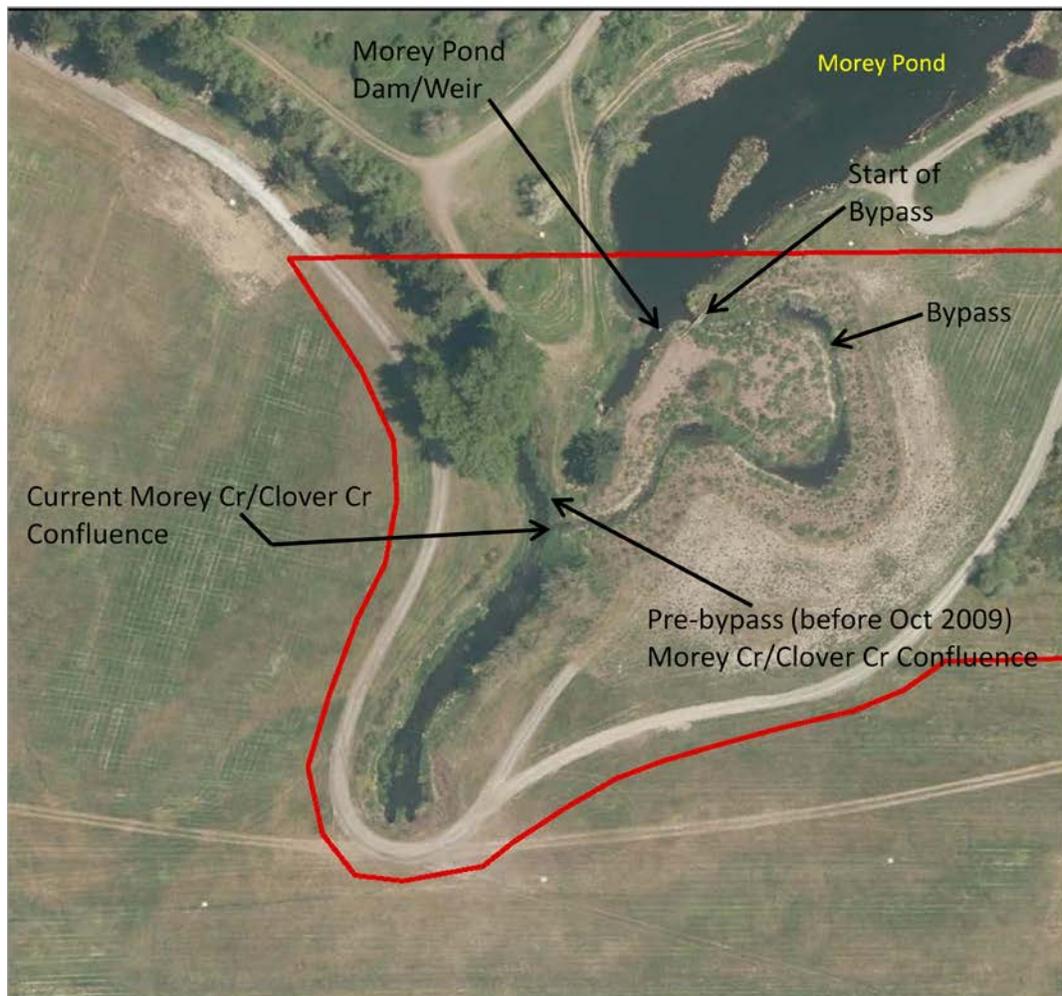


Figure 3: Aerial View of Clover Creek Tree Removal Area (all trees within red job site will be cut)

### Essential Fish Habitat Background

The Magnuson-Stevens Fishery Conservation and Management Act, as amended by the Sustainable Fisheries Act of 1996 (Public Law 104-267), requires federal agencies to consult with the National Marine Fisheries Service (NMFS) on activities that may adversely affect essential fish habitat (EFH).

The objective of this EFH/ESA assessment is to determine whether or not the proposed action “may adversely affect” designated EFH for relevant commercially, federally-managed fisheries species within the proposed action area. It also describes conservation measures proposed to avoid, minimize, or otherwise offset potential adverse effects to designated EFH/ESA resulting from the proposed action.



Figure 4: Clover Creek looking downstream at part of the project area where trees will be removed (191.5 foot section on left; 267.8 foot section on right (see Figure 2))

### **Endangered Species Act Background**

The [Endangered Species Act of 1973](#) (ESA; 7 U.S.C. § 136, 16 U.S.C. § 1531 et seq.) provides for the conservation of [species that are endangered or threatened](#) throughout all or a significant portion of their range, and the conservation of the ecosystems upon which they depend. The ESA's primary goal is to prevent the extinction of imperiled plant and animal life, and secondly, to recover and maintain those populations by removing or lessening threats to their survival. An endangered species is one that is in danger of extinction throughout all or a significant portion of its range. A threatened species is one that is likely to become an endangered species within the foreseeable future.

Under ESA section 7(a)(2), no federal agency may authorize, fund or carry out any action likely to threaten or harm the existence of an endangered / threatened species (or harm their habitat). One of the ESA's purposes is to provide a means to conserve ecosystems that are depended on by endangered and threatened species. Consideration must be given as to whether or not the species will be harmed and how the harm can be minimized.

### **Fisheries Species within the Proposed Project Area**

Fish surveys conducted in 2005 and 2009 observed 15 fish species in McChord Field aquatic habitats. All, but two species (pumpkinseed and brown bullhead), have been observed in the

Morey/Clover Creek system. The species include yellow perch (*Perca flavescens*), rainbow (*Oncorhynchus mykiss*) and cutthroat (*O. clarki*) trout, sculpin (*Cottus* sp.), threespine stickleback (*Gasterosteidae aculeatus*), western brook lamprey (*Lampetra richardsoni*), largescale sucker (*Catostomus macrocheilus*), redbelt shiner (*Richardsoniinus balteatus*), and coho salmon (*Oncorhynchus kisutch*) (found in Clover Creek near the western boundary of McChord Field in 2009).

The EFH designation for the Pacific salmon fishery includes all those streams, lakes, ponds, wetlands, and other water bodies currently or historically accessible to salmon in Washington, Oregon, Idaho, and California, except above the impassible barriers identified by Pacific Fishery Management Council (PFMC) (1999). Of the three salmon species managed by the Pacific Fishery Management Council, only coho or “silver” salmon are found within the proposed project area.

**Species Life Stages within the Project Vicinity:**

Pacific Salmon	Eggs	Larvae	Young Juvenile	Adult	Spawning
Coho (EFH)	X	X	X	X	X
Steelhead (ESA)	Unknown	Unknown	Unknown	Likely	Unknown

Coho salmon are highly migratory at each stage of their life and are dependent on high-quality spawning, rearing and migration habitat. Water depth, water velocity, water quality, cover, and lack of physical obstruction are important elements in all migration habitats. Soon after emergence in spring, fry move from spawning areas to rearing areas. Seaward migration is primarily triggered by photoperiod and usually coincides with spring freshet (Shapovalov and Taft 1954, Chapman 1962, Crone and Bond 1976). During this transition, coho undergo major physiological changes to enable them to osmoregulate in salt water. They are especially sensitive to environmental stress at this time. Coho migrate to the Puget Sound and north, to coastal waters. After about 12-14 months at sea, they migrate along the coast to their natal streams.

Puget Sound steelhead were listed as threatened under the ESA in May 2007 by National Oceanic and Atmospheric Administration Fisheries. Steelhead (*Oncorhynchus mykiss*) are anadromous rainbow trout that spawn in freshwater and migrate to the ocean then return to spawn in their natal freshwater. Steelhead can survive after spawning and can spawn in multiple years. Steelhead spawn in the spring. Steelhead fry emerge from the gravel in summer and generally rear for two or three years in freshwater, occasionally one or four years, depending on the productivity of the stream. They spend their first 1-3 years of life in the freshwater streams where they were born. They then migrate to the ocean where most of their growth occurs. After spending between one to four growing seasons in the ocean, steelhead return to their native freshwater stream to spawn.

Riverine/wetland habitats provide important habitat that serve as spawning, nursery, and rearing habitats. Protecting these habitats is key to providing a productive system and a healthy fishery. An important component of a river system includes the riparian area where vegetation harbors prey items (e.g. insects), contributes necessary nutrients, provides large woody debris that creates channel structure and cover for fish, and provides shade that controls stream temperatures (Bilby and Ward 1991). When vegetation is removed from riparian/wetland areas, waters are heated, and large woody debris is less common. This results in less refuge for fish, fundamental changes in channel structure (e.g. loss of pool habitats), instability of streambanks, and alteration of nutrient and prey structures within the river system.

## Potential Adverse Effects of Proposed Project

The direct and indirect impacts of timber (tree) harvest on aquatic habitat include the loss of riparian habitat functions/habitat that provide: shade (increased water temperature); a food source (drifting aquatic invertebrates and terrestrial insects that fall into the water); and inputs to the stream (large woody debris). These impacts result in the permanent loss of habitat and habitat degradation.

Short-term impacts include:

- Tree cutting and removal along the streambanks, in Clover Creek and within the Clover Creek wetland may cause an increase in turbidity in Clover Creek. The sediment would settle out quickly in the low streamflow and dense vegetation found in Clover Creek during the tree cutting period.

- Tree cutting and removal along the streambanks and within the Clover Creek wetland may cause disturbance of the undergrowth in the area. Some of this vegetation may enter Clover Creek. Since some of the vegetation is non-native and/or invasive, the cutting and removal may result in the downstream spread of some of these species.

Long-term impacts include:

The proposed tree cutting and removal will result in the permanent loss of approximately 584.3 feet of prime riparian/wetland habitat along Clover Creek. The tree cutting and removal could result in the following:

- an increase in the temperatures of the waters due to loss of canopy, no shading of the waters, making the waters less conducive for anadromous and other native fishes;
- the curtailment of food availability for the anadromous fishes;
- the erosion of the resultant unstable streambanks and the addition of sediment to the creek making the habitat less habitable for fish;
- the decrease of cover (refugia) for coho and steelhead at their various life stages;
- the growth of invasive species, especially Scot's broom, reed canarygrass and Himalayan blackberry.



Figure 5: Clover Creek looking downstream at part of the project area where trees will be removed (125 foot section on left (see Figure 2)).



Figure 6: Locust tree on bypass peninsula to be felled in place.



Figure 7: Douglas-firs located along the old dam/overflow channel to be cut.

### **Mitigating Conservation Measures for EFH and ESA**

The following measures will be implemented to minimize the potential adverse effects to designated EFH and steelhead (ESA):

- The proposed tree cutting will remove trees between July 16<sup>th</sup> and October 30<sup>th</sup>, which is the dry, low flow season. However, work would be discontinued should any coho salmon or steelhead be observed in Clover Creek or Morey Creek in the project area. Trees will be cut at their base and root systems will not be disturbed, to ensure minimal erosion impacts.
- No in-water work or walking, etc. in the creek will occur.

- All trees will be felled up the streambanks (upslope). No part of trees to be cut, including limbs, to the extent practicable, will be permitted in the creek or allowed to slide down the streambank into the creek.
- No trees will be felled into or across the creek.
- If trees are cut into 16.5-foot logs, these logs must be deposited on the adjacent upland area and not permitted to fall onto the creek's streambank/wetland.
- Regardless of how the trees are cut, in 16.5 foot logs or a total tree cut, logs or trees will not be skidded up the streambanks, but must be lifted off the streambank to the adjacent upland area to avoid vegetation damage and erosion impacts.
- No willows (shrubs), native shrubs or shrubs planted as part of the Morey Pond Dam bypass project along the streambanks of the Morey Pond Dam Bypass will be cut or removed as part of the project.
- The locust tree within the Morey Dam Bypass peninsula area will be felled in place in a southerly direction and left where it falls. This tree will not be cut into logs. The limbs on the top side of the felled tree will be removed so that no limbs are higher than the trunk of the felled tree. Removing this tree without causing damage to the bypass vegetation and the bypass itself, along with the associated and adjacent naturally seeded upland area would be very difficult and could cause significant impacts. Access to this area is extremely limited and removing the tree would also be a safety issue.
- No pesticide, herbicide, etc. spraying will be part of this action.

### **Conclusion and Effect Determination**

Some potential long-term impacts would result to coho salmon, steelhead or other salmonids or their habitat from the implementation of this project. This project would result in the permanent removal of mature trees that provide shading of Clover Creek, streambank/wetland stability, shelter, and prey species (food) for anadromous fishes.

**No adverse effect** to coho salmon Essential Fish Habitat will result from this project due to the timing of this project and the above mentioned mitigating conservation measures.

This project is **not likely to adversely affect** steelhead in Clover Creek due to the implementation of the above mentioned mitigating conservation measures.

### **References**

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- Chapman, D. W. 1962. Aggressive behavior in juvenile coho salmon as a cause of emigration. *Journal of the Fisheries Research Board of Canada* 19: 1047-1080.
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McChord Air Force Base. 2006. McChord Air Force Base Aquatic Species and Habitat Surveys.

Pacific Fisheries Management Council. 1999. Amendment 14 to the Pacific Coast Salmon Plan. Appendix A: Description and Identification of Essential Fish Habitat, Adverse Impacts, and Recommended Conservation Measures for Salmon. Pacific Fishery Management Council.

Shapovalov, L. and A. Taft. 1954. The life histories of the steelhead rainbow trout (*Salmo gairdneri gairdneri*) and silver salmon (*Oncorhynchus kisutch*). California Department of Fish and Game, Fish Bulletin (98). <http://texts.cdlib.org/view?docId=kt9x0nb3v6>

## APPENDIX B: ESA DETERMINATION FOR STREAKED HORNED LARK

The U.S. Air Force, in partnership with the Department of the Army (Army), proposes to clear all trees and vegetation within the boundaries of the runways 1,000 foot Primary Surface area (Figure 2 of EA) of McChord Field, located at Joint Base Lewis-McChord, WA. The Primary Surface area is required to be level with the runway and have a 0% slope. While most grounds maintenance is maintained in an existing service contract, the proposed action would remove all existing trees within the Primary Surface, that have previously been excluded from compliance with a Waiver from the Air Force. Under the Preferred Alternative, the DoD would remove all trees and vegetation currently penetrating, or having the potential to penetrate, the approach/departure airspace imaginary surface, including those trees within the Clover Creek and associated wetland area, and those trees within streaked horned lark proposed critical habitat.

The clearing of the Primary Surface area would remove over 100 trees east of the runway within the exclusion zone. The trees range in size from three (3) to thirty six (36) inches in diameter, and will be removed in a way to minimize the environmental impact. Where possible, the project will include cutting and grinding stumps flush with existing grade. Trees will be felled and skid in a manner that preserves and prevents damage to surrounding vegetation, soil and infrastructure.

Many trees that are within the Murray Creek riparian area will not be able to be cut at grade. In cases where the tree roots have established themselves within the creek bed, or otherwise have established themselves and/or provide stability to the Creek's slope will be cut in a manner that maintains the integrity of the creek (this is a top priority for the Air Force and Army). Trees will be cut as low as possible (to meet the objective of the project **and** to ensure species like Cotton Woods do not simply re-sprout).

Merchantable timber will be cut, and any excess (branches, large twigs, and stumps) will be cut for fire wood or chipped and moved off-site for composting.

Clearing of the Primary Surface Area will also include:

- Removal of all bluebird boxes that are within the Primary Surface Area. Bluebird boxes will be relocated to the east, just outside of the 1,000 foot clearance area; or a six (6) to seven (7) foot stump will be retained for those trees with bird boxes.
- All tree cutting would be required to be completed between September 1 and March 31 to avoid disturbance to nesting streaked horned lark.
- All removal of Oregon white oaks with a DBH equal to or greater than four (4) inches will be mitigated at a 6:1 ratio. Plantings of the trees will be included within the projects costs and will be at least two (2) inch caliper. Mitigated trees will be planted at the direction of the installation's Fish and Wildlife Program Manager.
- All trees outside of the Primary Surface, that have not been previously cut (i.e. are not already part of the Air Field Maintenance Contract), will be preserved through a Waiver obtained by the Air Field.
- Any landscape features scarred or damaged by the Contractor's equipment or operations shall be restored to the projects natural condition/grade. All skidding damage or ruts and tracks from any source shall be restored to their original condition (topography) and planted with Roemer's fescue (*Festuca roemerii*) at the proper planting period during the year.

- Roemer's fescue will be planted in the two areas (4.05 and 2.93 acres) where all vegetation will be removed. This will be done during the proper planting period during the year.

All staging areas for this project will be located outside of the boundaries of environmentally sensitive areas, including the Clover Creek buffer and proposed Critical Habitat areas. All Contractor furnished equipment must be thoroughly washed off-base and inspected prior to being brought on the base to ensure that no foreign material, including undesirable plant matter, seeds, etc., are introduced to the Air Field. No pesticide, herbicide, etc. spraying will be part of this action.

These proposed tree removal was analyzed to address the potential impacts on streaked horned lark (*Eremophila alpestris strigata*), a proposed Endangered Species Act (ESA) listed species, and their proposed critical habitat.

The proposed action will be a one-time action for tree removal. The contract will require that trees be harvested outside of the nesting time for streaked horned lark, between September 1 and March 31. Subsequent maintenance of the area will be mowed and maintained by the installation's Air Field Service contract, which currently maintains the open areas for the runway. The subsequent maintenance of the proposed tree cutting is also subject to those provisions outlined in the installation's Integrated Natural Resources Management Plan and the recommendations/requirements that have been outlined in previous conferences with the U.S. Fish and Wildlife Service (USFWS). Meetings and email correspondence with the USFWS, indicated that they did not have any concerns with this project, subject that work is conducted in accordance with the mitigation prescriptions that are outlined in the Environmental Assessment.

Because the project will be occurring outside of critical nesting periods and the mitigations that are provided in the scope of work, the project will have no effect on streaked horned lark, and will not destroy or adversely modify proposed critical habitat for the species.

This assessment satisfies the Air Force and the Army's responsibilities under Section 7(c) of the Endangered Species Act at this time. The USFWS and NMFS have directly requested that consultation is not initiated for *no effect* determinations, but a copy of this assessment will be filed for reference. We will continue to remain aware of any change in the status of these species or the listing of any new species and will be prepared to reevaluate potential impacts if necessary.

FWS ESA OK Tree Clearing in McChord Field Airfields Primary Surface Zone project 0813 (2).txt  
From: Jensen, Martha [martha\_l\_jensen@fws.gov]  
Sent: Wednesday, August 14, 2013 1:27 PM  
To: Elliott, Valerie R CIV (US)  
Subject: Re: Tree Clearing in McChord Field Airfield's Primary Surface Zone project (UNCLASSIFIED)

Thanks Valerie  
Yes, this looks fine and should not adversely affect habitat or the species

---

Martha Jensen  
Branch Manager, Federal Activities  
Division of Consultation and Conservation Planning Washington Fish and Wildlife Office  
510 Desmond Dr. SE  
Lacey, Washington 98503  
tel: (360) 753-9000 fax: (360) 753-9008  
email: martha\_l\_jensen@fws.gov

On Tue, Aug 13, 2013 at 9:07 AM, Elliott, Valerie R CIV (US) <valerie.r.elliott.civ@mail.mil> wrote:

Classification: UNCLASSIFIED  
Caveats: NONE

Martha,

I've enclosed a couple of maps and descriptions regarding the tree removals, vegetation clearing and ground grading for this project. The project is to be done outside the window when streaked horned larks are nesting (Apr-Aug). Therefore, our only concern is with the lark proposed critical habitat. We have determined that this project is not likely to adversely affect the lark critical habitat. We would appreciate a concurrence with this determination. Should this project not be completed prior to the lark listing ESA, we will initiate an informal consultation process.

Thanks,  
Valerie

Classification: UNCLASSIFIED  
Caveats: NONE

Figure 9. Section 7 Concurrence from USFWS

**APPENDIX C: FEDERAL CONSISTENCY DETERMINATION FOR McCHORD FIELD PRIMARY  
SURFACE TREE REMOVAL**

August 1, 2013

Washington Department of Ecology  
Coastal Zone Management, Federal Consistency Coordinator  
Post Office Box 47600  
Olympia, Washington 98504

Dear Ecology,

The Department of Army, in cooperation with the U.S. Air Force, has prepared an Environmental Assessment (enclosure) to analyze the impacts of a proposed tree removal at McChord Field airfield. The proposed action is being taken to remove trees that violate the McChord Field airfield's Primary Surface Zone along Clover Creek and Morey Creek.

Joint Base Lewis-McChord (JBLM), McChord Field is located within Pierce County, which is defined in the Washington Coastal Zone Management Program (CZMP) as part of the coastal zone. Therefore, a consistency determination is required to evaluate whether the proposed action will affect Washington's coastal zone or resources. In order to comply with Subpart C of the Federal Consistency Regulation (15 CFR 930) and the Coastal Zone Management Act (§307(c)(1)), as amended, the Army is requesting concurrence for the proposed tree clearing and removal.

The specific components of the proposed project are as follows:

- Clearcut all trees inside McChord Field airfield's Primary Surface Zone, using chain saws and a self-loading truck.
- Remove merchantable timber, tree trunks and large branches from the site.
- Although all existing trees would be removed, seedlings would re-emerge in the area because other trees remain nearby. Long-term maintenance would include additional tree removal in future years to remove trees that regenerate from seed or root structures.

Enclosed is the Federal Consistency Determination for this project. Joint Base Lewis-McChord has determined that this tree removal project will be undertaken consistent with enforceable policies of Washington's Coastal Resources Management Program.

We request your concurrence with our determination. Please provide written concurrence for our records.

If you have any questions or comments, please contact Thomas Olsen, NEPA Program Manager at 253-966-1770 or by email at [Thomas.w.olsen.civ@mail.mil](mailto:Thomas.w.olsen.civ@mail.mil).

Sincerely,

Paul Steucke  
Environmental Division Chief  
Joint Base Lewis-McChord

Enclosures: Federal Consistency Determination  
Environmental Assessment for Tree Clearing in McChord Field's Airfield Primary Surface Zone

# **FEDERAL CONSISTENCY DETERMINATION FOR TREE CLEARING IN MCCHORD FIELD'S PRIMARY SURFACE ZONE**

## **JOINT BASE LEWIS-McCHORD FIELD, WASHINGTON**

This document provides the State of Washington with the U.S. Department of the Army's (Army) Consistency Determination under Section 307(c)(1) of the federal Coastal Zone Management Act (CZMA) of 1972, as amended, for tree clearing/removal in McChord Field's airfield Primary Surface Zone.

### **Proposed Federal Agency Action**

The proposed tree clearing of the Clover Creek and Morey Creek wetland area involves clearcutting all trees within the boundaries of the runway's 1,000 foot Primary Surface Zone (see the blue shaded area in Figure 2 of the EA). The Primary Surface Zone is required to be level with the runway and have a 0% slope. Under the Preferred Alternative, the Army would remove all trees and vegetation currently penetrating, or having the potential to penetrate, the approach/departure airspace imaginary surface, including those trees within the Clover Creek and Morey Creek/wetland area.

Trees species to be cut in the Clover Creek wetland and creek are primarily black cottonwood, Douglas-fir and locust. Approximately 585 linear feet of streambank/wetland (three different areas) along Clover Creek will have trees removed. Locusts will be removed from 125 feet along the south side of Clover Creek just west of the convergence with the Morey Creek bypass. Black cottonwoods and Douglas-firs will be cut on opposite banks upstream from the bypass convergence, 268 feet on the north side and 192 feet on the south side. Trees range in size from three (3) to thirty six (36) inches in diameter, and will be removed in a way to minimize the environmental impact. Trees will be felled upslope and skidded in a manner that preserves and prevents damage to surrounding vegetation, soil and infrastructure.

Many of the trees within the Clover Creek wetland will not be able to be cut at grade. Tree roots that have established themselves within the creek bed, or otherwise have established themselves and/or provide stability to the creek's streambanks will be cut in a manner that maintains the integrity of Clover Creek. Trees will be cut as low as possible (to meet the objective of the project). However, without eliminating the stumps and root systems of the cottonwoods, these trees will re-spout and continue to grow. Trees will be cut and removed to avoid any work in the creek and no damage or minimal damage to the streambank/wetland, which will be rehabilitated. Any landscape features scarred or damaged by the Contractor's equipment or operations shall be restored to the projects original condition/grade. All skidding damage or ruts and tracks from any source shall be restored to their original condition (topography) and planted with appropriate non-tree vegetation.

Merchantable timber will be cut, and any excess (branches, large twigs, and stumps) will be cut for firewood or chipped and moved off-site for composting.

All staging areas for this project will be located outside of the boundaries of environmentally sensitive areas, including the Clover Creek and Morey Creek and their associated wetlands and their buffer areas (50-meter radius). All Contractor furnished equipment must be thoroughly washed off-base and inspected prior to being brought on the base to ensure that no foreign material, including undesirable plant matter, seeds, etc., are introduced to the airfield. No pesticide, herbicide, etc. spraying will be part of this action.



Proposed Project Area (in yellow; red area denotes Clover Creek and Morey creek and their associated wetlands included in the proposed project)

## Background

The CZMA, enacted in 1972, created the National Coastal Management Program for management and control of the uses of and impacts on coastal zone resources. The program is implemented through federally approved state coastal management programs (CMPs).

Federal approval of a state CMP triggers the CZMA Section 307 federal consistency determination requirement. Section 307 mandates that federal actions within a state's coastal zone (or outside the coastal zone if the action affects land or water uses or natural resources within the coastal zone) be consistent to the maximum extent practicable with the enforceable policies of the state CMP. Federal agency actions include direct and indirect federal agency activities, federal approval activities, and federal financial assistance activities. Accordingly, federal agency activities (direct, indirect, or cumulative) reasonably affecting the state's coastal zone must be fully consistent with the enforceable policies of the state's CMP, unless compliance is otherwise prohibited by law. There are no categorical exemptions or exclusions to or from the Section 307 federal consistency requirement.

The state of Washington has developed and implemented a federally approved CMP describing current coastal legislation and enforceable policies. Under the program, activities that impact any land use, water use, or natural resource of the coastal zone must comply with six laws, or “enforceable policies.” These include the Shoreline Management Act, the State Environmental Policy Act, the Clean Air Act, the Clean Water Act, the Energy Facility Site Evaluation Council, and the Ocean Resource Management Act.

### Program and Policy Analysis

Statutes addressed as part of the Washington Coastal Management Program consistency review and considered in the analysis of the proposed action are noted in the following table.

### Washington Coastal Management Program Consistency Review

Statute	Scope	Consistency
Shoreline Management Act	<p>Designates preferred uses for protected shorelines. Provides for the protection of shoreline natural resources and public access to shoreline areas.</p> <p>Protected shorelines include the following:</p> <ul style="list-style-type: none"> <li>- Marine waters;</li> <li>- Streams with greater than 20 cubic feet per second of mean annual flow;</li> <li>- Lakes 20 acres or larger;</li> <li>- Upland areas, e.g., shorelands, that extend 200 feet landward from the edge of these waters; and</li> <li>- Wetlands and floodplains associated with any of the above waters.</li> </ul>	<p><b>NOT APPLICABLE</b></p> <p>The proposed action will have no direct effect on any protected shoreline or shoreline natural resources as defined by the Shoreline Management Act.</p>

## Washington Coastal Management Program Consistency Review

Statute	Scope	Consistency
State Environmental Protection Act	Requires state and local agencies to consider the likely environmental consequences of a proposal before approving or denying the project.	<p style="text-align: center;"><b>NOT APPLICABLE</b></p> <p>The environmental consequences of the proposed action are being reviewed under the National Environmental Policy Act. State and local agencies will be provided an opportunity to review and comment on the environmental impacts of the proposed action. Consequently, a separate State Environmental Protection Act review is not required for the project.</p>
Clean Air Act – Air Quality	Addresses the state’s policy concerning air quality.	<p style="text-align: center;"><b>CONSISTENT</b></p> <p>Portions of Pierce County including southern Tacoma, WA are designated a nonattainment area. The boundary for the nonattainment area is adjacent to the boundary of JBLM, but does not include the Installation. The applicable General Conformity Rule (GCR) de minimis levels for JBLM (Pierce County portion) are 100 tons/year of CO (40 CFR 93.153). The project will not increase air impacts and is in compliance with the Clean Air Act.</p>
Clean Water Act – Water Quality	Addresses the state’s policy concerning water quality and wetlands.	<p style="text-align: center;"><b>CONSISTENT</b></p> <p>No Clean Water Act permits are required for this project.</p>
Ocean Resources Management Act	Addresses the state’s policy for leasing tidal or submerged lands.	<p style="text-align: center;"><b>NOT APPLICABLE</b></p> <p>The project does not include any activities within Washington’s tidal or submerged lands.</p>

## Washington Coastal Management Program Consistency Review

<b>Statute</b>	<b>Scope</b>	<b>Consistency</b>
Energy Facility Site Evaluation Council	Addresses the state's policy for permitting the development of new energy-generating facilities.	<b>NOT APPLICABLE</b>  The proposed action does not reach a threshold to be analyzed by EFSEC.

### Conclusion

We have determined the proposed tree removal in McChord Field airfield's Primary Surface Zone project will be undertaken in a manner consistent to the maximum extent practicable with the enforceable policies of Washington's Coastal Resources Management Program.

## APPENDIX D: INTERAGENCY AND PUBLIC REVIEW AND CORRESPONDENCE

During the project's public comment period, the Army received comments from Chambers-Clover Creek Watershed Council, Washington Department of Fish and Wildlife, and the U.S. Environmental Protection Agency. Response to comments are noted in the following table:

Affiliation of Commenter	Summary of Request or Comment	Department of Army Response
Chambers-Clover Creek Watershed Council (CCCWC)	WCCWC suggests the Army plants lower growing trees over several years to add habitat as mitigation for loss of trees.	The Army appreciates WCCWC's comments and has included mitigation, based on WCCW's recommendations. Shrubs and native vegetation ( $\leq$ 2 meters tall) will be planted along the stream section where trees are removed. Mitigation will also occur outside of the primary surface (within the Transitional Surface) along a 1,000 foot section of Clover Creek.
Washington Department of Fish and Wildlife (WDFW)	WDFW does not support projects that propose to permanently eliminate the functions provided by riparian trees.	Comment noted.
WDFW	WDFW recommends that JBLM adopt buffer widths consistent with WDFW recommendations for Washington's Priority Habitat - Riparian (250 feet buffer).	The Army appreciates WDFW's comment. With the exception of this small section of Clover Creek, the Army maintains a 50-meter buffer area around all riparian and wetland areas within the installation. This project is proposed solely to address life and safety concerns at McChord Field. The small project area is within the <i>Primary Surface</i> area of McChord's runway. Any runway obstructions pose a significant life and safety issue for anyone that flies in and out of McChord Field. Maintaining a riparian buffer in this area is not a viable alternative.
WDFW	If tree removal is unavoidable, WDFW recommends developing a plan that addresses long-term impacts. Suggestions may include: leave cut trees on the ground to provide downed woody material, create snags from trees for food/nesting, planting large-tree native species along Clover Creek in areas outside of clear zone.	The Army has developed mitigation measures to reduce impacts to the riparian habitat. In addition, the Army is consulting with NMFS to address impacts to steelhead and Pacific salmon EFH. Large woody debris is being considered as an optional mitigation.

WDFW	The EA only briefly discusses western gray squirrel and lacks any discussion on the needs of the species and assumes no formal surveys of the area have been conducted for western gray squirrel.	In accordance with §1500.4, the EA did not discuss in-depth, those issues that were not determined to be significant during project scoping. Western gray squirrel was discounted as a significant issue because the Oregon oaks within the project area are lone tree stands in the middle of the airfield, in habitat unsuitable for western gray squirrel.
WDFW	WDFW cannot support any actions that may eliminate occupied western gray squirrel habitat.	Comment noted.
WDFW	WDFW recommends that a complete survey of the project area is completed before project activities commence.	The Army's current budget requires prudent spending in all aspects, including natural resources management and species surveys. At this time, the Army believes it is unlikely that western gray squirrel is present in the proposed project area. The 62 <sup>nd</sup> Airlift Wing and the Department of Agriculture (Wildlife Services) implement McChord Field's Bird/Wildlife Aircraft Strike Hazard Program. Although the program is focused towards depredation and reducing strikes between planes and wildlife, USDA biologists serve as the 'boots on the ground' and are on-site daily monitoring, surveying, and documenting surrounding wildlife. Discussions with the USDA discounted the need to address western gray squirrel during project scoping because they have not been identified during BASH activities. In addition, the proposed project area does not include suitable habitat that would a more in-depth analysis regarding impacts to western gray squirrel.
WDFW	WDFW recommends expanding the EA to include an analysis of impacts to western gray squirrel and minimization/mitigation measures to be taken. The Army can refer to WA Priority Species: Western Gray Squirrel for WDFW's complete recommendations.	The Army is very familiar with WDFW's Priority Species recommendations for western gray squirrel, and frequently utilizes it as a resource in support of western gray squirrel management on the installation. The proposed project already includes mitigation to replace 6 oaks for every one removed. These trees will be planted in an area better suited for long-term recovery of the species, than an active airfield.
WDFW	Mitigation measures should protect oak woodland and include additional surveys to determine the presence of western bluebirds and gray squirrels. Mitigation should also retain connective corridor between oak and	As discussed before, trees that are within McChord Field's primary surface cannot be retained because of the life and safety concerns of anyone who flies in and out of McChord Field. Although the Army has taken a proactive approach at protecting Oregon white oak within the installation, habitat protection cannot trump the safety of those that utilize the runway. Surveys will not be conducted

	the project site and adjacent parcels.	for western bluebirds and gray squirrels. JBLM has taken a proactive approach is recovery of both species. Bluebird populations have increased significantly on the installation due to bluebird boxes that are used for nesting. One bluebird box will be required to be relocated as part of the proposed project, but will be replaced just outside of the 1,000 ft clear-zone. Surveys will not be conducted for western gray squirrel because BASH wildlife studies and existing habitat indicate that they are unlikely to be present within the proposed project area.
WDFW	<p>The preservation of oak habitat is critical to protect declining wildlife species. Specific recommendations include:</p> <ul style="list-style-type: none"> <li>-Do not cut Oregon white oaks except for habitat enhancement</li> <li>-Selectively harvest to improve age-class and structural diversity</li> <li>-Thin encroaching conifers in oak woodlands.</li> <li>-Retain large oaks and standing dead and dying trees</li> <li>-Create snags when thinning instead of removing trees</li> <li>-Leave fallen trees and leaf litter for foraging, nesting, and denning sites</li> <li>-Retain aerial pathways</li> <li>-Conduct prescribed burns where appropriate</li> </ul>	WDFW's recommendations for oak management are specific to oak woodlands, which are not present in the proposed project area. Only 2-3 individual oak trees (which stand by themselves in the middle of the open airfield) have been identified within the project area. These individual oaks will need to be removed for the Army to ensure McChord Field's primary surface zone is compliant with federal airfield regulations. The oaks will be mitigated at a ratio to 6:1 and will be replanted in an area that supports oak woodland habitats and species recovery efforts.
U.S. Environmental Protection Agency (EPA)	Because the dwindling oak woodland/ wetland/ prairie habitat of the south Puget Trough are so biologically rich and rare, any proposed actions that would diminish or inhibit the potential for recovery individual species and species assemblages associated with these habitats are of concern.	<p>Comment noted.</p> <p>Although the Army agrees with the premise of this comment, we disagree that the oaks that would be removed as part of the proposed action currently provide any real habitat value. The proposed oaks that would be removed are essentially lone trees within the middle of the airfield. The oaks would be mitigated at a 6:1 ratio and planted in an open forested area where the Army believes that they would provide greater value to the surrounding species assemblages (pine, firs, prairie open space), in addition to being able to contribute greater 'habitat' value than they would within an airfield.</p>

EPA	EPA urges that all due attention be given to this and similar proposed action that would potentially affect the habitats and species on JBLM.	<p>Comment noted.</p> <p>Although no similar or connected actions were identified during initial project scoping, the Army re-looked at this issue to ensure no 'segmentation' was occurring with the environmental review. We again asked ourselves: "With the exception of this project, are there any future projects (planned, programmed, or funded) that involve tree clearing at McChord Field?" The answer remains 'no'. There are no known plans, or even discussions, to remove additional trees (i.e. to remove trees within the Approach/Departure or Horizontal Surface) at McChord Field.</p>
EPA	EPA points out that the EA states (p. 19) that "the proposed action would result in significant impacts, yet based on the analysis, the proposed action would produce no significant adverse impacts." This statement would benefit from further explanation.	This is a typing error that has been corrected in the Final EA. The sentence now correctly reads: "The proposed action, under either action alternative, would result in <i>no</i> significant impacts."
EPA	<p>Based on information presented in the EA, it can be derived that:</p> <ul style="list-style-type: none"> <li>• The environmental effects of the tree removal in the Morey wetlands and Clover Creek riparian area, as well as other areas designated for clearing, would be long-term or permanent since a treeless condition would be maintained in the future.</li> <li>• Tree removal would potentially exacerbate impaired water quality conditions in the affected streams, which are currently CWA Section 303(d) listed for temperature, dissolved oxygen and fecal coliform.</li> </ul> <p>EPA recommends the final EA addresses the affects of</p>	<p>Changes have been made to the EA to reflect EPA's comments. The Army has expanded its discussion regarding the project's potential impacts to water quality, including impacts to temperature and dissolved oxygen, for affected water bodies.</p> <p>Minor, less than significant short-term and long-term impacts to temperature are expected as a result of the proposed action. The proposed action will remove the trees within the Primary Surface Area which result in the direct and indirect impacts to loss of stream shade and potential increases to the stream temperature. In review of the proposed project these potential impacts were expected to result in minor, less than significant impacts to temperature because of the minimal tree cutting that would occur and the mitigation that was proposed to be implemented with the proposed action.</p> <p>The proposed action will have no direct, indirect, or cumulative impact on dissolved oxygen. Issues with dissolved oxygen are isolated to Morey Pond/Morey Creek, and have been contributed to the muck soils that are characteristic of this pond/wetland habitat. Creeks that are heavily</p>

	tree removal on temperature and dissolved oxygen for affected water bodies, aquatic habitats and species.	associated with marsh and wetland areas are often found to have low dissolved oxygen levels. Outside of Morey Pond, dissolved oxygen has not been an issue within Clover Creek and the proposed tree clearing will have no effect on dissolved oxygen within the Chambers-Clover Creek watershed.
EPA	<p>Based on information presented in the EA, it can be derived that:</p> <ul style="list-style-type: none"> <li>• The potential long-term effects of permanent tree removal to water quality and aquatic habitat may adversely affect ESA-listed salmonids.</li> </ul> <p>EPA recommends that the Army include the results of formal ESA Section 7 consultation, and update information and conclusions regarding environmental consequences on ESA listed species.</p>	The Army's consultation with the National Marine Fisheries Service remains ongoing. Results of the consultation will be included in the Army's FNSI, which will be available for review.
EPA	<p>Based on information presented in the EA, it can be derived that:</p> <ul style="list-style-type: none"> <li>• Tree removal would result in increased establishment of invasive species, such as reed canary grass, Himalaya blackberry and Scot's broom, thereby altering the ecological structure and function of the affected areas.</li> </ul> <p>EPA recommends that the EA address how DoD would prevent, manage, monitor, and restore habitats that would potentially be affected by invasive species due to tree clearing and ground disturbance, in accordance with E.O. 13112 (Invasive Species).</p>	<p>Invasive species, including reed canary grass, Himalaya blackberry and Scot's broom are managed under the JBLM's Integrated Natural Resources Management Plan (INRMP). All of these species currently exist within the proposed project area, and will continue to require management with the implementation of the proposed action or the no action alternative.</p> <p>The spread of invasive species within areas opened up from tree removal should be minimized due to plantings of native species that is occurring as part of the project mitigation.</p> <p>The Army recognizes that even with native plantings, some spreading of invasives is likely to occur. Ongoing management utilizing mechanical, chemical, and hand removal will be conducted, as consistent with the IRNMP and Ecology requirements (i.e. only glyphosate 'Rodeo®' is licensed for use in aquatic systems in Washington).</p>
EPA	As part of the indirect impacts of the project, the	Comment noted.

	<p>EA should analyze and disclose other ecological effects of the proposed action. For example, conversion of forest to open shrub and grassland may result in fields of invasive Scot's broom, which may support heavy rodent populations and subsequent raptor predation, which may, in turn, increase the potential for bird strikes/collisions with aircraft, a significant safety concern.</p>	<p>Although the Army considered indirect effects as part of their proposed action, the Army does not agree with the example of potential indirect impacts that was provided by the EPA, and did not include it within their discussion of potential environmental impacts. The EPA outlined a scenario where indirect effects of the proposed action may increase rodent populations, which may increase raptor predation, which could then increase bird strikes/collisions. The Army felt that this chain of events was flawed in the fact that:</p> <ul style="list-style-type: none"> <li>- There is no real 'conversion' of forest to openspace. Trees will be removed where they are encroaching on the airfield (which mimics prairie habitat). Only 22 trees would be removed from the 4.05 and 2.93 acre areas (outside of the riparian area). Scot's broom dominates the area and will be cut to grade as part of the proposed action.</li> <li>- All vegetation within the 1,000 ft clear zone must be maintained at 0% slope, Himalayan blackberry and Scot's broom will be mowed and maintained within the existing airfield maintenance contract.</li> <li>- The proposed action would remove any potential perching locations within the clear zone, which would be expected to reduce raptor presence within the clear zone. Perching areas (trees) would still be available right outside of the 1,000 ft clear zone, so although trees would be removed, it is not expected to be a limiting factor for birds of prey and no impacts to raptor presence is expected as part of the proposed action.</li> </ul> <p>Bird/Aircraft strikes was not considered as part of the proposed action but are under JBLM's Bird Air Strike Hazard (BASH) Plan which outlines tools to reduce potential hazards and to increase pilot safety.</p>
EPA	<p>The EA provides a brief discussion regarding past tree removals and states that other removals beyond this proposal would require further NEPA analysis. The EPA is concerned that the past, current and potential future tree removals are not sufficiently disclosed or</p>	<p>There are no future tree removals planned, programmed, funded, or even being discussed at this time. Nevertheless, the statement is true. 'If future tree removal projects are proposed that fall outside of the scope of this EA and/or previous analysis, additional NEPA analysis would need to be completed. They would not be covered under this environmental assessment.</p>

	analyzed in the EA.	
	<p>The potential for obtaining waivers for this proposed project and other future projects, which is relevant to the disclosure of environmental consequences, is also not discussed. NEPA documents need to include information regarding the likelihood of implementation and success of mitigation such as obtaining waivers for part or all of the proposed tree removals.</p> <p>EPA recommends that the EA disclose whether or not any waivers for tree removals have ever been granted and, if so, under what circumstances. Given what is known, discuss the potential for obtaining waivers for future tree removals.</p>	<p>Waivers are discussed in UFC 3-260-01 Appendix B. To obtain a temporary or permanent waiver, JBLM's aviation safety officer and airfield manager prepare and initiate waiver requests which are submitted through the installation to the major command. Temporary waivers are for a specified time period during which additional actions to mitigate the situation must be initiated to fully comply with criteria. Permanent waivers are required where no further mitigative actions are intended or necessary.</p> <p>In 2008, the USAF requested that HQ AMC/A7 issue a temporary waiver for trees in the south approach zone until they could be cleared (NEPA completed for the proposed removal in 2007) and a permanent waiver for all remaining trees on- and off-base. The request for a permanent waiver was denied because HQ AMC/A7 determined that there were further mitigative actions that could be completed. A temporary waiver was issued for the entire McChord Field.</p> <p>Again in November 14, 2012, the USAF sent a request to HQ AMC/A7 to approve a permanent waiver for all remaining tree obstructions within the:</p> <ol style="list-style-type: none"> <li>1) Primary Surface</li> <li>2) 7:1 Transitional Surfaces</li> <li>3) 150' Inner Horizontal surface inclusive of Holiday Park</li> <li>4) North 50:1 Approach/Departure Imaginary Surface</li> <li>5) 150 feet Inner Horizontal Imaginary Surface.</li> </ol> <p>The request for a permanent waiver was denied under UFC 3-260-01 criteria which states that a permanent waiver can only be obtained when no further mitigative actions can be completed. A temporary waiver was again issued to McChord Field.</p> <p>If the DoD selects the No Action Alternative for this action, the USAF will continue to remain out of compliance with UFC 3-260-01, and will continue to request temporary waivers for the Primary Surface Zone and all other remaining tree obstructions at McChord Field.</p>
	The EPA indicated that they	As stated above, there are no known tree clearing

	<p>were concerned that the effects of the proposed tree removals are not sufficiently analyzed in a cumulative context. If future additional tree removals are foreseen, it is important that they not be analyzed and conducted in an ongoing, incremental manner without sufficient evaluation of cumulative effect.</p> <p>EPA recommends the final NEPA document provide a robust cumulative effects analysis that clarifies the location, nature, and extent of past, current/proposed, and potential future tree clearing on JBLM, particularly on McChord Field. Include the direct and indirect consequences for habitats and species; military operations, maintenance, and safety; conservation efforts of the military and partner entities; and effects with respect to environmental statutes, including but not limited</p>	<p>projects planned, programmed or funded (outside of the proposed action) at McChord Field. All remaining tree obstructions will remain out of compliance, but a temporary waiver will be requested for them annually. The trees outside of the Primary Surface are less of a safety concern to the Airfield, so they would prefer to maintain them under a temporary waiver.</p> <p>The Army has added information to its cumulative impacts discussion regarding past impacts to water quality. Although this information was previously considered, the value that it provided to the discussion of impacts was discounted because the past impacts to Clover Creek are focused on water quantity, where the project's potential impacts are focused on water quality (temperature and erosion concerns).</p> <p>Nevertheless, more information on cumulative impacts has been included in the Environmental Assessment to adhere to EPA's recommendation for a more 'robust' cumulative effects analysis. At the time of draft publication the Army did not have any project programmed or planned within the Clover Creek area. Since that time, a FEMA report has been submitted to the Army that indicates, two existing culverts need to be replaced with new bridge construction along Clover Creek. The report also stated the need to reinforce the abutments on one the existing roadway bridges to stop slippage into the creek. The projects will not involve any tree clearing, but will require in-water work. The project is still in the initial scoping, and limited information is available at this time. Information that we have has been included in this EA, but further analysis will need to be completed (design of new bridges, NEPA analysis, in-water permitting requirements, etc). The new bridge construction will result in a net-benefit to Clover Creek. The results of this analysis have maintained that the proposed project will result in less than significant cumulative impacts to water quality.</p>
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**APPENDIX E: TREE CUTTING/VEGETATION REMOVAL ESTIMATES AND DESIGNATED CUTTING/REMOVAL PRESCRIPTIONS**



**Area A** – Cottonwood/Douglas fir riparian removal.  
Approximately 44 trees will be removed from this area.

**Area B** – Locust tree riparian removal.  
Approximately 20 locust ‘trees’ will be removed from this area.

**Area C** – Upland tree/brush removal.  
Approximately  
~ 22 10-inch Douglas firs (ranging from 28-40 feet tall)

**Area D** – Upland Oregon white oak removal.  
Approximately 3 oak trees that are isolated from other habitat will be removed.

**Tree removal < 100 trees (~100 trees to be removed)**

**Area A** - Zoomed in section of northern part of project area.

Approximately 40 stems/shoots of cottonwood trees will be removed and 4 Douglas firs.





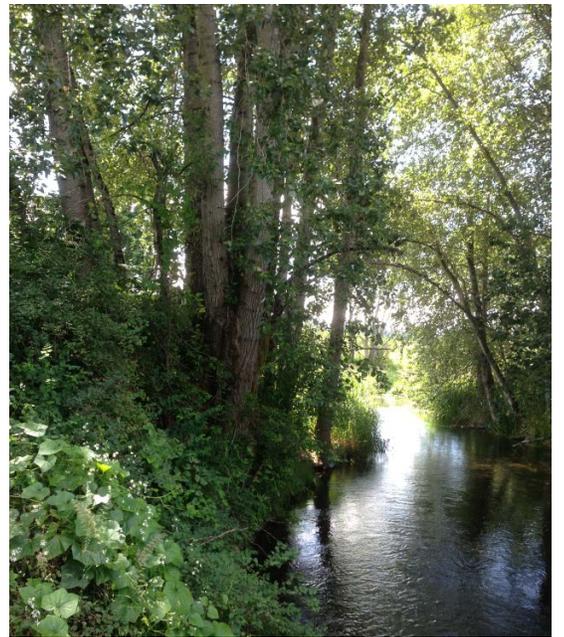
Pod of cottonwood trees and adjacent Douglas firs taken near Morey Pond.



Larger scale of picture above. First three Douglas firs will be removed. The rest of the vegetation that continues to the right (up Clover Creek) will remain.



Cottonwoods  
from stream  
bank



Picture of the single Douglas fir  
to the south of Morey Pond.

**Area B** - Zoomed in section Clover Creek section right before it enters culverts that run under McChord Field.

Approximately 20 stems/shoots of locust trees will be removed from this area.

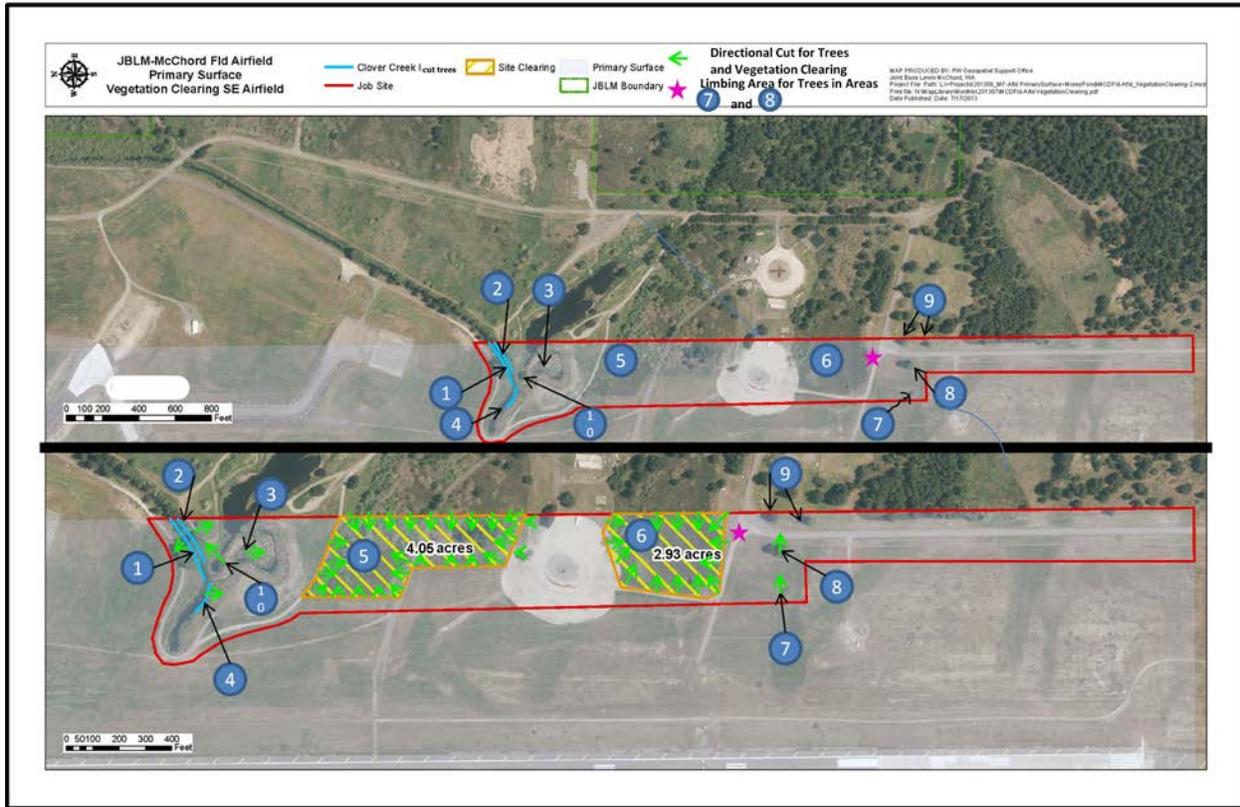


**Area C** – Upland site clearing area. Dominated by Scots broom. Approximately 22 Douglas firs will be removed from these two areas.

Douglas firs height range from 28-40 feet (~10" dbh)



## Tree Clearing Prescriptions



1 Trees, primarily black cottonwoods, removed from the north streambank of Clover Creek will be cut and felled up the streambank (upslope). Trees will be cut at their base or no higher than 1-foot from the ground, when possible, and root systems will not be disturbed, to ensure minimal erosion impacts. If not possible to cut trees at their base without entering Clover Creek, the trees should be cut at a point as close to their base or 1-foot stump height as possible. The remaining stump shall be lower than the height of the streambank. No trees will be felled into Clover Creek, allowed to enter the creek, e.g. sliding down the streambank into the creek, or felled across Clover Creek. Logs or trees will not be skidded up the streambanks, but must be lifted off the streambank to the adjacent upland area to avoid vegetation damage and erosion impacts. If trees are cut into 16.5-foot logs, these logs must not be permitted to fall, slide or roll onto the creek's streambank/wetland. All efforts should be made to prevent limbs from entering Clover Creek. No in-water work or walking, etc. in the creek is allowed. Trees will be cut and removed to avoid causing any damage or very minimal damage to the streambank/wetland and its vegetation, which will be rehabilitated, preferably with Pacific willow stake plantings during the proper planting period and using the proper planting method.

2 Trees, primarily black cottonwoods, removed from the north streambank of Clover Creek will be cut and felled up the streambank (upslope). Core boring of a cottonwood with 24-inch dbh showed it was about 40 years old. Its height above the top of the streambank was about 95 feet with its total height being approximately 101 feet tall. Trees will be cut at their base or no higher than 1-foot from the ground, when possible, and root systems will not be disturbed, to ensure

minimal erosion impacts. If not possible to cut trees at their base without entering Clover Creek, the trees should be cut at a point as close to their base or 1-foot stump height as possible. The remaining stump shall be lower than the height of the streambank. No trees will be felled into Clover Creek, allowed to enter the creek, e.g. sliding down the streambank into the creek, or felled across Clover Creek. Logs or trees will not be skidded up the streambanks, but must be lifted off the streambank to the adjacent upland area to avoid vegetation damage and erosion impacts. If trees are cut into 16.5-foot logs, these logs must not be permitted to fall, slide or roll onto the creek's streambank/wetland. All efforts should be made to prevent limbs from entering Clover Creek. No in-water work or walking, etc. in the creek will occur. Trees will be cut and removed to avoid causing any damage or very minimal damage to the streambank/wetland and its vegetation, which will be rehabilitated, preferably with Pacific willow stake plantings during the proper planting period and using the proper planting method.

3 This is a single locust tree, approximately 38-feet tall, within the Morey Pond Dam Bypass peninsula area. Due to extremely limited access to this site and safety concerns, this tree will be cut and felled in a southerly direction as shown on the map and left in place on the peninsula. This tree will not be cut into logs. The limbs on the top side of the felled tree will be removed so that no limbs are higher than the trunk of the felled tree. No willows (shrubs), other native shrubs or shrubs planted as part of the Morey Pond Dam Bypass project located along the streambanks of the Morey Pond Dam Bypass will be cut or removed as part of the project.

4 These locust trees are located on the south streambank of Clover Creek downstream from the confluence of Clover Creek and the Morey Pond Dam Bypass. These trees are in two areas (one with 50+ trees and the other with 6 trees) with about 50 feet in between them. These trees will be felled away from Clover Creek and its streambank/wetland area, in a southwesterly direction. This site has good native Oregon grape understory that should be protected from damage, if possible.

5 This area has directional cut, vegetation removal and grading restrictions to avoid impacting proposed streaked horned lark critical habitat on the airfield. These are noted on the map. The directional cut is designed so that equipment or vehicles should only be on the west side of the site (the airfield mowed/grassed area) to initiate the tree cutting and vegetation removal. Once initiated, all remaining work should be completed within the site, including the grading. No equipment or vehicles should need to be on the airfield mowed/grassed area or west of this 4.05 acre site after the initial work. Haul routes were designed to avoid this area.

6 This area has directional cut and vegetation removal restrictions to avoid impacting proposed streaked horned lark critical habitat on the airfield. These are noted on the map. The directional cut is designed so that equipment or vehicles should only be on the west side of the site (the airfield mowed/grassed area), on an established dirt road, which is the western boundary of this site, to initiate the tree cutting and vegetation removal. Once initiated, all remaining work should be completed within the site. No equipment or vehicles should need to be on the airfield mowed/grassed area or west of this 2.93 acre site after the initial work. **NOTE:** The area west of the road located on the west side of this site is NOT to be cleared or graded as it is NOT part of this project and would require additional permitting.

7 This denotes 2-3 Oregon white oak trees located almost directly west of the trees at site 8. These trees will be cut in an easterly direction, as shown on the map. They should NOT be limbed

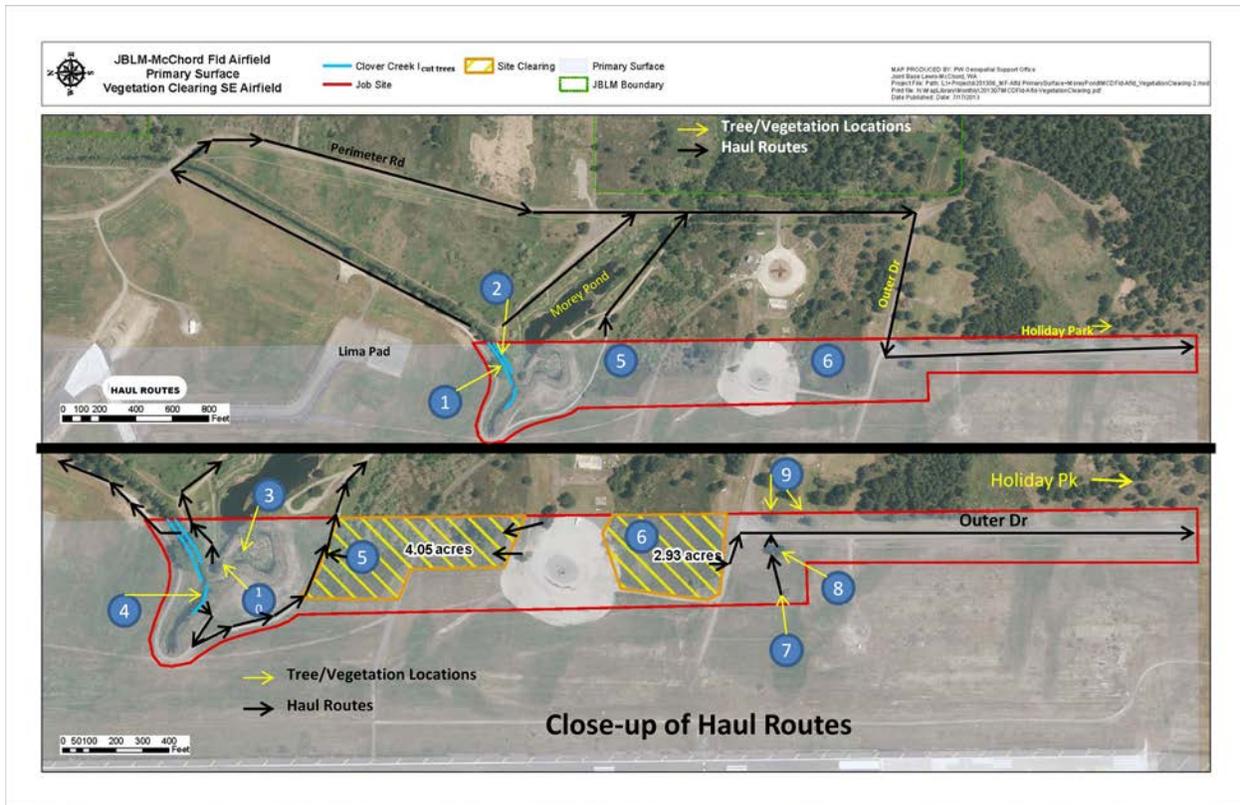
at the site, but should be moved out to Outer Drive, using the route designated on the haul map, and limbed either on Outer Drive, using appropriate precautions, or moved on Outer Drive to the limbing area designated by a ★ on the map. At no time will equipment or transport vehicles travel or park west of this site or deviate north or south from the travel line between this site and site 8.

8 This denotes a couple of trees, a Douglas-fir and black cottonwood, located just west of the paved jogging trail. These trees will be cut in an easterly direction, as shown on the map. They should NOT be limbed at the site, but should be moved out to Outer Drive and limbed either on Outer Drive using appropriate precautions or moved on Outer Drive to the limbing area designated by a ★ on the map.

9 These two (2) trees are Douglas-firs located just to the east of Outer Drive. They can be felled, as appropriate, providing that they don't touch any part of the airfield west of Outer Drive.

10 This site has approximately two Douglas-fir trees. The Douglas-firs are 52 and 57 feet tall. They are located within Morey Pond Dam Bypass peninsula area and along the top of the streambank of the original Morey Pond Dam outflow channel. These trees will be cut so that they fall over/across the original Morey Dam outflow channel (northerly direction). They will be lifted over to the north side of the original Morey Pond Dam outflow channel by crane or truck boom without damaging or impacting the streambanks of the original outflow channel. They can then be limbed and placed on a transport vehicles(s). They will then be transported off the site following the designated haul route.

## APPENDIX F: TREE CUTTING AND VEGETATION REMOVAL DESIGNATED HAUL ROUTES



**1** Trees removed from this area, north streambank of Clover Creek will be taken out by the gravel and paved road that runs northeastward along the north side of Clover Creek. This route will go past Lima Pad (L Pad). Upon reaching Perimeter Road the transport vehicle(s) will continue through a gate to Outer Drive. Note: This gate is a locked gate and access arrangements will need to be made with the appropriate personnel for access. At Outer Drive, vehicle(s) will turn right and proceed off the base or other designated location by an appropriate route.

**2** Trees removed from the south streambank of Clover Creek will be taken out by a dirt/gravel road that runs several feet along the south side of Clover Creek. This road then turns right and continues in an easterly direction, past a gazebo and intersects with Perimeter Road. Transport vehicle(s) will then turn right onto Perimeter Road and proceed to Outer Drive. At Outer Drive, vehicle(s) will turn right and proceed off the base or other designated location by an appropriate route.

**3** This is a single locust tree within the Morey Pond Dam Bypass peninsula area. This tree will be cut and left on the peninsula. No haul routes are necessary for this tree.

4 These locust trees are located on the south streambank of Clover Creek downstream from the confluence of Clover Creek and the Morey Pond Dam Bypass. These trees will be transported using a short segment of an old dirt road. After several feet the transport vehicle(s) will make a sharp left turn onto another dirt/gravel road. At the end of this road, the transport vehicle(s) will turn right onto Perimeter Road and proceed to Outer Drive. At Outer Drive, vehicle(s) will turn right and proceed off the base or other designated location by an appropriate route.

5 This area has directional cut, vegetation removal and grading restrictions to avoid impacting proposed streaked horned lark habitat on the airfield. The removal of trees and cleared vegetation will be to the gravel/dirt road located on the north side of this 4.05 acre area. Transport vehicle(s) need to stay on the road and loading equipment needs to work within the perimeter of the 4.05 acre area. No equipment or vehicles should be on the airfield mowed/grassed area. After loading, the transport vehicle(s) will proceed in an easterly direction. At the end of this road, the transport vehicle(s) will turn right onto Perimeter Road and proceed to Outer Drive. At Outer Drive, vehicle(s) will turn right and proceed off the base or other designated location by an appropriate route.

6 This area has directional cut and vegetation removal restrictions to avoid impacting proposed streaked horned lark habitat on the airfield. The removal of trees and cleared vegetation will be to the gravel/dirt road located on the south side of this 2.93 acre area. Transport vehicle(s) need to stay on the road and loading equipment needs to work within the perimeter of the 2.93 acre area. The area west of the road located on the west side of this area is not to be cleared or graded as it is NOT part of this project. No equipment or vehicles should be on the airfield mowed/grassed area or the previously mentioned area west of this 2.93 acre site. After loading, the transport vehicle(s) will proceed in an easterly direction to the intersection with Outer Drive. At Outer Drive transport vehicle(s) will turn right and proceed off the base or other designated location by an appropriate route.

7 This denotes 2-3 Oregon White oak trees. These trees will be removed by transporting them to site 8 and then over the jogging trail to Outer Drive. At Outer Drive or the limbing point designated by a pink star on the cutting prescription map, transport vehicle(s) will turn right and proceed off the base by an appropriate route. At no time will equipment or transport vehicles travel or park west of this site or deviate north or south from the travel line between this site and site 8.

8 This denotes a couple of trees located just west of the paved jogging trail. These trees will be removed by transporting them over the jogging trail to Outer Drive. At Outer Drive or the limbing point designated by a pink star on the cutting prescription map, transport vehicle(s) will turn right and proceed off the base by an appropriate route. At no time will equipment or transport vehicles travel or deviate north or south from the travel line between this site and Outer Drive.

9 The haul route for these trees will be using Outer Drive, immediately adjacent to the location of these trees. The transport vehicle(s) will proceed on Outer Drive to an off base location or other designated location by an appropriate route.

10

This denotes several Douglas-fir trees located within Morey Pond Dam Bypass peninsula area and along the top of the streambank of the original Morey Dam outflow channel. These trees will be cut so that they fall over/across the original Morey Dam outflow channel. They will be lifted over to the north side of the original Morey Pond Dam outflow channel by crane or truck boom without damaging or impacting the streambanks of the original outflow channel, where they will be limbed. They will then be lifted onto a transport vehicles(s). These trees will be taken out by a dirt/gravel road that runs along the south side of Clover Creek. This road turns right and continues in an easterly direction, past a gazebo and intersects with Perimeter Road. Transport vehicle(s) will then turn right onto Perimeter Road and proceed to Outer Drive. At Outer Drive, vehicle(s) will turn right and proceed off the base or other designated location by an appropriate route.

**NOTE: At no time will any transport vehicle travel over the Clover Creek culverts that are located at the east side of the airfield.**